



YOUR LONDON AIRPORT
Gatwick

*Our northern runway:
making best use of Gatwick*

Preliminary Environmental Information Report Chapter 17: Health and Wellbeing

September 2021

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17 Health and Wellbeing

17.1. Introduction

- 17.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings of the Environmental Impact Assessment (EIA) work undertaken to date concerning the potential effects of the proposal to make best use of Gatwick's existing runways (referred to within this report as 'the Project') on health and wellbeing.
- 17.1.2 The chapter draws from and builds upon Chapter 5: Project Description and the other relevant technical chapters within the PEIR (most notably: Chapter 12: Traffic and Transport; Chapter 13: Air Quality; Chapter 14: Noise and Vibration; and Chapter 16: Socio-economic Effects) which provide the basis of the assessment of the effects on health and wellbeing. For the sake of brevity, this chapter does not repeat text or replicate data from the inter-related technical disciplines.
- 17.1.3 For the purposes of this chapter, health is defined as '*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*' (WHO, 1948). As such, this chapter applies a broad socio-economic model of health that encompasses conventional health impacts such as disease, accidents and risks, along with wider socio-economic health determinants important to achieving good health and wellbeing.
- 17.1.4 In particular, this PEIR chapter:
- sets out the existing and future environmental baseline conditions established from desk studies and consultation with health stakeholders to date;
 - presents the potential environmental and socio-economic effects on health and wellbeing arising from the Project, based on the information gathered and analysis and assessments undertaken to date;
 - identifies any assumptions and limitations encountered in compiling the information; and
 - highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset possible adverse effects or enhance possible beneficial effects identified in the EIA process.
- 17.1.5 This chapter is accompanied by:
- Appendix 17.2.1: Summary of Local Planning Policy: Health and Wellbeing;
 - Appendix 17.3.1: Summary of Stakeholder Consultation; and
 - Appendix 17.6.1: Health and Wellbeing Baseline Conditions.
- 17.1.6 The PEIR will inform pre-application consultation. Following consultation, comments on the PEIR will be reviewed and taken into account in preparation of the Environmental Statement (ES) that will accompany the application to the Planning Inspectorate for development consent.

17.2. Legislation and Policy

Legislation

17.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations) set out, at Regulation 5(2) and Schedule 4, the topics to be assessed within the EIA process, including:

‘(2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors –

(a) population and human health;...’ (Regulation 5(2))

17.2.2 There is no other relevant legislation applicable to this chapter.

Planning Policy Context

National Policy Statements

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

17.2.4 The NPS for National Networks (Department for Transport, 2015) 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 made¹. This has been taken into account in relation to the highways improvements proposed as part of the Project.

17.2.5 Table 17.2.1 provides a summary of the relevant requirements of these NPSs and how these are addressed within the PEIR.

Table 17.2.1: Summary of NPS Information Relevant to this Chapter

Summary of NPS requirement	How and where considered in the PEIR
Airports NPS	
A project level Health Impact Assessment is required (paragraph 1.37)	In the absence of any explicit guidance relating to the assessment of health in EIA, the assessment included within this chapter applies recognised Health Impact Assessment (HIA) guidance and combines this with the regulatory requirements defined for EIA to investigate,

¹ It is noted that the Transport Decarbonisation Plan published by Department for Transport (DfT) on 14 July 2021 announced DfT’s intention to review the NPS for National Networks in due course once demand patterns post-pandemic become clearer. It is understood DfT intends to commence the review by the end of 2021 and complete it by Spring 2023. In the interim and whilst the review is undertaken, DfT has confirmed the NPS for National Networks remains relevant government policy and has full force and effect for the purposes of the Planning Act 2008

Summary of NPS requirement	How and where considered in the PEIR
	inform, assess and effectively communicate how and where all health issues and opportunities are addressed.
The application should include and propose health mitigation, which seeks to maximise the health benefits of the scheme and mitigate any negative health impacts (paragraph 1.37)	The approach draws from and builds upon mitigation outlined by the inter-related technical disciplines to not only reduce any potentially adverse impacts, but also enhance health and wellbeing opportunities where possible. Any recommended mitigation or enhancement measures will seek to support the delivery of local health objectives. Mitigation measures included as part of the Project are set out in Section 17.8.
Where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant health impacts (paragraph 4.72).	This has been addressed through the provision of this health and wellbeing PEIR chapter and will be considered further through the ongoing EIA and consultation process prior to the final submission.
The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, the Examining Authority and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health (Paragraph 4.73).	The approach draws from and builds upon the inter-related technical disciplines to consider all tangible environmental and socio-economic changes and activities with the potential to influence health and wellbeing, including cumulative effects. Mitigation measures are set out in Section 17.8.
National Networks NPS	
Where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant adverse health impacts (paragraph 4.81)	This has been addressed through the provision of this Health and Wellbeing chapter and will be considered further through the ongoing EIA and consultation process prior to the final submission.
The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health (paragraph 4.82).	The approach draws from and builds upon the inter-related technical disciplines to consider all tangible environmental and socio-economic changes and activities with the potential to influence health and wellbeing, including cumulative effects. Mitigation measures are set out in Section 17.8.

National Planning Policy Framework

- 17.2.6 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) sets out the planning policies for England. Promoting healthy and safe communities is a central theme, whereby the NPPF states that planning policies and decisions

should aim to achieve healthy, inclusive and safe places which promote social interaction (including opportunities for meetings between people who might not otherwise come into contact with each other), are safe and accessible, and enable and support healthy lifestyles (paragraph 92).

- 17.2.7 The National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019) supports the NPPF and provides guidance across a range of topic areas, including 'healthy and safe communities'. As stated in the NPPG, planning and health need to be considered firstly in terms of creating environments that support and encourage healthy lifestyles, and secondly in terms of healthcare capacity. In addition, engagement with individuals and/or organisations, such as the relevant Director(s) of Public Health, will help ensure local public health strategies and any inequalities are considered appropriately.

Other Relevant National Planning Policy

Aviation Policy Framework (2013)

- 17.2.8 While the Aviation Policy Framework (Department for Transport, 2013) does not include health and wellbeing as a specific focus area, its protection remains an important consideration throughout, via commitments to mitigate environmental health determinants (namely air quality and noise), which act as precursors to health and wellbeing outcomes.
- 17.2.9 In terms of air pollution from aviation activities and associated transport movements, the government's objective is to meet relevant legal obligations to ensure appropriate health protection. In addition, through the government's commitment to mitigate climate change impacts associated with carbon dioxide (CO₂) emissions, there would be a consequent reduction in non-CO₂ emissions (such as oxides of nitrogen (NO_x)) which are hazardous to human health but more poorly understood as climate change contributors.
- 17.2.10 Regarding noise, the government seeks to strike a balance between the negative impacts of noise, such as on health and wellbeing, and the positive economic impacts of aviation. A general principle is to ensure that benefits from future growth are shared between the aviation industry and local communities. As such, the industry should continue to reduce and mitigate noise as airport capacity grows, with the government's policy on aviation noise consistent with agreed international approaches and relevant European laws.
- 17.2.11 For night-time noise specifically, the government recognises the health costs associated with sleep disturbance, but also that certain types of flights, which are valuable to the UK economy, may only be viable if they operate during the night-time period. As such, there is an expectation that the aviation industry will make extra efforts to reduce and mitigate noise from night flights and voluntary approaches are commended.

Aviation Strategy (Green Paper): Aviation 2050 – The Future of UK Aviation Policy (2019)

- 17.2.12 One of the objectives of the Aviation Strategy to 2050 and beyond (Department for Transport, 2018b) is to support growth while tackling environmental impacts. While the primary focus of environmental-related strategy is on addressing carbon emissions, air quality and noise, the protection of health and wellbeing is a key factor. As set out above, commitments to mitigate environmental health determinants act as precursors to health and wellbeing outcomes.

- 17.2.13 The government recognises air pollution as the top environmental risk to health in the UK and is therefore aiming to improve air quality. Specifically, the Clean Air Strategy (Defra, 2019) sets out the ambition to reduce the harm to health from air pollution by half. Of particular concern are levels of nitrogen oxides. While concentrations have improved in recent years, compliance with ambient air quality legislation remains challenging in some areas of the UK. Pollutants associated with aviation come from airborne aircraft, from ‘airside’ operations such as taxiing and airside equipment, and from passengers and staff (and other airport users) travelling to and from airports. As the largest source of air pollution is from users of the airport travelling to and from airports, action taken to address potential health effects from air quality should focus on surface access strategies and airport transport forums.
- 17.2.14 The government also recognises that disturbance from aircraft noise has negative impacts on health and wellbeing, and that the public are particularly sensitive to aircraft noise exposure, as opposed to noise exposure associated with other modes of transport.
- 17.2.15 The government intends to set a new objective to limit aviation noise to reduce total adverse effects on health and wellbeing. While the government agrees with the ambition to reduce noise as detailed within the World Health Organization (WHO) environmental noise guidelines for the European region (WHO, 2018), the government wants to ensure any policy is underpinned by the most robust evidence on these effects, including the total cost of action and recent UK specific evidence which the WHO report did not assess.

Local Planning Policy

- 17.2.16 Gatwick Airport is located in the county of West Sussex and immediately adjacent to the bordering county of Surrey to the north. The airport lies within 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. The administrative area of Tandridge District Council is located approximately 1.9 km to the east of Gatwick Airport, while Mid Sussex District Council lies approximately 2 km to the south east.
- 17.2.17 The relevant local planning policies specific to health and wellbeing based on the extent of the study area for this assessment are summarised in Table 17.2.2. Further details are provided in Appendix 17.2.1.

Table 17.2.2: Local Planning Policy

Administrative Area	Plan	Policy
Adopted Policy		
Crawley Borough Council	Crawley 2030: Crawley Borough Local Plan 2015-2030 (2015)	Policy ENV10: Pollution Management and Land Contamination
		Policy ENV11: Development & Noise
		Policy GAT1: Development of the Airport with a Single Runway

Administrative Area	Plan	Policy
Reigate and Banstead Borough Council	Reigate and Banstead Local Plan Development Management Plan 2018-2027 (2019)	Policy DES9: Pollution and contaminated land
	Reigate and Banstead Local Plan: Core Strategy 2014	Policy CS5: Valued People & Economic Development
Horsham District Council	Horsham District Planning Framework (excluding South Downs National Park)	Policy 24: Environmental Protection
Mid Sussex District Council	Mid Sussex District Plan 2014-2031 (2018)	Policy DP24: Leisure, Cultural & Recreational Activities
		Policy DP25: Community Facilities & Local Services
		Policy DP29: Noise, Air and Light Pollution
Tandridge District Council	Tandridge District Core Strategy (2008)	No local policies directly applicable to health and wellbeing
Emerging Policy		
Crawley Borough Council	Draft Crawley Borough Local Plan 2021-2037 (2021)	Policy SD2: Enabling Healthy Lifestyles and Wellbeing
		Policy GAT1: Development of the Airport with a Single Runway
		Policy EP3: Pollution Management and Land Contamination
		Policy EP4: Development and Noise
		Policy EP5: Air Quality
Tandridge District Council	Our Local Plan 2033 (Regulation 22 Submission) (2019)	Policy TLP17: Health and Wellbeing
		Policy TLP46: Pollution and Air Quality
Horsham District Council	Draft Horsham District Local Plan 2019-2036 (2020)	Policy 25 - Strategic Policy: Environmental Protection
		Policy 32 - Local Greenspace
		Strategic Policy 45: Inclusive Communities, Health and Wellbeing
Mole Valley	Future Mole Valley 2018-2033: Consultation Draft Local Plan (2020)	EN5: Inclusive Environment
		EN13: Promoting Environmental Quality
		INF1: Promoting Sustainable Transport and Parking

17.3. Consultation and Engagement

- 17.3.1 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 phases 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.

- 17.3.2 Following consultation with the statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 11 October 2019.
- 17.3.3 Key issues raised during the scoping process specific to health and wellbeing are listed in Table 17.3.1, together with details of how these have been addressed within the PEIR. Further details of individual consultee scoping responses are provided in Appendix 17.3.1.

Table 17.3.1: Summary of Scoping Responses

Reference	Details	How/where addressed in the PEIR
Planning Inspectorate: 11 October 2019		
4.11.1	The Scoping Report states that the majority of the operational workforce would originate from within the region, with no material change in demography or associated health care requirements. However, the Inspectorate does not agree that population impacts (ie change in local demography) should be scoped out during construction or operation, on which basis the Inspectorate also does not agree that health effects arising from population change should be scoped out.	Changes in local healthcare capacity associated with population changes are discussed in Section 17.9 and will be explored in greater detail within the ES following further consideration regarding health service provision.
4.11.2	The Inspectorate agrees that, as any electricity supply infrastructure for the Proposed Development would be compliant by design, and within guideline exposure levels set to protect public health, electric and magnetic field (EMF) risk is unlikely to result in significant effects and can be scoped out of the ES. However, the Inspectorate welcomes the commitment that EMF concerns should be addressed if raised during consultation.	A 'Risk Perception' section, which addresses health effects from EMF, has been provided at the end of Section 17.9 to address any potential key areas of concern.
4.11.3	The Inspectorate agrees that the effects of climate change can be scoped out of the health assessment as they will be addressed within the Climate Change and Carbon chapter of the ES, but would expect to see adequate cross-referencing and signposting to the matter within the health chapter of the ES.	Effects of climate change are addressed in Chapter 15: Climate Change and Carbon with cross references made in other chapters, where required.

Reference	Details	How/where addressed in the PEIR
4.11.4	<p>The Inspectorate is content that any effects from major accidents can be scoped out of the health and wellbeing assessment, as they will be considered as part of the assessment of Major Accidents and Disasters.</p> <p>The Inspectorate is also content that the risk of transmission of communicable diseases can be scoped out, as it is managed through International Health Regulations. However, the Inspectorate advises that the ES provides an explanation of how the risk is to be controlled.</p> <p>A statement was made in the Scoping Report that impacts of changes to Public Safety Zones will be addressed in the section on Major Accidents and Disasters. However, there was no reference to assessing such changes in the Major Accidents and Disasters section of the Scoping Report. As such, the Inspectorate does not agree that risks from changes to Public Safety Zones can be scoped out of the ES.</p>	<p>It is noted that the Inspectorate is content that any effects from major accidents can be scoped out of the health and wellbeing assessment on the basis that this is covered in Appendix 5.3.3 (Major Accidents and Disasters).</p> <p>Regarding risk of transmission of communicable diseases, further explanation of the management of this issue, through International Health Regulations, is provided in the Risk Perception sub-section of Section 17.9.</p> <p>Effects in relation to Public Safety Zones will be considered once the outcome of the Civil Aviation Authority's consultation on standardising Public Safety Zones is known.</p>
4.11.5	<p>The Inspectorate agrees that the commitments to ensuring control of pests should be sufficient to ensure significant effects on public health are unlikely and can be scoped out. However, the Inspectorate advises that the ES contains a summary of this matter and an explanation of the measures to be provided in the Code of Construction Practice.</p>	<p>Appendix 5.3.1 (Outline Code of Construction Practice), sets out the measures that GAL and its contractors would be required to implement for all construction activities associated with the Project. These measures have been identified during the design of the Project and as part of the EIA process. They include strategies, control measures and monitoring procedures, for managing the potential environmental impacts during the construction phase and limiting disturbance from construction activities as far as reasonably practicable, including pest control (Section 5.6).</p>
4.11.6	<p>Despite the implementation of the lighting strategy, the scale and location of any requisite lighting had not yet been determined during scoping. The Inspectorate does not consider it possible to rule out any likely significant effects on health from the impact of light pollution without this information and</p>	<p>Potential health effects from permanent lighting associated with design and temporary construction lighting required to provide a safe and appropriate working environment, are addressed in Section 17.9.</p>

Reference	Details	How/where addressed in the PEIR
	therefore, does not agree that this can be scoped out.	
4.11.7	The Inspectorate agrees that operational effects on staff wellbeing can be scoped out of the ES as this will be managed in accordance with existing procedures and would be regulated by the Health and Safety at Work Act. However, the Inspectorate advises that the ES contains a summary of existing procedures to provide assurances that there would be no likely significant effect.	Occupational health is covered within Section 17.9. It is recognised that, while this is covered under the Health and Safety at Work Act 1974, existing and future occupational health provision will be explored further at the ES stage.
4.11.8	The Inspectorate advises that the health and wellbeing assessment methodology is discussed and agreed with relevant consultation bodies, prior to the commencement of the assessment.	A health forum has been set up with representatives from West Sussex County Council and Surrey County Council, whereby the proposed methodology was discussed. Feedback from the health forum was taken into consideration during the development of the PEIR. There will be continuing engagement with the health forum to test and refine the final ES, and any health-related mitigation and enhancement measures provided.
4.11.9	The Inspectorate acknowledges that the study area will vary depending on the issue being explored (eg air quality or surface transport), but states that the study areas should be sufficiently broad to account for the transient nature of noise, of effects on air and water quality, and vehicle movements. The Applicant is advised to make efforts to agree study areas for these different issues with relevant consultation bodies. It should be clear in the text of the ES, which study area is being applied and a clear cross reference to the relevant sections of other chapters should be made, where relevant.	The study areas are tailored to the individual health determinants investigated. Health determinants such as air quality, noise and socio-economics, include a broad study area to consider the distribution and magnitude of change upon public health. The study area methodology is discussed in more detail in Section 17.4.
4.11.10	The ES should consider not only the effects of safety and community connectivity, but also any likely significant health effects on non-motorised users (for example through losses or changes to public rights of way, open space and the existing road network) and on community severance.	The health and wellbeing assessment (Section 17.9) relating to changes in transport nature and flow rate analyses impacts on: severance; pedestrian and cyclist amenity; and accidents and safety. In addition, a section on health and wellbeing effects from changes to lifestyle factors is included, which addresses the impacts

Reference	Details	How/where addressed in the PEIR
		associated with loss or changes to public rights of way and open space.
4.11.11	For the avoidance of doubt, the Inspectorate considers that impacts on water quality, flood risk and ground conditions should be assessed in the health and wellbeing chapter.	Included within Section 17.9.
4.11.12	The Scoping Report has not identified potential sensitive receptors. These should be identified in the ES, with consideration given to vulnerable groups who might be disproportionately affected by the Proposed Development.	Further detail on the potential sensitive receptors relevant to health and wellbeing, is provided in Section 17.4 where the study area is also discussed in more detail.
4.11.13	The ES should assess the impact on local primary health care, acute services and emergency responders from additional passenger movements, where these are likely to result in significant effects.	Health and wellbeing effects from changes to local healthcare capacity are addressed in Section 17.9.

17.3.4 Key issues raised during consultation and engagement with interested parties specific to health and wellbeing are listed in Table 17.3.2, together with details of how these issues have been addressed within the PEIR.

Table 17.3.2: Summary of Consultation

Consultee	Date	Details	How/where addressed in the PEIR
Local Authority Economics and Employment Topic Working Group			
Representatives from: Crawley; Tandridge; Reigate & Banstead; Mole Valley; West Sussex; Surrey; Horsham; Mid Sussex; and East Sussex.	28 August 2019	Included a presentation on discussion of the proposed scope and methodology of the health and wellbeing chapter.	Session outputs informed and refined the content of the health and wellbeing chapter and helped finalise the purpose of the proposed Health Forum and its participants.
Inaugural Health Forum Meeting			
Representatives from West Sussex County Council and Surrey County Council Public Health Teams.	18 September 2019	Introduced the Project, proposed scope and methodology of the health and wellbeing chapter to the Health Forum made up of key health stakeholders. Discussion focused on: the DCO process; health and wellbeing assessment	Session outputs informed and refined the content of the health and wellbeing chapter, mitigation and support initiatives.

Consultee	Date	Details	How/where addressed in the PEIR
		scope/approach; and local public health circumstance, priorities and need to inform potential mitigation or enhancement measures.	

17.4. Assessment Methodology

Relevant Guidance

- 17.4.1 The EIA Regulations reinforce the consideration of health within the planning and assessment process, but do not provide definitive guidance on the approach, process or methodology to follow.
- 17.4.2 Taking this into consideration, it is considered appropriate for the health and wellbeing chapter to apply recognised Health Impact Assessment (HIA) guidance and other relevant guidance, and combine this with the requirements defined for EIA to investigate, inform, assess and effectively communicate how and where all health issues and opportunities are addressed.
- 17.4.3 The following guidance has been taken into account in undertaking the assessment:
- A Critical Guide to HIA (West Midlands Public Health Observatory, 2007);
 - Health Impact Assessment: A practical guide (Chadderton, *et al.*, 2012);
 - Fair Society, Healthy Lives: The Marmot Review. Strategic review of health inequalities in England post-2010 (Marmot, *et al.*, 2010);
 - Healthy Lives, Healthy People: Our strategy for public health in England (Department of Health, 2010);
 - National Planning Practice Guidance: Health and wellbeing (Ministry of Housing, Communities & Local Government, 2019);
 - Design Manual for Roads and Bridges (DMRB) LA112: Population and Health (Highways England, 2020a); and
 - Reuniting Health with Planning - Healthier Homes, Healthier Communities (Ross & Chang, 2012).

Scope of the Assessment

- 17.4.4 The scope of this PEIR has been developed in consultation with relevant statutory and non-statutory consultees as set out in Table 17.3.1 and Table 17.3.2. The assessment scope focuses on a range of environmental, social and economic determinants with the potential to influence health and wellbeing, either adversely or beneficially.
- 17.4.5 Taking into account the scoping and consultation process, Table 17.4.1 summarises the issues considered as part of this assessment.

Table 17.4.1: Issues Considered within the Assessment

Activity	Potential Effects
Construction Phase (including Demolition): Health and Wellbeing	
Construction and demolition activities within existing airport boundary, including construction of upgraded highway junctions and associated changes in surface transport	Environmental (changes in air quality, the water environment, ground conditions, noise and light exposure from construction activities and road traffic).
	Transport (severance, pedestrian/cyclist amenity, risk of accident and injury).
	Lifestyle (access to open space, barriers to physical activity etc.).
	Socio-economic (employment opportunities and associated income generation).
	Impacts on local healthcare capacity from the introduction of a large workforce.
	Health risks from pests.
Operational Phase: Health and Wellbeing	
Use of the airport, including upgraded highway junctions	Environmental (changes in air quality, the water environment, ground conditions, noise and light exposure from operational activities, eg aircraft/support operations/road traffic).
	Transport (severance, pedestrian/cyclist amenity, risk of accident and injury).
	Lifestyle (access to open space, barriers to physical activity etc.).
	Socio-economic (employment opportunities and associated income generation).
	Impacts on local healthcare capacity from changes to the operational workforce and increase in passenger throughput (on Port Health).
	Extended operational hazards (specifically, the risk of transmission of communicable diseases). Changes to Public Safety Zones will be considered once the outcome of the Civil Aviation Authority's consultation on standardising Public Safety Zones is known.

17.4.6 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 17.4.2.

Table 17.4.2: Issues Scoped Out of the Assessment

Issue	Justification
Health and wellbeing effects from exposure to electric and magnetic fields	All overhead power lines, underground cables or substations operating at ≤132 kV are compliant with guideline exposure levels set to protect public health by design. All electricity supply infrastructure for the Project will comply with this guideline exposure limit.
Health and wellbeing effects associated with climate change	Climate change is addressed within Chapter 15: Climate Change and Carbon.

Study Area

17.4.7 The study area presented within the Scoping Report consisted of the local authority districts of Crawley and Reigate and Banstead and was considered suitable for the purposes of profiling the population in the immediate vicinity of the Project. For the purposes of the assessment, this study

area has been reviewed in light of baseline information and likely changes to health determinants outlined by the inter-related technical disciplines. While the local authority districts of Crawley and Reigate and Banstead provide a localised insight to health circumstances, some health determinants would be wider reaching. An updated study area has been applied for 1) environmental health determinants, and 2) socio-economic health determinants, which is described in more detail below.

- 17.4.8 Environmental health determinants (such as changes to air quality and noise exposure) are likely to have a more local impact where potential change in hazard exposure is limited by physical dispersion characteristics. As a result, the local study area for health-specific baseline statistics relating to population and human health effects focuses on the local authority districts of: Crawley, Reigate and Banstead, Tandridge, Mid Sussex, Horsham and Mole Valley, using regional and national averages as comparators.
- 17.4.9 The socio-economic health determinant study area remains consistent with the largest study area defined in Chapter 16: Socio-economic Effects, and comprises the County areas of East Sussex, West Sussex, Surrey, Kent and Brighton and Hove ('Five Authorities Area').
- 17.4.10 The study area defining the relevant sensitive receptors identified for assessment purposes remains consistent with the inter-related technical disciplines assessed within the PEIR, which the health and wellbeing topic relies upon.

Methodology for Baseline Studies

Desk Study

- 17.4.11 Different communities have varying susceptibility to health and wellbeing effects (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstances.
- 17.4.12 The approach to defining the baseline involved collation and interpretation of published demographic, socio-economic and existing public health and healthcare capacity data. The following open source websites and datasets have been used in order to develop the health and wellbeing baseline:
- Office for National Statistics;
 - NOMIS;
 - Ministry of Housing, Communities and Local Government;
 - Public Health England Fingertips Health Profile Tool;
 - Public Health England Local Health Tool;
 - NHS Quality Outcomes Framework (QOF) Database; and
 - NHS Digital.
- 17.4.13 In addition, the relevant Joint Strategic Needs Assessment (JSNA) reports have been analysed to provide additional context on local health circumstances, inequalities and public health priorities (health protection, health promotion and health care). These reports partly draw from the open source websites and datasets detailed above.
- 17.4.14 These baseline data have been used to better understand local health and socio-economic circumstances. Where quantitative assessment methods are being applied, locally specific parameters can be used within equations used to predict changes in baseline population health,

and then assess the significance of an effect. Understanding the existing baseline socio-economic and health status within the study area also supports bespoke mitigation and community support initiatives tailored to local circumstances and need, where appropriate.

Assessment Criteria and Assignment of Significance

- 17.4.15 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. 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, sensitivity and significance are based on, and have been adapted from, those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020b), which is described in further detail in Chapter 6: Approach to Environmental Assessment.

Receptor Sensitivity/Value

- 17.4.16 Within a defined population individuals will range in level of sensitivity due to a series of factors such as age, socio-economic deprivation, and the prevalence of any pre-existing health conditions which could become exacerbated. Sensitive individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially), whereby they could experience disproportionate effects when compared to the general population.
- 17.4.17 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than for someone of working age who has good respiratory health. On the other hand, an individual who has been unemployed for a long period of time would benefit more from employment opportunities generated by the Project in comparison to an individual who is already employed.
- 17.4.18 An extensive amount of baseline data has been collected in order to interpret local health circumstances. This information is set out in Appendix 17.6.1: Health and Wellbeing Baseline Conditions and summarised within Section 17.6. Overall, it is concluded that local health circumstances are good. As an example of this conclusion, health deprivation data (provided by the Index of Multiple Deprivation) show that within the local study area, the mean, median and modal deprivation deciles for all Lower Super Output Areas (LSOAs) are 8, 9 and 10 – where 10 represents areas within the least deprived 10% of all LSOAs in England and 1 represents the most deprived 10% of all LSOAs in England.
- 17.4.19 As such, when looking at the population in general, the existing burden of poor health is low. However, it is recognised that there will be individuals within a defined population who are particularly sensitive and could experience disproportionate effects. On this basis, a precautionary approach has been applied by assuming that the population within the study area is of uniformly high sensitivity.

Magnitude of Impact

- 17.4.20 The criteria for defining magnitude in this chapter are outlined in Table 17.4.3.

Table 17.4.3: Impact Magnitude Criteria

Magnitude of Impact	Definition
High	Change in environmental or socio-economic factor sufficient to result in a major change in baseline population health or socio-economic circumstance (adverse or beneficial).
Medium	Change in environmental and socio-economic factor sufficient to result in a moderate change in baseline population health or socio-economic circumstance (adverse or beneficial).
Low	Change in environmental and socio-economic factor sufficient to result in a minor change in baseline population health or socio-economic circumstance (adverse or beneficial).
Negligible	Change in environmental and socio-economic factor below that for which it is possible to result in any manifest health outcome at a population level but may impact at an individual level (adverse or beneficial).
No Change	No opportunity for change in health outcome or socio-economic circumstance (adverse or beneficial).

Significance of Effect

- 17.4.21 The significance of the effect 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 17.4.4. Where a range of significance levels are presented, the overall assessment for each effect is based upon expert judgement.
- 17.4.22 In all cases, a precautionary approach has been applied by applying a uniformly high receptor sensitivity and the evaluation of impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.
- 17.4.23 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 17.4.4: 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

17.5. Assumptions and Limitations of the Assessment

- 17.5.1 The health and wellbeing assessment partially draws from and builds upon the technical outputs from inter-related technical disciplines, namely: Chapter 8: Landscape, Townscape and Visual Resources; Chapter 10: Ground Conditions; Chapter 11: Water Environment; Chapter 12: Traffic and Transport; Chapter 13: Air Quality; Chapter 14: Noise and Vibration; Chapter 16: Socio-economic Effects; and Chapter 18: Agricultural Land Use and Recreation.
- 17.5.2 As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter (eg for modelling work undertaken). However, it is considered that the information available provides a suitable basis for a preliminary assessment of health and wellbeing for the purposes of this PEIR.
- 17.5.3 This assessment has been based on estimates of how the aircraft fleet will transition over time, based on assumptions around airlines' fleet procurement programmes and business models. The 'central case' used in this assessment is based on what is considered today to be the most likely rate of fleet transition. Any implications of a slower transition fleet will be reviewed for the ES.

17.6. Baseline Environment

Current Baseline Conditions

Introduction

- 17.6.1 Different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstances.
- 17.6.2 The aim of the following information, which summarises the more detailed health and wellbeing baseline information provided in Appendix 17.6.1, is primarily to put into context the local health circumstances of the communities within the local and wider study area. It should be recognised that in describing the whole population, and the populations within the local and wider study area, there will be some individuals or groups of people who do not conform to the overall profile. In addition, specific parameters used within quantitative health assessments are referenced towards the end of this section.
- 17.6.3 Furthermore, baseline environmental conditions referenced in the relevant technical disciplines are used within quantitative health assessments where appropriate. For the sake of brevity, these are not replicated within this section.

Demography, Deprivation and Socio-economic Indicators

- 17.6.4 The age structure in the local and wider study areas has higher proportions of the population aged 5 to 14 years and 40 to 80+ years, and a lower proportion of the population aged 15 to 34 when compared to the national average. Total population growth in the local and wider study areas between the years of 2011 and 2019 have exceeded the national average by 0.7% and 0.6% respectively.
- 17.6.5 The local study area is relatively affluent, where for overall deprivation levels there are no Lower Super Output Areas (LSOAs) within the local study area categorised in the 20% most deprived nationally, and 47% of the LSOAs within the local study area are categorised in the 20% least

deprived nationally. For the health domain specifically, there are also no LSOAs within the local study area categorised within the 20% most deprived nationally, and 61% of the LSOAs within the local study area are categorised in the 20% least deprived nationally. The areas with the highest levels of overall deprivation in the local study area are in the south west of Crawley (Southgate and Broadfield areas), with the least deprived areas located in the eastern half of Crawley (Pound Hill, Maidenbower) and in the northern parts of Horley.

- 17.6.6 For further information on socio-economic circumstances, which are a key determinant of health, refer to Chapter 16: Socio-economic Effects.

Physical and Mental Health Indicators

- 17.6.7 Male and female life expectancy and healthy life expectancy (ie the amount of years spent in good health) in the local study area are both higher than the regional and national averages. Life expectancy and healthy life expectancy for males and females in the wider study area are also higher than the national average, but are more comparable to the regional average.
- 17.6.8 All-age all-cause mortality in the local study area is lower than both the regional and national averages; Crawley has the highest all-age all-cause mortality within the local study area. In the wider study area, all-age all-cause mortality is also lower than the national average, but higher than the regional average.
- 17.6.9 From analysis of under 75 mortality rates for cardiovascular disease and cancer, the under 75 mortality rate within the local study area is consistently below the regional and national averages. Within the wider study area, the under 75 mortality rate for cardiovascular disease and cancer is consistently below the national average and more comparable to the regional average. The under 75 mortality rate for respiratory disease in the local and wider study areas has consistently been below the national average.
- 17.6.10 Regarding hospital admission rates, emergency hospital admissions for respiratory and cardiovascular diseases in both the local and wider study areas are lower when compared to the national average. This is consistent with mortality trends for cardiovascular and respiratory diseases whereby the under 75 mortality rate within the local and wider study areas are consistently below the national average.
- 17.6.11 Analysis of indicators relating to mental health, such as suicide rate and hospital stays for self-harm, show slight fluctuations over the years, but a generally improving trend. While hospital stays for self-harm in the wider study area are consistently higher than the regional and national averages, figures for the local study area have decreased over the years to below the regional average, but higher than the national average. Dementia prevalence in the local and wider study areas is marginally higher than the regional and national averages, which is likely to reflect the higher than average age profile.

Lifestyle Indicators

- 17.6.12 The levels of childhood obesity in the local and wider study areas have remained relatively static over the years and below the regional and national averages. The proportion of the adult population classified as overweight or obese shows a decreasing trend overall in the local study area (between 2015/16 to 2019/20) to a level lower than the regional and national averages – this contrasts with the increasing trends apparent in the wider study area, regionally and nationally. Participation in physical activity in the local and wider study areas has been increasing slightly

over the years and was consistently higher than the regional and national averages until 2018/19, after which figures have decreased to levels more comparable to the national average.

- 17.6.13 Smoking prevalence in the local and wider study areas have shown a general decrease over the years. While smoking prevalence in the local study area has consistently been lower than both the regional and national averages (from 2016 to 2019), smoking prevalence in the wider study area is consistently higher than the regional average, but more comparable to the national average.
- 17.6.14 Hospital stays for alcohol-related harm in the local and wider study areas have remained relatively static over the years. In the local and wider study area, hospital stays for alcohol related harm have been consistently lower than the national average. Hospital stays for alcohol related harm in the local study area have also been consistently lower than the regional average. However, this is not the case in the wider study area, where hospital stays for alcohol-related harm have been consistently higher than the regional average.

Baseline Parameters Used for Quantitative Assessment Purposes

- 17.6.15 While collection and interpretation of a wide range of baseline indicators is useful to put into context the local health circumstances, certain baseline parameters are used directly in quantitative health assessment calculations.
- 17.6.16 At this stage, a quantitative health assessment has only been completed for predicted changes in air noise exposure. Details of the baseline parameters used in this assessment are outlined in Table 17.6.1.

Table 17.6.1: Baseline Parameters Used in Quantitative Health Assessment for Changes in Noise Exposure

Health Outcome	Local Study Area Average	Source
Hypertension prevalence	13.5%	NHS QOF database
Stroke incidence rate	116.6 per 100,000 population	NHS Digital, Hospital Admitted Patient Care Activity
Stroke mortality rate	36.4 per 100,000 population	NOMIS
Ischaemic Heart Disease (IHD) incidence rate	175.2 per 100,000 population	NHS Digital, Hospital Admitted Patient Care Activity
IHD mortality rate	67.4 per 100,000 population	NOMIS
Depression and anxiety prevalence	11.1%	PHE Mental Health and Wellbeing JSNA Profiles
Dementia prevalence	0.8%	NHS QOF database

- 17.6.17 The parameters set out in Table 17.6.1 will be updated for the final ES to take into account further quantitative assessment relating to changes in local air quality.

Port Health

- 17.6.18 Gatwick Airport has a paramedic on-site between the hours of 06.00 and 00.00. The paramedic is supported by 290 staff members who are trained to provide first aid. This figure excludes first aiders, who are also located in every commercial outlet with between 5-50 members of staff. In

addition, there is a total of 56 Automated External Defibrillators (AEDs) located within the airport. As such, the airport is well prepared to respond, treat, and, if required, call for emergency assistance from the South East Coast Ambulance Trust. An example of the existing effectiveness of port health treatment is that AED treatment success rate is more than six times greater than the national average.

- 17.6.19 Some key port health statistics are provided in Table 17.6.2. From analysis of statistics, while the increase in calls to Gatwick Control Centre between 2015 and 2018 correlates with an increase in passenger throughput per annum, the number of passengers who have been taken to hospital has shown a general decrease and the number of passengers who have continued their journey has increased.

Table 17.6.2: Port Health Statistics

Year	Type of Call and Outcome					Total Passenger numbers (Arr + Dep)
	C1 - Life threatening calls	C3 & First Aid - Non life threatening medical calls	Total medical calls to Gatwick Control Centre	Passengers who continued journey	Passengers dispatched to Hospital	
2015	160	4245	4405	3146	1118	40,010,000
2016	164	4727	4847	3777	1070	42,670,000
2017	177	5116	5295	4173	1121	44,176,000
2018	123	5256	5369	4271	1098	44,786,000

Existing GAL Community Initiatives

- 17.6.20 GAL operate a range of existing initiatives to share the benefits generated by the airport among local communities by supporting community-related projects and programmes across the region. All community initiatives fall under the following categories: economy; environment; health and wellbeing; education; employment and skills; community investment; or community.
- 17.6.21 As employment is a key wider determinant of health, GAL's One Destination Employability Programme is particularly beneficial to the health and wellbeing of the local community. The programme constitutes a four-week training course, which is intended to equip long-term unemployed individuals with a range of skills to improve employability. Approximately 92% of those taking the course have been offered employment at the airport.
- 17.6.22 Healthcare provision is a more direct influencer of health and wellbeing. As such, GAL's support for charity partners such as Air Ambulance Kent Surrey Sussex, St. Catherine's Hospice and Surrey and Sussex Healthcare NHS Trust (amongst others) are relevant. Specifically, during the national lockdowns, GAL supported their charity partners with donations of digital advertising, profits of sales of masks, proceeds of charity collection globes and refreshments for front line workers.
- 17.6.23 Overall, as health and wellbeing are influenced by several factors, community initiatives falling under all categories supported by GAL will to some extent contribute to improving local health circumstances.

Conclusion

- 17.6.24 From analysis of available statistics, physical and mental local health circumstance in the local and wider study area can be considered good, and trends are generally positive. In most circumstances, health status is better than the national average and more comparable to the regional average.
- 17.6.25 On this basis, it is not considered that the local communities living within the study area would be particularly sensitive to socio-economic or environmental changes associated with the construction and operation of the Project.

Future Baseline Conditions

- 17.6.26 Trends are analysed as part of the current baseline to provide insight into likely future local community circumstances. Overall, data collected show generally positive trends for health-specific data. As it is challenging to predict health-specific data with high confidence, it is considered appropriate and conservative to use present-day statistics for the purpose of this assessment, including assessment for future years.
- 17.6.27 As population data are used for quantitative health and wellbeing assessment methods, population projection information has been applied within calculations for all relevant assessment years, where possible. In addition, any new residential receptors introduced as a result of other proposed developments in the locality have been captured within modelling outputs from inter-related technical disciplines, which inform the health and wellbeing assessment.
- 17.6.28 Regarding the potential influence on the health and wellbeing baseline associated with climate change, while it is probable that the effects of climate change will be realised to some extent by the final main assessment year used for the Project (2038), these changes are not expected to materially alter the health and wellbeing baseline conditions.

17.7. Key Project Parameters

- 17.7.1 The assessment has been based on the parameters identified within Chapter 5: Project Description.
- 17.7.2 Table 17.7.1 below identifies the key parameters relevant to this assessment. Where options exist, 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 17.7.1: Maximum Design Scenarios

Potential Impact	Maximum Design Scenario	Justification
Initial Construction Phase: 2024-2029		
Changes in local air quality, noise exposure, construction transport and access to open space and public	Maximum design scenarios are specified in Chapter 13: Air Quality, Chapter 14: Noise and Vibration,	The maximum design scenario parameters for each parameter

Potential Impact	Maximum Design Scenario	Justification
rights of way due to on-site construction and associated transport movements	Chapter 12: Traffic and Transport Chapter 18: Agricultural Land Use and Recreation.	have been specified for that assessment.
Construction-related employment opportunities and associated income generation (direct, indirect and catalytic)	Peak construction workforce of approximately 1,300 workers (occurring in October 2026).	Reasonable employment generation predicted by the applicant.
Introduction of a large workforce during construction		Potential adverse social-related health and wellbeing effects based on how the construction workforce is managed.
First Full Year of Opening: 2029, Interim Assessment Year: 2032		
Changes in local air quality, noise exposure, transport and access to open space and public rights of way due to construction/operational activities and associated transport movements	Maximum design scenarios are specified in Chapter 13: Air Quality, Chapter 14: Noise and Vibration, Chapter 12: Traffic and Transport Chapter 18: Agricultural Land Use and Recreation.	The maximum design scenario parameters for each parameter have been specified for that assessment.
Construction and operational-related employment opportunities and associated income generation (direct, indirect and catalytic)	Peak construction workforce of approximately 880 workers (2029), with an average of 600 workers between 2029 and 2032. The peak construction workforce would reduce to 380 workers (between 2032 and 2037). In addition, direct, indirect and catalytic operational employment will increase by 1,000, 1,900 and 3,800 jobs respectively (in 2029) and by 3,200, 6,100 and 11,600 jobs respectively (in 2032).	Reasonable employment generation predicted by the applicant.
Introduction of a large workforce during construction	Peak construction workforce of approximately 880 workers (2029) and 380 workers (between 2032 and 2037).	Potential adverse social-related health and wellbeing effects based on how the construction workforce is managed.
Design Year: 2038		
Changes in local air quality, noise exposure, transport and access to open space and public rights of way	Maximum design scenarios are specified in Chapter 13: Air Quality, Chapter 14: Noise and Vibration, Chapter 12: Traffic and Transport	The maximum design scenario parameters for each parameter have been specified for that assessment.

Potential Impact	Maximum Design Scenario	Justification
due to operational activities and associated transport movements	Chapter 18: Agricultural Land Use and Recreation.	
Operational-related employment opportunities and associated income generation (direct, indirect and catalytic)	Direct, indirect and catalytic employment will increase by 3,200, 6,300 and 10,800 jobs respectively.	Reasonable employment generation predicted by the applicant.

17.8. Mitigation and Enhancement Measures Adopted as Part of the Project

17.8.1 In addition to the existing community initiatives detailed in Section 17.6, which contribute beneficially to local community health circumstances, a number of measures have been designed into the Project to reduce the potential for impacts on health and wellbeing. These are listed below in Table 17.8.1.

Table 17.8.1: Mitigation and Enhancement Measures

Measures Adopted as Part of the Project	Justification
Mitigation	
Generally, mitigation focusses on limiting environmental precursors to preclude adverse health outcomes. As a result, any adopted mitigation measures are detailed within the relevant topic chapters and the Outline Code of Construction Practice (CoCP).	
Health service provision for the construction workforce	As stated in the Outline CoCP, in order to avoid any potential adverse impact on the local health care system, on-site health care would be provided for construction workers. For instance, a health care practitioner would be available for construction workers to consult. The details of this provision will be explored as part of the ES.
Monitoring	
No health specific monitoring is required as environmental monitoring acts as a precursor to, and enables intervention before, any manifestly adverse health outcome. Where relevant, environmental monitoring is described within the relevant topic chapters (air quality, noise transport etc).	
Enhancement	
Outline Employment Skills and Business Strategy (OESBS)	Includes a series of training, employment and procurement initiatives that will aid in addressing existing local barriers to a range of employment opportunities locally. The Outline Employment Skills and Business Strategy (OESBS) is currently under development and will be further informed and refined during the EIA process and submitted as part of the application for development consent.

17.9. Assessment of Effects

Initial Construction Phase: 2024-2029

Health and Wellbeing Effects from Changes to Air Quality

Introduction

- 17.9.1 The assessment of air quality effects for the initial construction phase (2024-2029) relates specifically to airfield construction activities and establishment of construction compounds. In addition to the potential impacts on air quality from on-site construction activities, air quality modelling results include road traffic sources of air pollution.

Construction Dust

- 17.9.2 Construction of the Project has the potential to influence health and wellbeing by contributing to nuisance dust emissions (from demolition activities, general on-site construction, earthworks or through trackout²). As stated in Chapter 13: Air Quality, following the implementation of appropriate mitigation, the effect from dust on air quality would not be considered significant and therefore it follows that there would be no significant adverse health impacts.

Nitrogen Dioxide and Particulate Matter

- 17.9.3 During the initial construction phase, no exceedances of air quality objective thresholds are predicted for annual mean particulate matter that is less than or equal to 10 µm in diameter (PM₁₀) or particulate matter that is less than or equal to 2.5 µm in diameter (PM_{2.5}) concentrations at any modelled human receptor locations. The annual mean nitrogen dioxide (NO₂) air quality objective threshold is currently exceeded at a total of seven receptor locations, by an average of 3.5 µg/m³, where the maximum is 49.7 µg/m³.
- 17.9.4 As stated in Chapter 13: Air Quality, the largest changes in annual mean concentrations due to the Project in the initial construction phase are predicted to be:
- 0.8 µg/m³ for NO₂;
 - 0.1 µg/m³ for PM₁₀; and
 - 0.1 µg/m³ for PM_{2.5}.
- 17.9.5 The maximum changes in NO₂, PM₁₀ and PM_{2.5} concentrations are not considered significant by air quality standards and annual mean particulate matter would remain within objective thresholds set to be protective of the environment and health. As a result, it is anticipated that the absolute changes in concentration exposure would be below those that would require the quantification of a change in local health outcomes when considering the relevant risk ratios³ in a quantitative exposure response assessment.

Conclusion

- 17.9.6 On the above basis, the magnitude of impact of changes in air quality on health and wellbeing during construction is considered to be negligible. In the context of a high sensitivity receptor, the

² See Chapter 13: Air Quality for definitions of types of dust effects.

³ Risk ratios represent the ratio of the probability of an outcome in an exposed group to the probability of an outcome in an unexposed group

resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

- 17.9.7 Data outputs relating to absolute changes in concentration exposure across the local study area will be used to further test this conclusion through a quantitative exposure response assessment at the ES stage. While the quantitative assessment will provide accurate figures upon which to determine the magnitude of impact, the assessment of significance provided above is considered robust.

Health and Wellbeing Effects from Changes in Noise Exposure

Construction Noise

- 17.9.8 Construction activities taking place during the initial construction phase would occur during the day, evening and night time periods. Adverse changes in noise exposure are likely to be larger at night, reflecting the current expectation that much of the airfield work during this phase would need to be undertaken during the night time period.
- 17.9.9 As stated in Chapter 14: Noise and Vibration, the communities bordering the airport perimeter with the most potential to experience localised adverse changes in noise exposure during the initial construction phase comprise Charlwood, Hookwood, Horley, Ifield and Lowfield Heath.
- 17.9.10 An indication of the likely number of households that could be significantly affected by construction noise (with measures adopted as part of the Project, such as noise barriers, in place) is provided in Appendix 14.9.1. Results show that one property in Horley could experience noise levels above the Significant Observed Adverse Effect Level (SOAEL) during the daytime, nine properties in Horley could experience noise levels above the SOAEL during the evening, and 120 properties could experience noise levels above the SOAEL during the night time period (91 in Horley, 14 in Charlwood, ten in Lowfield Heath, four in Hookwood and one in Ifield). It is expected that further mitigation would be identified and applied to reduce noise levels, including quieter methods of working, reducing plant noise levels for night works near sensitive areas, site perimeter noise barriers and receptor-based mitigation where appropriate (noise insulation and temporary re-housing).
- 17.9.11 As stated in Chapter 14: Noise and Vibration, the significance of the effects on all communities following mitigation will be assessed in detail at the ES stage when further information on the construction programme, activities to be undertaken and plant likely to be used is known. However, based on the available information at this stage, it is anticipated that some residual noise effects are likely.
- 17.9.12 A full assessment of noise associated with on-site construction activities will be undertaken and reported in the ES which will inform the health and wellbeing assessment.

Traffic Noise

- 17.9.13 As stated in Chapter 14: Noise and Vibration, construction traffic on public highways has the potential to create noise disturbance, the extent of which will be determined by the number of receptors along the relevant routes.
- 17.9.14 It should be noted that it is not proposed to route construction traffic on smaller roads or through villages. However, there would be construction traffic associated with the Project at night during highways works and to support other construction activities being undertaken during the night

time period. As such, general traffic using affected routes may divert to other roads, which may increase noise levels elsewhere.

- 17.9.15 A full assessment of noise associated with construction traffic will be undertaken and reported in the ES which will inform the health and wellbeing assessment.

Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

Introduction

- 17.9.16 As stated in Chapter 12: Traffic and Transport, only airfield construction traffic would be generated by the Project during this phase, and the proposal is for all construction vehicles to travel to and from the airport via M23 Junction 9. The estimated vehicle trip generation is 33 vehicles (Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs)) in and out per hour along the M23 Spur, and 150 construction worker vehicles in the AM peak hour.

Severance

- 17.9.17 Community severance can occur when transport infrastructure or motorised traffic acts as a physical or psychological barrier to the movement of pedestrians, which has associated health and wellbeing effects.
- 17.9.18 As stated in Chapter 12: Traffic and Transport, no road link is expected to experience an increase in overall traffic flows of over 30% (ie the threshold for severance effects) as the result of the Project.
- 17.9.19 Overall, the increase in HGV traffic flows during the initial construction phase is expected to be localised, with the largest volumes limited to the strategic highway network. In addition, exposure to changes in traffic volume and composition would be low as there are limited pedestrian and cyclist movements expected along construction routes. As a result, the overall magnitude of impact on health and wellbeing from severance would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Pedestrian and Cyclist Amenity

- 17.9.20 As stated in Chapter 12: Traffic and Transport, a doubling of traffic volume or a change in traffic composition can adversely affect pedestrian and cyclist amenity. Any change in pedestrian and cyclist amenity can have associated impacts on health and wellbeing through the modification of healthy behaviour.
- 17.9.21 However, traffic modelling indicates volumes would not double on any road link analysed. While there would be some change in traffic composition, the percentage of HGVs (number of HGVs divided by total vehicle number) on the road link which experiences the highest increase in traffic flows is 3% for all peak periods (on the A23 London Road, to the south of Longbridge Roundabout) from 4% to 7% in the AM Peak 1 (AM1)⁴ and AM Peak 2 (AM2)⁵ periods, 6% to 9% in the Interpeak (IP)⁶ and 2% to 5% in the PM Peak⁷. In addition, the potential for exposure to

⁴ The AM Peak 1 is between 0700 to 0800

⁵ The AM Peak 2 is between 0800 to 0900

⁶ The Interpeak is the average hour between 0900 and 1600

⁷ The PM peak is the average hour between 1600 and 1800, as 1600-1700 and 1700-1800 are very similar in terms of flows

changes in traffic volume and composition is low, as there are limited pedestrian and cyclist movements expected along construction routes.

- 17.9.22 As a result, the overall magnitude of impact on health and wellbeing from changes in pedestrian and cyclist amenity would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Accidents and Safety

- 17.9.23 As stated in Chapter 12: Traffic and Transport, suitable measures to minimise the impact of construction-related traffic would be implemented as part of the Construction Traffic Management Plan (CTMP). Following this, the predicted increases in construction-related traffic volumes and composition are not expected to be significant.
- 17.9.24 As such, the overall magnitude of impact on health and wellbeing from changes in accidents and safety would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Lifestyle Factors

- 17.9.25 As stated in Chapter 18: Agricultural Land Use and Recreation, there is the potential for disruption to access along three public rights of way (the Sussex Border Path, public footpath 367Sy and public footpath 359Sy) during the initial construction phase due to commencement of works on the South Terminal roundabout improvements and the associated construction compound, which may be located to the south of the M23 Spur. However, perimeter fencing and a diversion is proposed in order to minimise any temporary adverse impacts, while public access improvements would also be provided to permanently enhance opportunities for physical activity and recreation. Improvement measures include the following:
- Provision of new circular recreational route around the flood compensation area to the east of Museum Field, with a link to the existing alignment of the Sussex Border Path.
- 17.9.26 Chapter 18: Agricultural Land Use and Recreation provides two significance classifications for the South Terminal roundabout improvements – one for the temporary effects on public rights of way during construction (minor adverse) and another for permanent effects on recreational routes and facilities during operation (minor beneficial).
- 17.9.27 In addition, there is potential for permanent impacts on recreational resources during the initial construction phase due to the North Terminal roundabout improvements anticipated to commence in 2029. These include the following:
- Permanent loss of approximately 0.75 hectares of public open space along the southern boundary of Riverside Garden Park bringing the highway boundary close to the south eastern corner of the lake and resulting in the loss of mature vegetation along the existing highway embankment which would reduce amenity from visual and acoustic impacts. Overall, it is stated that the loss of land would not adversely affect the integrity of this resource.
 - Reduction in the amenity of National Cycle Route 21 within the south eastern corner of Riverside Garden Park and under the existing A23 due to visual impacts.

- Permanent loss of a proportion of a section of the existing Sussex Border Path route to the south of the A23 due to land take for the new junction.

17.9.28 However, the following mitigation measures are incorporated into the Project to minimise any adverse impacts and provide enhancements where practicable:

- Creation of new areas of public open space totalling an area equivalent to or in excess of the total loss of public open space to serve the local community and meet the needs of all users, although these would not be immediately contiguous with the park.
- Improvements/enhancements within Riverside Garden Park in consultation with Reigate and Banstead Borough Council.
- Provision of a permanent and more attractive diversion to the Sussex Border Path prior to the commencement of construction works to maintain access during this phase.
- Provision of a pedestrian link between the footway on the northern side of the A23 footway into Riverside Garden Park.
- Provision of an additional pedestrian route linking Riverside Garden Park with the Sussex Border Path.

17.9.29 Chapter 18: Agricultural Land Use and Recreation provides two significance classifications: one for the adverse long-term loss of land at Riverside Garden Park (moderate adverse) and another for the beneficial changes to the Sussex Border Path (minor beneficial).

17.9.30 In the context of health and wellbeing, temporary adverse changes are unlikely to have a material effect on the basis that the change does not persist and therefore has limited opportunity to influence health and wellbeing. In this case, the temporary adverse change constitutes diversions along two public rights of way and therefore does not remove any opportunity for access to physical activity.

17.9.31 The only permanent adverse changes are associated with the permanent loss of land at Riverside Garden Park and reduction of amenity on National Cycle Route 21 – all other permanent changes are beneficial in nature. In a health and wellbeing context, the permanent loss of land does not remove any opportunity for access to physical activity on the basis that: firstly, the loss of land would not adversely affect the integrity of this resource; and secondly, the creation of public open space would constitute a comparable and accessible alternative. Similarly, while there may be potential for deterrence of use associated with the reduction in amenity on National Cycle Route 21, this does not affect the whole resource and does not remove any opportunity for access to physical activity.

17.9.32 On the basis that all temporary and permanent adverse changes would not have a material impact on health or wellbeing and all other changes are beneficial in nature, the overall magnitude of impact on health and wellbeing from changes in lifestyle factors associated with impacts on public rights of way, recreational routes and facilities would be low. In the context of a high sensitivity receptor, the overall significance of the resultant effect is considered **minor beneficial**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Socio-economic Factors

17.9.33 Having a consistent income and being in long-term employment are two of the most important wider determinants of health. The construction phase of the Project would offer a number of

medium-term job opportunities. While job opportunities would vary in type, the majority of jobs available would be for construction workers.

- 17.9.34 As stated in Chapter 16: Socio-economic Effects, research by the Construction Industry Training Board (CITB) indicates that the construction industry is highly mobile in nature whereby approximately 48% of construction workers in the south east in 2018/19 travelled at least 50 miles from home to site and, in the same year, 12% of construction workers travelled at least 100 miles from home to site.
- 17.9.35 Within the initial construction phase, construction employment would increase from around 450 workers (at the start of 2024) to 1,300 workers (in October 2026). Following its peak in October 2026, the number of construction workers would then decrease to around 820 workers. While the demand for direct construction workers would be very large at points during the initial construction phase, it is anticipated that there would be some leakage of associated health and wellbeing benefits from the study area (to areas outside the study area), due to the highly mobile nature of the construction industry.
- 17.9.36 Regarding indirect employment opportunities generated within the supply chain, while the construction phase is temporary in nature, it is still expected that there would be a sizeable impact on the construction supply chain due to the large scale nature of the Project. However, due to the specialist nature of some of the construction services required for the Project and on the basis that the number of enterprises in the area which could potentially benefit is small, it is unlikely that indirect employment opportunities generated would be captured locally, with leakage of associated health and wellbeing benefits to areas beyond the study area.
- 17.9.37 Overall, while employment effects would be large in the context of the size of the local study area construction sector, employment opportunities would only be temporary (medium-term at most) and it is anticipated that there would be some leakage of effects outside of the study area due to the highly mobile nature of the construction industry. As a result, the magnitude of impact on local health and wellbeing from employment opportunities would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor beneficial**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Exposure to Light

- 17.9.38 Temporary lighting during construction would be required to provide a safe and appropriate working environment. As stated in Chapter 8: Landscape, Townscape and Visual Resources, lighting would be visible at the following locations/for the following receptors:
- occupiers of the office building at Meadowcroft House; and
 - receptors travelling along Balcombe Road.
- 17.9.39 Occupiers of an office building and transient receptors travelling along Balcombe Road are not considered to be sensitive in a health and wellbeing context as there is no potential for consistent sleep disturbance (which would be the case at residential receptors). At residential receptors, exposure to temporary lighting would be restricted due to their location and because of proposed screening. As a result, there is limited potential for sleep disturbance and consequential effects on health and wellbeing.
- 17.9.40 On the above basis, the magnitude of impact on health and wellbeing from changes in light exposure would be negligible. In the context of a high sensitivity receptor, the significance of the

resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Water Quality, Flood Risk and Ground Conditions

Water Quality and Flood Risk

- 17.9.41 As stated in Chapter 11: Water Environment, it is considered that there would be impacts on a range of aspects of the water environment during the initial construction phase. However, a number of mitigation measures and best practices would be applied prior to and during construction works to reduce potential impacts on water quality and flood risk to an acceptable level. These measures are described in full in Section 11.8 of Chapter 11: Water Environment and within the Outline CoCP and include the following:
- provision of flood compensation areas to mitigate loss of floodplain storage due to ground raising within the floodplain;
 - relocation and reconfiguration of a surface water attenuation facility (Pond A) to ensure no increase in flood risk, including an increase in capacity to account for increases in impermeable surfaces;
 - enhancement of the River Mole channel area during realignment works to increase capacity and reduce flood risk;
 - provision of syphon connections to maintain floodplain connections on both sides of the taxiway to reduce flood risk;
 - installation of a drainage network with flow control arrangements to limit discharges to watercourses and reduce flood risk; and
 - provision of a new biochemical oxygen demand discharge control monitoring system to limit discharges of diluted de-icer runoff to the environment.

- 17.9.42 As a result, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse** which is not significant in terms of the EIA Regulations.

Ground Conditions

- 17.9.43 Construction activities that involve breaking the ground surface and disturbing soil and perched groundwater have the potential to influence human health as a result of exposure to contaminants via a range of exposure modes (dermal contact, ingestion and inhalation).
- 17.9.44 As stated in Chapter 10: Geology and Ground Conditions, potential areas of concern (PAOC) exist within the Project site, where elevated concentrations of contaminants could exist. In these circumstances, remediation strategies would be developed, as appropriate, following further investigation, to ensure minimal risk to human health. In addition, construction workers would be provided with appropriate protective equipment to limit any temporary exposure.
- 17.9.45 As a result, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Local Healthcare Capacity

Construction Workforce

- 17.9.46 There would be a peak construction workforce of approximately 1,300 workers during the initial construction phase. As previously stated, it is unlikely that the construction workforce demand would be met wholly by the local population, with a proportion of the construction workforce being made up of individuals commuting from outside the study area due to the highly mobile nature of the construction workforce.
- 17.9.47 As stated in Chapter 16: Socio-economics, if the peak number of construction workers were to move temporarily to the local study area and labour market area⁸ from outside, it would equate to an increase in the local population of around 0.9% which is considered negligible. Furthermore, the peak number of construction workers is lower than the suggested 1,800 registered patients per full-time equivalent GP (based on guidance from the Royal College of GPs (NHS London HUNDU, 2009)). This suggests that the hypothetical increase in population would not be sufficient to create demand for an additional GP across the entire labour market area.
- 17.9.48 While the maximum population increase is anticipated to be negligible and lower than that required to create demand for an additional GP, on-site health care would be provided for construction workers to avoid any potential adverse impact on the local health care system (refer to Outline CoCP). The details of this provision will be explored and further assessed at ES stage.

Further Mitigation

- 17.9.49 Mitigation measures proposed during the initial construction phase: 2024-2029 focus on limiting environmental precursors to potential health and wellbeing outcomes to levels which are not considered significant. As a result, the measures included within the Project would preclude any significant adverse health and wellbeing effects. No further mitigation or enhancement measures are recommended at this stage.

Future Monitoring

- 17.9.50 Recommended monitoring focuses on environmental precursors to potential health and wellbeing outcomes. As a result, any recommended monitoring measures relating to health and wellbeing are described within the relevant topic chapters.

Significance of Effects

- 17.9.51 No further mitigation or monitoring is required; therefore, the significance of effects would remain as presented above.

First Full Year of Opening: 2029

Health and Wellbeing Effects from Changes to Air Quality

Introduction

- 17.9.52 There are two assessments of air quality effects for the first full year of opening (2029), one of which relates specifically to highway construction impacts and the other of which relates to operational activities. In addition to the potential impacts on air quality from highway construction

⁸ The labour market area is defined by Chapter 16: Socio-economics as: Crawley, Mole Valley, Reigate and Banstead, Croydon, Tandridge, Wealden, Lewes, Brighton and Hove, Mid Sussex, Horsham, Eastbourne, Adur, Worthing and Arun

activities and aircraft emissions, air quality modelling results are inclusive of road traffic sources of air pollution.

Construction Scenario – Nitrogen Dioxide and Particulate Matter

- 17.9.53 In the first full year of opening (2029) construction scenario, no exceedances of air quality objective thresholds are predicted for annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at any modelled human receptor locations. As stated in Chapter 13: Air Quality, the largest changes in annual mean concentrations due to the Project in 2029 are predicted to be:
- 1.5 µg/m³ for NO₂;
 - 0.4 µg/m³ for PM₁₀; and
 - 0.2 µg/m³ for PM_{2.5}.
- 17.9.54 The maximum changes in NO₂, PM₁₀ and PM_{2.5} concentrations are not considered significant in terms of air quality standards and would remain within objective thresholds set to be protective of the environment and health. As a result, it is anticipated that the absolute change in concentration exposure would be below that which would require the quantification of a change in local health outcomes when considering the relevant risk ratios in a quantitative exposure response assessment.
- 17.9.55 On the above basis, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.
- 17.9.56 Data outputs relating to absolute change in concentration exposure across the local study area will be used to further test this conclusion through a quantitative exposure response assessment at the ES stage. While the quantitative assessment will provide accurate figures to assess the magnitude of impact, the assessment of significance provided above is considered robust.
- #### Operational Scenario – Nitrogen Dioxide and Particulate Matter
- 17.9.57 In the first full year of opening (2029) operational scenario, no exceedances of air quality objective thresholds are predicted for annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at any modelled human receptor locations. As stated in Chapter 13: Air Quality, the largest changes in annual mean concentrations due to the Project in 2029 are predicted to be:
- 0.8 µg/m³ for NO₂;
 - 0.2 µg/m³ for PM₁₀; and
 - 0.1 µg/m³ for PM_{2.5}.
- 17.9.58 The maximum changes in NO₂, PM₁₀ and PM_{2.5} concentrations are not considered significant in terms of air quality standards and would remain within objective thresholds set to be protective of the environment and health. As a result, it is anticipated that the absolute changes in concentration exposure would be below those that would require the quantification of a change in local health outcomes when considering the relevant risk ratios in a quantitative exposure response assessment.
- 17.9.59 On the above basis, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations. These

conclusions will be further tested through a quantitative exposure response assessment at the ES stage.

Health and Wellbeing Effects from Changes in Noise Exposure

Construction Noise

- 17.9.60 As stated in Chapter 14: Noise and Vibration, on the basis that construction activities would continue up to 2038, there is the potential for noise-related disturbance during the first full year of opening (2029).
- 17.9.61 As previously stated, the communities bordering the airport perimeter have the most potential to experience localised adverse changes in noise exposure and the scale of noise impacts is likely to be greater at night, reflecting the current expectation that much of the work would need to be carried out during the night time period.
- 17.9.62 Horley has the highest potential for adverse changes in noise exposure due to night works required for the highway alterations. Overall, prior to the application of further mitigation measures, there is potential for adverse noise effects at approximately 80 properties during the day and approximately 420 during the night. Following the application of further mitigation measures, the numbers of households affected would be substantially reduced.
- 17.9.63 As stated in Chapter 14: Noise and Vibration, the significance of effects on all communities following mitigation will be assessed in detail at the ES stage when further information on the construction programme, activities to be undertaken and plant likely to be used is known. However, based on the available information at this stage, it is anticipated that some residual noise effects are likely.
- 17.9.64 A full assessment of noise associated with on-site construction activities will be undertaken and reported in the ES, which will inform the health and wellbeing assessment.

Air Noise

Introduction

- 17.9.65 The health and wellbeing assessment relating to changes in exposure to operational air noise is based on exposure-response factors for statistical risks applicable to a large exposed population. Although the changes in noise at most individual receptors over the relevant day and night averaging periods are likely to be small, cumulatively they may be associated with measurable health outcomes at the population level. While some individual receptors would experience larger noise changes which would contribute to the overall health and wellbeing impacts assessed, it should be noted that the probability-based risk factor approach cannot predict effects for particular receptors (which would be affected by an individual's specific circumstances).
- 17.9.66 In some cases, the health outcome metrics selected for the health and wellbeing assessment may overlap (eg stroke and IHD are potential outcomes of hypertension) or provide more than one estimate for a given health outcome. As such, these results should not be summed; rather, they provide a range of effect estimates, communicating the order of magnitude for likely health effects from changes in noise exposure associated with the Project.
- 17.9.67 In addition, although there is some evidence that these effects are not confounded by co-exposure to road traffic air pollutants, there is potential for double-counting with the effects of air

pollution exposure quantified above. Caution should therefore be used if summing the air pollution and noise health effects predicted for each assessment scenario.

Results

17.9.68 As stated in Chapter 14: Noise and Vibration, the use of the northern runway is expected to increase beyond 2029. Therefore, the impacts on air noise predicted in 2029 would be lower than in 2032 and beyond. While this is the case, health outcome results relating to changes in exposure to air noise are presented for two scenarios:

- the 2029 with Project scenario, using the present day 2019 air noise baseline as a comparator; and
- the 2029 with Project scenario, using the 2029 air noise future baseline as a comparator.

17.9.69 Table 17.9.1 and Table 17.9.2 show the change in population exposure predicted for each of the air noise contours in the day and night periods, respectively. Details of future changes in noise levels are set out in Chapter 14: Noise and Vibration. In some cases, future improvements in aircraft fleets result in reductions in future noise levels.

Table 17.9.1: Residential Population Noise Exposure During the Day (L_{eq} 16 hour Day)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change	2029 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change
>51 - 54	52.5	14,200	11,300	-2,900	12,800	11,300	-1,500
>54 - 57	55.5	7,300	6,600	-700	6,200	6,600	400
>57 - 60	58.5	1,100	1,000	-100	900	1,000	100
>60 - 63	61.5	950	600	-350	600	600	0
>63 - 66	64.5	250	400	150	300	400	100
>66 - 69	67.5	150	200	50	100	200	100
>69	70.5	100	0	-100	100	0	-100
Totals		24,050	20,100	-3,950	21,000	20,100	-900

Table 17.9.2: Residential Population Noise Exposure During the Night (L_{eq} 8 hour Night)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change	2029 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change
>45 - 48	46.5	15,550	13,200	-2,350	13,600	13,200	-400
>48 - 51	49.5	6,550	6,100	-450	5,800	6,100	300
>51 - 54	52.5	4,000	3,000	-1,000	3,000	3,000	0

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change	2029 Baseline scenario (no. of people)	2029 Project scenario (no. of people)	Change
>54 - 55	54.5	300	300	0	300	300	0
>55 - 57	56	500	600	100	500	600	100
>57 - 60	58.5	450	200	-250	200	200	0
>60 - 63	61.5	150	100	-50	100	100	0
>63 - 66	64.5	150	200	50	200	200	0
Totals		27,650	23,700	-3,950	23,700	23,700	0

17.9.70 For the first assessment scenario (2029 with Project when compared to the 2019 baseline), there is a predicted net decrease in population noise exposure during the day time period and no change in population noise exposure during the night time period. Specifically, the only increases in population noise exposure during the day would occur in the >63 – 66 dB and >66 – 69 dB contours (a total of +200 people). All other contours would experience a decrease, including the >69 dB contour where there would be a decrease of approximately 100 people exposed to this level of noise.

17.9.71 During the night time period, the only increases in population noise exposure would occur in the >55 – 57 dB and >63 – 66 dB contours. All other contours would experience no change or a decrease.

17.9.72 For the second assessment scenario (2029 with Project when compared to the 2029 baseline), there would be a net decrease in population noise exposure during the day time period and no change during the night time period. During the day, there would be a decrease in the number of people within the quietest and loudest noise contours (>51 – 54 dB and >69 dB), while the largest increase occurs in the >54 – 57 dB noise contour. During the night time period, there would be a decrease in the number of people within the quietest noise contour (>45 – 48 dB) and no increase in the number of people within five of the remaining seven noise contours, including the three loudest (>51 – 54, >54 – 55, >57 – 60 dB, >60 – 63 dB and >63 – 66 dB).

17.9.73 The health outcome assessment uses current baseline annual disease incidence/prevalence and mortality rates to estimate the change in annual rates of risk factors⁹ and health outcomes for the existing population were they to be exposed instantaneously to the predicted changes in long-term noise exposure. Risk factors which are considered in the health outcome assessment include hypertension, annoyance and sleep disturbance.

17.9.74 The results of the health outcome assessment are shown in Table 17.9.3 and Table 17.9.4. Results in Table 17.9.3 are provided for context to the assessment and contribute no weight to the significance conclusion.

⁹ Risk factor – defined as any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury

Table 17.9.3: Noise Exposure Health Parameters (2029 with Project when compared to the 2019 baseline) – Population Attributable Fraction (PAF)

Health Parameter	Estimated number of cases (PAF – 2019 Baseline scenario)	Estimated number of cases (PAF – 2029 with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	81	70	-12
Hypertension prevalence (b)	146	125	-21
Highly annoyed	2,341	1,983	-358
Highly sleep disturbed	1,906	1,631	-275
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	101	85	-15

17.9.75 For the first assessment scenario (2029 with Project when compared to the 2019 baseline), it is predicted that there would be a decrease in the number of people experiencing risk factors. In addition, the number of health outcomes prevalent within the population attributable to the Project show either no measurable change or a decrease from the 2019 baseline scenario.

Table 17.9.4: Noise Exposure Health Parameters (2029 with Project when compared to the 2029 baseline) – Population Attributable Fraction

Health Parameter	Estimated number of cases (PAF – 2029 Baseline scenario)	Estimated number of cases (PAF 2029 – with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	69	70	<1
Hypertension prevalence (b)	124	125	<1
Highly annoyed	2,015	1,983	-32
Highly sleep disturbed	1,622	1,631	+10

Health Parameter	Estimated number of cases (PAF – 2029 Baseline scenario)	Estimated number of cases (PAF 2029 – with Project scenario)	Total change (PAF – estimated number of cases)
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	87	85	-1

17.9.76 For the second assessment scenario (2029 with Project when compared to the 2029 baseline), all health outcomes analysed show either a minimal or no measurable change or a decrease attributable to the Project.

17.9.77 There is at most a minimal increase in the number of people who are predicted to experience hypertension (a risk factor for a range of health outcomes) and there is a decrease in the number of people who would experience being highly annoyed in the 2029 with Project scenario when compared to the 2029 baseline scenario. Prior to any further mitigation, the only negative outcome is that there is a small increase in the number of people who are highly sleep disturbed (+10), which also constitutes a risk factor for a range of health outcomes.

17.9.78 Overall, the magnitude of impact on health and wellbeing from changes in exposure to air noise would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor beneficial** (during the day time period) **and minor adverse** (during the night time period), which is not significant in terms of the EIA Regulations. Following submission of the PEIR, it is proposed that the emerging health evidence base will be further reviewed. As a result, the risk ratios applied to the quantitative health and wellbeing air noise assessment may change.

Ground Noise

17.9.79 As stated in Chapter 14: Noise and Vibration, ground noise impacts predicted in the first full year of opening (2029) would be lower than for the interim assessment year (2032), because the use of the northern runway is expected to increase beyond 2029. As per the approach in Chapter 14: Noise and Vibration, the health and wellbeing assessment relating to ground noise focuses on the 2032 assessment year as a worst-case for ground noise.

Traffic Noise

17.9.80 As stated in Chapter 14: Noise and Vibration, construction-related road traffic noise would continue into 2029. The impacts of this have been considered in the initial construction phase assessment.

- 17.9.81 In addition to construction-related traffic, operational traffic would contribute to the overall effect, which will be assessed in the ES. The outputs from this will inform the health and wellbeing assessment.

Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

Introduction

- 17.9.82 As stated in Chapter 12: Traffic and Transport, the annual passenger demand for 2029 is expected to increase from 57.3 million in the 2029 future baseline to 61.3 million with the Project.

Severance

- 17.9.83 As shown in Chapter 12: Traffic and Transport, only two road links within the whole study area (Old Brighton Road South and Perimeter Road East) would exceed the 30% threshold for potential severance effects during the first full year of opening (2029). All other links would experience a change of less than 30%.
- 17.9.84 The change in overall traffic flows is predicted to range from -36% (on Perimeter Road East during the PM Peak) to +259% (on Old Brighton Road South during the PM Peak). Regarding HGVs specifically, the change in traffic flows is predicted to range from -25% (on Old Brighton Road South during the AM1 peak) to +44% (on Old Brighton Road South during the PM peak).
- 17.9.85 Whilst the increase in traffic on both Old Brighton Road and Perimeter Road East would exceed the 30% threshold for potential severance effects, both road links are considered to have low sensitivity in terms of pedestrians and cyclists.
- 17.9.86 As a result, the overall magnitude of impact on health and wellbeing from severance would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Pedestrian and Cyclist Amenity

- 17.9.87 As stated in Chapter 12: Traffic and Transport, a doubling of traffic volume or a change in traffic composition can adversely affect pedestrian and cyclist amenity.
- 17.9.88 Old Brighton Road South is expected to experience a doubling of traffic flows in the PM Peak. Regarding traffic composition, the highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) would be 5% for the PM Peak on Perimeter Road East (from 7% to 12%). Both road links are considered to have a low sensitivity in terms of pedestrians and cyclists.
- 17.9.89 As a result, the overall magnitude of the impact on health and wellbeing, from changes in pedestrian and cyclist amenity would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Accidents and Safety

- 17.9.90 As stated in Chapter 12: Traffic and Transport, the predicted increases in traffic volumes are not expected to be significant and no changes to the highway layouts are proposed.

- 17.9.91 As such, the overall magnitude of the impact on health and wellbeing from changes in accidents and safety would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Lifestyle Factors

- 17.9.92 As stated in Chapter 18: Agricultural Land Use and Recreation, the North and South Terminal roundabout improvements, which would commence towards the end of the initial construction phase, are anticipated to be completed by 2032. As such, the associated health and wellbeing effects would remain the same (ie minor beneficial and not significant in EIA terms).
- 17.9.93 Works to the Longbridge Roundabout are anticipated to take place between 2030 and 2032. These may impact on the southern part of areas of public open space at St Bartholomew's Church and the former Horley Anderson Centre and Playing Fields (an approximate area of 0.1 ha). Overall, it is considered that the proposed loss of land would not adversely affect the integrity of this resource. In addition to the permanent loss of land, there may be a permanent reduction in amenity in the southern perimeter areas due to changes in the visual and acoustic environments.
- 17.9.94 However, the following mitigation measures are incorporated into the Project to minimise any adverse impacts:
- Creation of new areas of public open space (totalling an area equivalent to or in excess of the total loss of public open space) to serve the local community and meet the needs of all users.
- 17.9.95 In a health and wellbeing context, the permanent loss of amenity land does not remove any opportunity for access to physical activity on the basis that: firstly, the loss of land would not adversely affect the integrity of this resource; and secondly, the creation of new replacement public open space would constitute a comparable and accessible alternative. Similarly, while there may be potential for deterrence of use associated with the reduction in amenity at the southern perimeter areas, this does not affect the whole resource and does not remove any opportunity for access to physical activity.
- 17.9.96 On the basis that the permanent adverse change described would not have a material impact on health or wellbeing, the overall magnitude of impact on health and wellbeing from changes in lifestyle factors associated with impacts on public rights of way, recreational routes and facilities would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Socio-economic Factors

Construction Related Employment

- 17.9.97 The peak construction workforce between 2029 and 2032 is estimated to be around 880 workers. As the direct construction workforce is expected to decrease from the initial construction phase, the level of related supply chain activity is also likely to decrease. However, overall employment effects would still remain large in the context of the size of the local study area construction sector.

- 17.9.98 As previously stated, research by the CITB indicates that the construction industry is highly mobile in nature. As a result, it is unlikely that the construction workforce demand would be met wholly by the local population, with a proportion of the construction workforce being made up of individuals with specialist skills commuting from outside the study area.

Operational Related Employment

- 17.9.99 As stated in Chapter 16: Socio-Economic Effects, within the first full year of opening (2029) the Project would lead to a net increase of approximately 1,000 permanent direct operational related jobs. As a result of the direct operational job opportunities provided, a further 1,900 indirect and 3,800 catalytic job opportunities would be generated further down the supply chain which are anticipated to be captured within the wider study area.

Conclusion

- 17.9.100 Construction employment opportunities would be temporary (medium-term at most) in nature where the workforce is likely to be highly mobile. Therefore, it is anticipated that there would be leakage of potential health and wellbeing benefits from the local study area (to areas beyond the study area) during the construction phase. However, operational employment opportunities would provide long-term employment where the workforce are likely to reside in the wider study area. As a result, the overall magnitude of impact on health and wellbeing from employment opportunities would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor beneficial** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Exposure to Light

- 17.9.101 Temporary lighting during construction is required to provide a safe and appropriate working environment. As stated in Chapter 8: Landscape, Townscape and Visual Resources, lighting would be visible at the following locations/for the following receptors:
- public right of way 362a Horley;
 - McDonalds and KFC at South Terminal;
 - occupiers of the office building at Meadowcroft House; and
 - receptors travelling along Balcombe Road.
- 17.9.102 Occupiers of an office building, customers of the McDonald's and KFC at South Terminal, and transient receptors travelling along public right of way 362a and Balcombe Road Horley are not considered to be sensitive in a health and wellbeing context as there is no potential for consistent sleep disturbance (which would be the case at residential receptors). At residential receptors, exposure to lighting would be restricted due to their location and because of proposed screening. As a result, there is limited potential for sleep disturbance and consequential effects on health and wellbeing.
- 17.9.103 As a result, the magnitude of impact on health and wellbeing from changes in light exposure would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Water Quality, Flood Risk and Ground Conditions

Water Quality and Flood Risk

- 17.9.104 As stated in Chapter 11: Water Environment, all of the proposed flood mitigation measures (except for the Gatwick Stream flood compensation area) would have been completed by the first full year of opening (2029). After 2029, the main works that could impact fluvial flood risk would be the proposed surface access improvement works which would include their own mitigation measures and the satellite airfield contractor construction compound, that would encroach on the floodplain, would remain until 2032.
- 17.9.105 As such, the assessment undertaken for the initial construction phase represents a reasonable worst-case scenario whereby no additional effects are anticipated in the first full year of opening (2029). On this basis, the potential significance of effect on health and wellbeing also remains the same (ie minor adverse and not significant in EIA terms).

Ground Conditions

- 17.9.106 As stated in Chapter 10: Geology and Ground Conditions, construction within PAOCs is proposed to be ongoing during this period and therefore, the effects remain as described during the initial construction phase (2024-2029). Following the completion of remediation, the magnitude of impact would be negligible.
- 17.9.107 As a result, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Local Healthcare Capacity

Construction Workforce

- 17.9.108 During the first full year of opening (2029), there would be a peak construction workforce of around 880 personnel. As previously stated, it is unlikely that the construction workforce demand would be met wholly by the local population, with a proportion of the construction workforce being made up of individuals commuting from outside the study area due to the highly mobile nature of the construction industry.
- 17.9.109 The size of the construction workforce in the first full year of opening (2029) would be less than in the peak year of construction (occurring during the initial construction phase). As a result, even if all construction workers were to move temporarily to the local study area and labour market area from outside, this would equate to a negligible population increase that is lower than that required to create demand for an additional GP.
- 17.9.110 While this is the case, on-site health care would be provided for construction workers to avoid any potential adverse impact on the local health care system (refer to Outline CoCP). The details of this provision will be explored and further assessed at ES stage.

Port Health

- 17.9.111 Baseline Port Health statistics are outlined in Section 17.6 and show that while the increase in calls to Gatwick Control Centre between 2015 and 2018 correlates with an increase in passenger throughput per annum, the number of passengers who have been taken to hospital has shown a

general decrease and the number of passengers who have continued their intended journey has increased.

- 17.9.112 As such, it is clear that the residual impact on external healthcare providers is not solely a function of passenger throughput, as the intervention, triage and care provided can significantly reduce the need for ambulance call outs. At the ES stage, a forecast of Port Health statistics based on passenger throughput in the first full year of opening (2029) will be explored.

Occupational Health

- 17.9.113 While occupational healthcare for the operational workforce is covered under the Health and Safety at Work Act 1974, existing and future occupational health provision will be explored further at the ES stage.

Conclusion

- 17.9.114 As a result, the overall magnitude of impact on health and wellbeing from changes to local healthcare capacity would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Further Mitigation

- 17.9.115 Mitigation measures proposed during the first full year of opening (2029) focus on limiting environmental precursors to potential health and wellbeing outcomes to a level which is not considered significant. As a result, the measures included within the Project would preclude any significant adverse health and wellbeing effects. No further mitigation or enhancement measures are recommended at this stage.

Future Monitoring

- 17.9.116 Generally, recommended monitoring focuses on environmental precursors to potential health and wellbeing outcomes. As a result, any recommended monitoring measures relating to health and wellbeing are described within the relevant topic chapters. However, it is anticipated that public health event data and emergency call out rates from Port Health will be made available to the community liaison group to further communicate the measures in place, to protect public health and minimise impacts on local health care providers.

Significance of Effects

- 17.9.117 No further mitigation or monitoring is required; therefore, the significance of effects would remain as presented above.

Interim Assessment Year: 2032

Health and Wellbeing Effects from Changes to Air Quality

Introduction

- 17.9.118 The assessment of air quality effects for the interim assessment year (2032) relates to the operational phase only. While construction activities are due to take place up to 2037, the impact on air quality from airfield and highway construction is addressed in the initial construction phase (2024-2029) and first full year of opening (2029) sections above. In addition to the potential

impacts on air quality on aircraft emissions, air quality modelling results are inclusive of road traffic sources of air pollution.

Nitrogen Dioxide and Particulate Matter

- 17.9.119 In the interim assessment year (2032), no exceedances of air quality objective thresholds are predicted for annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at any modelled human receptor locations. As stated in Chapter 13: Air Quality, the largest changes in annual mean concentrations due to the Project in 2029 are predicted to be:
- 1.4 µg/m³ for NO₂;
 - 0.2 µg/m³ for PM₁₀; and
 - 0.1 µg/m³ for PM_{2.5}.
- 17.9.120 The maximum predicted changes in NO₂, PM₁₀ and PM_{2.5} concentrations are not considered significant in terms of air quality standards and would remain within objective thresholds set to be protective of the environment and health. As a result, it is anticipated that the absolute changes in concentration exposure those that would require the quantification of a change in local health outcomes when considering the relevant risk ratios in a quantitative exposure response assessment.
- 17.9.121 On the above basis, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.
- 17.9.122 Data outputs relating to absolute change in concentration exposure across the local study area will be used to further test this conclusion through a quantitative exposure response assessment at the ES stage. While the quantitative assessment will provide accurate figures to assess the magnitude of impact, the assessment of significance provided above is considered robust.

Health and Wellbeing Effects from Changes in Noise Exposure

Air Noise

Noise Health Outcomes for Residential Population

- 17.9.123 Health outcome results relating to changes in exposure to air noise are presented for two scenarios:
- the 2032 with Project scenario, using the present day 2019 air noise baseline as a comparator; and
 - the 2032 with Project scenario, using the 2032 air noise future baseline as a comparator.
- 17.9.124 Table 17.9.5 and Table 17.9.6 show the change in population exposure predicted for each of the air noise contours in the day and night periods, respectively.

Table 17.9.5: Residential Population Noise Exposure During the Day (L_{eq} 16 hour Day)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2032 Project scenario (no. of people)	Change	2032 Baseline scenario (no. of people)	2032 Project scenario (no. of people)	Change
>51 - 54	52.5	14,200	9,800	-4,400	9,400	9,800	400
>54 - 57	55.5	7,300	6,800	-500	4,900	6,800	1,900
>57 - 60	58.5	1,100	1,000	-100	900	1,000	100
>60 - 63	61.5	950	700	-250	500	700	200
>63 - 66	64.5	250	300	50	200	300	100
>66 - 69	67.5	150	200	50	100	200	100
>69	70.5	100	0	-100	100	0	-100
Totals		24,050	18,800	-5,250	16,100	18,800	2,700

Table 17.9.6: Residential Population Noise Exposure During the Night (L_{eq} 8 hour Night)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2032 Project scenario (no. of people)	Change	2032 Baseline scenario (no. of people)	2032 Project scenario (no. of people)	Change
>45 - 48	46.5	15,550	11,700	-3,850	9,900	11,700	1,800
>48 - 51	49.5	6,550	5,500	-1,050	5,300	5,500	200
>51 - 54	52.5	4,000	3,100	-900	2,600	3,100	500
>54 - 55	54.5	300	300	0	100	300	200
>55 - 57	56	500	500	0	400	500	100
>57 - 60	58.5	450	200	-250	200	200	0
>60 - 63	61.5	150	100	-50	200	100	-100
>63 - 66	64.5	150	200	50	100	200	100
Totals		27,650	21,600	-6,050	18,800	21,600	2,800

17.9.125 For the first assessment scenario (2032 with Project when compared to the 2019 baseline), there is a predicted net decrease in population noise exposure during the day and night time periods. Specifically, the only increases in population noise exposure during the day would occur in the >63 – 66 dB and >66 – 69 dB contours (a total of +100 people). All other contours would experience a decrease, including the >69 dB contour where there would be a decrease of approximately 100 people exposed to this level of noise.

- 17.9.126 During the night time period, the only increase in population noise exposure would occur in the >63 – 66 dB contour. All other contours would experience no change or a decrease. In particular, the >54 – 55 dB and >55 – 57 dB contours experience no increase in population noise exposure.
- 17.9.127 For the second assessment scenario (2032 with Project when compared to the 2032 baseline), there would be a net increase in population noise exposure during the day and night time periods. During the day, there would be a decrease in the number of people within the loudest noise contour (>69 dB), while the largest increase would occur in the >54 – 57 dB noise contour. During the night time period, there would be no increase in the number of people within the three loudest noise contours (>57 – 60 dB, >60 – 63 dB and >63 – 66 dB), with the largest increase in exposure predicted to occur in the quietest noise contour (>45 – 48 dB).
- 17.9.128 The health outcome assessment uses current baseline annual disease incidence/prevalence and mortality rates to estimate the change in annual rates of risk factors and health outcomes for the existing population were they to be exposed instantaneously to the predicted changes in long-term noise exposure. Risk factors which are considered in the health outcome assessment include hypertension, annoyance and sleep disturbance.
- 17.9.129 The results of the health outcome assessment are shown in Table 17.9.7 and Table 17.9.8, respectively. Results in Table 17.9.7 are provided for context to the assessment and contribute no weight to the significance conclusion.

Table 17.9.7: Noise Exposure Health Parameters (2032 with Project when compared to the 2019 baseline) – Population Attributable Fraction (PAF)

Health Parameter	Estimated number of cases (PAF – 2019 Baseline scenario)	Estimated number of cases (PAF – 2032 with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	81	67	-14
Hypertension prevalence (b)	146	120	-25
Highly annoyed	2,341	1,889	-451
Highly sleep disturbed	1,906	1,500	-406
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	101	81	-19

- 17.9.130 For the first assessment scenario (2032 with Project when compared to the 2019 baseline), it is predicted that there would be a decrease in the number of people experiencing all risk factors (ie hypertension, high annoyance and high sleep disturbance). In addition, the number of health outcomes prevalent within the population attributable to the Project shows either no measurable change (for stroke, CHD and IHD health outcomes) or a decrease from the 2019 baseline scenario (for depression and anxiety prevalence).
- 17.9.131 As previously stated, there would be a net decrease in population noise exposure during the day and night time periods between the 2032 with Project scenario and the 2019 baseline scenario. This is primarily due to changes in the aircraft fleet composition and the introduction of newer and quieter engines. As a result, despite an increase in aircraft movements per annum, the overall effect on noise exposure and consequent health and wellbeing outcomes is anticipated to be beneficial.

Table 17.9.8: Noise Exposure Health Parameters (2032 with Project when compared to the 2032 baseline) – Population Attributable Fraction

Health Parameter	Estimated number of cases (PAF – 2032 Baseline scenario)	Estimated number of cases (PAF 2032 – with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	55	67	+12
Hypertension prevalence (b)	98	120	+22
Highly annoyed	1,579	1,889	+310
Highly sleep disturbed	1,304	1,500	+196
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	68	81	+13

- 17.9.132 For the second assessment scenario (2032 with Project when compared to the 2032 baseline), prior to any further mitigation there is predicted to be a measurable increase in the number of people experiencing changes in risk factors (ie hypertension, high annoyance and high sleep disturbance). However, the change in risk factors is not sufficient to measurably alter the number of stroke, CHD, IHD and dementia health outcomes prevalent within the population attributable to the Project, which all show no change from the 2032 baseline scenario. The only health outcome which shows a measurable increase in the 2032 with Project scenario when compared to the 2032 baseline scenario is depression and anxiety prevalence (+13).

Changes in Noise Exposure at Community Locations

- 17.9.133 Chapter 14: Noise and Vibration identifies 50 noise sensitive community buildings that are predicted to experience noise levels at or above 51 dB $L_{eq\ 16\ hr}$ in 2032 with the Project. These comprise 23 schools, one hospital, 18 places of worship and eight other community buildings.
- 17.9.134 At 42 of the noise sensitive community buildings (84%), noise levels are predicted to either decrease or increase by less than 1 dB, which is considered to be a negligible change. The maximum change in noise is predicted to be only slightly more than that considered negligible (+1.3 dB), and would occur at the following sensitive receptors: Scott Broadwood C of E Infant School, RH5 5JX; St John the Baptist's Church, Capel, RH5 7JY; The Chapel, RH6 0DQ; and Capel Village Hall, RH5 5LB. Furthermore, two noise sensitive community buildings (4%), both places of worship, would experience reductions in noise levels.

Significance Conclusion

- 17.9.135 Overall, the magnitude of impact on health and wellbeing from changes in exposure to air noise would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations. Following submission of the PEIR, it is proposed that the emerging health evidence base will be further reviewed. As a result, the risk ratios applied to the quantitative health and wellbeing air noise assessment may change.

Ground Noise

- 17.9.136 As stated in Chapter 14: Noise and Vibration, noise barriers would be included as mitigation adopted as part of the Project to reduce ground noise. Once mitigation is taken into account, the worst-case increase in noise levels during the daytime period ($L_{eq\ 16\ hr}$) at any receptor location would be +6 dB, with some receptors experiencing a decrease of up to -1 dB. During the night time period ($L_{eq\ 8\ hr}$), the worst-case increase in noise levels at any receptor location would be +4 dB, with some receptors experiencing a decrease of up to -3 dB.
- 17.9.137 Overall, Chapter 14: Noise and Vibration identifies that predicted ground noise effects would not be significant at the majority of the representative receptors studied (11 out of 12 for daytime noise, and 9 out of 12 for night time noise). Significant effects are identified at one receptor for daytime noise and three receptors for night time.
- 17.9.138 As stated in Chapter 14: Noise and Vibration, with the Project, there are approximately 10 residential receptors that exceed the SOAEL. The properties where the SOAEL may be exceeded are within or close to the Noise Insulation Scheme Inner Zone boundary. The Inner Zone boundary will be modified as necessary when the assessment is completed, so that significant effects on health and quality of life are avoided.
- 17.9.139 On the basis that the Inner Zone boundary would be modified as necessary so that significant effects on health and quality of life would be avoided, the overall magnitude of impact on health and wellbeing would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Traffic Noise

- 17.9.140 As stated in Chapter 14: Noise and Vibration, noise barriers would be included as mitigation adopted as part of the Project to reduce traffic noise.
- 17.9.141 Absolute noise levels and changes in noise exposure due to road traffic have been assessed in Chapter 14: Noise and Vibration at a selection of receptor locations, representing the closest nearby communities/dwellings to the Project.
- 17.9.142 As baseline noise levels at four of the seven receptors analysed were above the SOAEL before considering the change in noise exposure associated with the Project, the change in noise exposure at any given receptor provides more information for use in a health and wellbeing context. Overall, noise reductions are predicted at the majority of receptors, with a worst-case increase in noise exposure of less than 1 dB at any receptor.
- 17.9.143 As such, the magnitude of impact on health and wellbeing from changes in exposure to traffic noise is low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

Introduction

- 17.9.144 As stated in Chapter 12: Traffic and Transport, the annual passenger demand for 2032 is expected to increase from 59.4 million in the future baseline to 72.3 million with the Project.

Severance

- 17.9.145 As shown in Chapter 12: Traffic and Transport, during the interim assessment year, the change in overall traffic flows is predicted to range from -18% (on Perimeter Road East during the PM Peak) to +254% (on the Old Brighton Road South during the PM Peak). Regarding HGVs, the change in traffic flows is predicted to range from -8% (on A213 Windmill Road) to +300% (on Gatwick Way).
- 17.9.146 The severance effects reported in Chapter 12: Traffic and Transport on the 14 road links that exceed the 30% threshold for potential severance effects range from minor to moderate adverse. As stated in Chapter 12: Traffic and Transport, most of the road links experiencing a high increase in traffic flows are located in Croydon during the PM Peak; as such, this area will be further reviewed in the modelling work for the final development consent.
- 17.9.147 All other road links would experience a change in traffic flows below the 30% threshold, whereby the potential effect on severance reported in Chapter 12: Traffic and Transport would range from negligible to minor adverse.
- 17.9.148 Overall, while some of the road links in the study area would experience a moderate adverse effect, the majority would only experience negligible to minor adverse effects, which would not be significant. As a result, the overall magnitude of impact on health and wellbeing from severance would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Pedestrian and Cyclist Amenity

- 17.9.149 As stated in Chapter 12: Traffic and Transport, a doubling of traffic volume or a change in traffic composition can adversely affect pedestrian and cyclist amenity.

- 17.9.150 Old Brighton Road South, Waddon New Road, Reeves Corner and London Road would experience a doubling of traffic flows in the PM Peak. These road links generally have low future baseline traffic flows and their sensitivity in terms of pedestrians and cyclists ranges from low to medium.
- 17.9.151 Regarding traffic composition, the highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) would be 10% in the AM1 and AM2 periods and 17% in the PM Peak, both on Northgate Road. However, there is no pedestrian or cyclist facility along Northgate Road and therefore potential exposure to changes is limited.
- 17.9.152 As a result, the overall magnitude of impact on health and wellbeing from changes in pedestrian and cyclist amenity would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Accidents and Safety

- 17.9.153 As stated in Chapter 12: Traffic and Transport, the design of the proposed highway improvements would separate through traffic from the North Terminal roundabout. This would reduce traffic flows through the junction and consequent risk of conflict.
- 17.9.154 As a result, the overall magnitude of impact on health and wellbeing from changes in accidents and safety would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse/beneficial** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Lifestyle Factors

- 17.9.155 As stated in Chapter 18: Agricultural Land Use and Recreation, no effects on recreational resources are anticipated as a result of the operation of the Project in the interim assessment year (2032). As a result, no further health and wellbeing assessment has been undertaken.

Health and Wellbeing Effects from Changes in Socio-economic Factors

Construction Related Employment

- 17.9.156 The peak construction workforce between 2032 and 2037 is projected to be approximately 380 workers. As the direct construction workforce is expected to further decrease from the first full year of opening, the level of related supply chain activity is also likely to decrease. However, overall employment effects would still remain large in the context of the size of the local study area construction sector.
- 17.9.157 As previously stated, research by the CITB indicates that the construction industry workforce is highly mobile in nature. As a result, it is unlikely that the construction workforce demand would be met wholly by the local population, with a proportion of the construction workforce being made up of individuals commuting from outside the study area.

Operational Related Employment

- 17.9.158 As stated in Chapter 16: Socio-Economic Effects, within the interim assessment year (2032) the Project would lead to a net increase of approximately 3,200 permanent direct operational jobs. As a result of the direct operational job opportunities provided, a further 6,100 indirect and 11,600

catalytic job opportunities would be generated further down the supply chain, which are anticipated to be captured within the wider study area.

Conclusion

- 17.9.159 Construction employment opportunities would be temporary (medium-term) in nature where the workforce is likely to be highly mobile. Therefore, it is anticipated that there would be leakage of potential health and wellbeing benefits from the study area (to areas outside the study area) during the construction phase. However, operational employment opportunities would provide long-term employment where the workforce is likely to reside in the wider study area. As a result, the overall magnitude of impact on health and wellbeing from employment opportunities would be medium. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **moderate beneficial** which is significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Exposure to Light

- 17.9.160 Temporary lighting during construction is required to provide a safe and appropriate working environment. In addition, there would be permanent lighting associated with completion of some infrastructure associated with the operation of the Project.
- 17.9.161 As stated in Chapter 8: Landscape, Townscape and Visual Resources, lighting would be visible at the following locations/for the following receptors:
- public right of way 362a Horley;
 - McDonalds and KFC at South Terminal; and
 - occupiers of the office building at Meadowcroft House.
- 17.9.162 Occupiers of an office building, transient receptors travelling along public right of way 362a Horley and customers of the McDonald's and KFC at South Terminal are not considered to be sensitive in a health and wellbeing context, as there is no potential for consistent sleep disturbance (which would be the case at residential receptors).
- 17.9.163 As a result, the magnitude of impact on health and wellbeing from changes in light exposure would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Water Quality, Flood Risk and Ground Conditions

Water Quality and Flood Risk

- 17.9.164 As stated in Chapter 11: Water Environment, the effects of construction works in the watercourses would have stabilised by 2032. Furthermore, all primary works that could affect current flood risk would have been completed by this time, whereby the measures implemented by this stage would be adequate to ensure that no further increase in flood risk would occur. For all remaining activities with the potential to impact water quality (eg creation of Gatwick Stream flood compensation area), the implementation of mitigation measures and best practices would continue to be applied prior to and during construction works to reduce potential impacts on water quality and flood risk to an acceptable level.
- 17.9.165 As such, the assessment undertaken for the initial construction phase represents a reasonable worst-case scenario, whereby no additional effects are anticipated in the interim assessment year

(2032). On this basis, the potential significance of effect on health and wellbeing would also remain the same (ie **minor adverse** and not significant in terms of the EIA Regulations).

Ground Conditions

- 17.9.166 As stated in Chapter 10: Geology and Ground Conditions, remediation may be required for the remaining construction areas from 2032 onwards. However, the requirement for remediation is likely to be localised in its extent. In addition, remediation is unlikely to be required in the majority of the remaining construction areas.
- 17.9.167 As a result, the magnitude of impact on health and wellbeing would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Local Healthcare Capacity

Construction Workforce

- 17.9.168 The peak construction workforce between 2032 and 2037 is projected to be approximately 380 personnel. As previously stated, it is unlikely that the construction workforce demand would be met wholly by the local population, with a proportion of the construction workforce being made up of individuals commuting from outside the study area due to the highly mobile nature of the construction industry.
- 17.9.169 The size of the construction workforce in the interim assessment year (2032) would be less than in the peak year of construction (occurring during the initial construction phase). As a result, even if all construction workers were to move temporarily to the local study area and labour market area from outside, this would equate to a negligible population increase that is lower than that required to create demand for an additional GP.
- 17.9.170 While this is the case, on-site health care would be provided for construction workers to avoid any potential adverse impact on the local health care system (refer to the Outline CoCP). The details of this provision will be explored and further assessed at ES stage.

Port Health

- 17.9.171 As previously stated, baseline Port Health statistics are outlined in Section 17.6 and show that while the increase in calls to Gatwick Control Centre between 2015 and 2018 correlates with an increase in passenger throughput per annum, the number of passengers who have been taken to hospital has shown a general decrease and the number of passengers who have continued their intended journey has increased.
- 17.9.172 As such, it is clear that the residual impact on external healthcare providers is not solely a function of passenger throughput, as the intervention, triage and care provided can significantly reduce the need for ambulance call outs. At the ES stage, a forecast of Port Health statistics based on passenger throughput in the interim assessment year (2032) will be explored.

Occupational Health

- 17.9.173 While occupational healthcare for the operational workforce is covered under the Health and Safety at Work Act 1974, existing and future occupational health provision will be explored at the ES stage.

Conclusion

- 17.9.174 As a result, the overall magnitude of impact on health and wellbeing from changes to local healthcare capacity would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Further Mitigation

- 17.9.175 Mitigation measures proposed during the interim assessment year (2032) focus on limiting environmental precursors to potential health and wellbeing outcomes to a level, which is not considered significant. As a result, the measures proposed as part of the Project would preclude any significant adverse health and wellbeing effects. No further mitigation or enhancement measures are recommended at this stage.

Future Monitoring

- 17.9.176 Generally, recommended monitoring focuses on environmental precursors to potential health and wellbeing outcomes. As a result, any recommended monitoring measures relating to health and wellbeing are described within the relevant topic chapters. However, it is anticipated that public health event data and emergency call out rates from port health will be made available to the community liaison group to further communicate the measures in place to protect public health and minimise impacts on local health care providers.

Significance of Effects

- 17.9.177 No further mitigation or monitoring is required; therefore, the significance of effects would remain as presented above.

Design Year: 2038

Health and Wellbeing Effects from Changes to Air Quality

- 17.9.178 It is anticipated that there will be improvements in background air quality and vehicle emissions in the design year (2038). On this basis, for the purposes of the PEIR, the 2038 design year has been assessed in terms of aircraft emissions and not for road vehicle emissions.
- 17.9.179 Regarding aircraft emissions, as stated in Chapter 13: Air Quality, the Project would result in an increase in emissions for all sources and pollutants when compared to the 2038 future baseline scenario. However, when comparing the design year (2038) with Project to the interim assessment year (2032) with Project, there is a decrease in the overall airport-related NO_x, PM₁₀ and PM_{2.5} emissions. This is attributed to the changes in aircraft fleet composition and the introduction of newer and lower emitting engines.
- 17.9.180 The assessment of health and wellbeing effects from changes in air quality will be revisited at the ES using any further assessment of road traffic emissions for the design year (2038) provided as part of Chapter 13: Air Quality.

Health and Wellbeing Effects from Changes in Noise Exposure

Air Noise

Noise Health Outcomes for Residential Population

17.9.181 Health outcome results relating to changes in exposure to air noise are presented for two scenarios:

- the 2038 with Project scenario, using the present day 2019 air noise baseline as a comparator; and
- the 2038 with Project scenario, using the 2038 air noise future baseline as a comparator.

17.9.182 Table 17.9.9 and Table 17.9.10 show the change in population exposure predicted for each of the air noise contours in the day and night periods, respectively.

Table 17.9.9: Residential Population Noise Exposure During the Day (L_{eq} 16 hour Day)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change	2038 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change
>51 - 54	52.5	14,200	9,000	-5,200	7,300	9,000	1,700
>54 - 57	55.5	7,300	5,700	-1,600	4,100	5,700	1,600
>57 - 60	58.5	1,100	800	-300	900	800	-100
>60 - 63	61.5	950	500	-450	400	500	100
>63 - 66	64.5	250	300	50	100	300	200
>66 - 69	67.5	150	200	50	100	200	100
>69	70.5	100	0	-100	100	0	-100
Totals		24,050	16,500	-7,550	13,000	16,500	3,500

Table 17.9.10: Residential Population Noise Exposure During the Night (L_{eq} 8 hour Night)

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change	2038 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change
>45 - 48	46.5	15,550	9,400	-6,150	7,600	9,400	1,800
>48 - 51	49.5	6,550	4,900	-1,650	4,800	4,900	100
>51 - 54	52.5	4,000	2,900	-1,100	2,300	2,900	600
>54 - 55	54.5	300	200	-100	200	200	0
>55 - 57	56	500	400	-100	400	400	0
>57 - 60	58.5	450	200	-250	100	200	100

Noise Contour (dB)	Assumed Noise Level (dB)	2019 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change	2038 Baseline scenario (no. of people)	2038 Project scenario (no. of people)	Change
>60 - 63	61.5	150	200	50	200	200	0
>63 - 66	64.5	150	100	-50	100	100	0
Totals		27,650	18,300	-9,350	15,700	18,300	2,600

- 17.9.183 For the first assessment scenario (2038 with Project when compared to the 2019 baseline), there is a predicted net decrease in population noise exposure during the day and night time periods. Specifically, the only increases in population noise exposure during the day would occur in the >63 – 66 dB and >66 – 69 dB contours (a total of +100 people). All other contours would experience a decrease, including the >69 dB contour where there would be a decrease of approximately 100 people exposed to this level of noise.
- 17.9.184 During the night time period, the only increase in population noise exposure would occur in the >60 – 63 dB contour. All other contours would experience no change or a decrease.
- 17.9.185 For the second assessment scenario (2038 with Project when compared to the 2038 baseline), there would be a net increase in population noise exposure during the day and night time periods. During the day, there would be a decrease in the number of people within the loudest noise contour (>69 dB), while the largest increase occurs in the quietest noise contour (>51 – 54 dB). During the night time period, there would be no increase in the number of people within the two loudest noise contours (>60 – 63 dB and >63 – 66 dB), with the largest increase in exposure predicted to occur in the quietest noise contour (>45 – 48 dB).
- 17.9.186 The health outcome assessment uses current baseline annual disease incidence/prevalence and mortality rates to estimate the change in annual rates of risk factors and health outcomes for the existing population were they to be exposed instantaneously to the predicted changes in long-term noise exposure. Risk factors which are considered in the health outcome assessment include hypertension, annoyance and sleep disturbance.
- 17.9.187 The results of the health outcome assessment are shown in Table 17.9.11 and Table 17.9.12, respectively. Results in Table 17.9.11 are provided for context to the assessment and contribute no weight to the significance conclusion.

Table 17.9.11: Noise Exposure Health Parameters (2038 with Project when compared to the 2019 baseline) – Population Attributable Fraction (PAF)

Health Parameter	Estimated number of cases (PAF – 2019 Baseline scenario)	Estimated number of cases (PAF – 2038 with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	81	58	-23
Hypertension prevalence (b)	146	104	-42
Highly annoyed	2,341	1,641	-700
Highly sleep disturbed	1,906	1,284	-622
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	101	71	-30

17.9.188 For the first assessment scenario (2038 with Project when compared to the 2019 baseline), it is predicted that there would be a decrease in the number of people experiencing risk factors. In addition, the number of health outcomes prevalent within the population attributable to the Project show either no change or a decrease from the 2019 baseline scenario.

Table 17.9.12: Noise Exposure Health Parameters (2038 with Project when compared to the 2038 baseline) – Population Attributable Fraction

Health Parameter	Estimated number of cases (PAF – 2038 Baseline scenario)	Estimated number of cases (PAF 2038 – with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	45	58	+12
Hypertension prevalence (b)	81	104	+22
Highly annoyed	1,293	1,641	+348
Highly sleep disturbed	1,108	1,284	+176

Health Parameter	Estimated number of cases (PAF – 2038 Baseline scenario)	Estimated number of cases (PAF 2038 – with Project scenario)	Total change (PAF – estimated number of cases)
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	56	71	+15

17.9.189 For the second assessment scenario (2038 with Project using 2038 baseline), prior to any further mitigation, there is predicted to be a measurable increase in the number of people experiencing changes in risk factors (ie hypertension, high annoyance and high sleep disturbance). However, the change in risk factors is not sufficient to measurably alter the number of stroke, CHD, IHD and dementia health outcomes prevalent within the population attributable to the Project. The only health outcome which shows a measurable increase in the 2038 with Project scenario when compared to the 2038 baseline scenario is depression and anxiety prevalence (+15).

17.9.190 Overall, the magnitude of impact on health and wellbeing from changes in exposure to air noise is low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations. Following submission of the PEIR, it is proposed that the emerging health evidence base will be further reviewed. As a result, the risk ratios applied to the quantitative health and wellbeing air noise assessment may change.

Ground Noise

17.9.191 As stated in Chapter 14: Noise and Vibration, noise barriers would be included as mitigation adopted as part of the Project to reduce ground noise. Once mitigation is taken into account, the worst-case increase in noise levels during the daytime period ($L_{eq\ 16\ hr}$) at any receptor location would be +6 dB, with some receptors experiencing a decrease of up to -2 dB. During the night time period ($L_{eq\ 8\ hr}$), the worst-case increase in noise levels at any receptor location would be +5 dB, with some receptors experiencing a decrease of up to -5 dB.

17.9.192 The worst-case increase in day time noise would be 1 dB higher than for the interim assessment year (2032). However, this predicted change is in the context of lower overall predicted noise levels with the Project in 2038 due to a larger proportion of quieter, next generation aircraft in the fleet.

17.9.193 As per the interim assessment year (2032), on the basis that the Inner Zone boundary would be modified as necessary so that significant effects on health and quality of life are avoided, the overall magnitude of impact on health and wellbeing would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Traffic Noise

- 17.9.194 As stated in Chapter 14: Noise and Vibration, the DMRB does not require an assessment of road traffic noise in 2038. Instead, road traffic noise 15 years after the opening of the roads associated with the Project (2047) are assessed.
- 17.9.195 Chapter 14: Noise and Vibration sets out the $L_{A10,18\text{ hour}}$ road traffic noise predictions (with the implementation of noise barrier mitigation) at a selection of receptor locations representing the closest nearby communities/dwellings to the Project.
- 17.9.196 Comparing the predicted traffic noise levels from the Project in 2047 to the baseline scenario in 2032, reductions are predicted at the majority of residential receptors and in the Riverside Garden Park. Where long term noise does increase, the change would be less than 3 dB, which is considered negligible in noise terms.
- 17.9.197 As such, the magnitude of impact on health and wellbeing from changes in exposure to traffic noise would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

Introduction

- 17.9.198 Following DRMB guidance, Chapter 12: Traffic and Transport assesses the design year to be 2047. As stated in Chapter 12: Traffic and Transport, the annual passenger demand for 2047 is expected to increase from 67.2 million in the future baseline scenario to 80.2 million with the Project.

Severance

- 17.9.199 As shown in Chapter 12: Traffic and Transport, during the design year (2047), the change in overall traffic flows is predicted to range from -62% (on Northgate Road during the PM Peak) to +897% (on Perimeter Road East during the PM Peak). Regarding HGVs, the change in traffic flows is predicted to range from 0% (on several road links) to +2217% (on Longbridge Way during the IP peak).
- 17.9.200 The severance effects reported in Chapter 12: Traffic and Transport on the 16 road links that exceed the 30% threshold for potential severance effects range from negligible to minor adverse. As stated in Chapter 12: Traffic and Transport, the links experiencing the highest increase in traffic flows are associated with the airport access, which are considered to have negligible to low pedestrian and cyclist sensitivity.
- 17.9.201 All other road links would experience a change in traffic flows below the 30% threshold, whereby the potential effect on severance reported in Chapter 12: Traffic and Transport would also range from negligible to minor adverse.
- 17.9.202 As a result, the overall magnitude of impact on health and wellbeing from severance would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse**, which is not significant in terms of the EIA Regulations.

Pedestrian and Cyclist Amenity

- 17.9.203 As stated in Chapter 12: Traffic and Transport, a doubling of traffic volume or a change in traffic composition can adversely affect pedestrian and cyclist amenity.
- 17.9.204 Old Brighton Road South, Perimeter Road East, Longbridge Way, Northgate Road, Perimeter Road North and Gatwick Way are expected to experience a doubling in traffic flows. However, these are airport estate roads with negligible to low sensitivity in terms of pedestrians and cyclists.
- 17.9.205 Regarding traffic composition, the highest increase in the percentage of HGVs (number of HGVs divided by total vehicle number) are also predicted on the airport estate roads with negligible to low sensitivity in terms of pedestrians and cyclists.
- 17.9.206 As a result, the overall magnitude of impact on health and wellbeing from changes in pedestrian and cyclist amenity would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Accidents and Safety

- 17.9.207 As stated in Chapter 12: Traffic and Transport, the design of the proposed highway improvements would separate through traffic from the North Terminal roundabout. This would reduce traffic flows through the junction and consequent risk of conflict.
- 17.9.208 As a result, the overall magnitude of impact on health and wellbeing from changes in accidents and safety would be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse/beneficial** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Lifestyle Factors

- 17.9.209 As stated in Chapter 18: Agricultural Land Use and Recreation, no effects on recreational resources are anticipated as a result of the operation of the Project in the design year (2038). As a result, no further health and wellbeing assessment has been undertaken.

Health and Wellbeing Effects from Changes in Socio-economic Factors

- 17.9.210 As stated in Chapter 16: Socio-Economic Effects, within the design year (2038) the Project would lead to a net increase of 3,200 permanent direct operational related jobs. As a result of the direct operational job opportunities provided, a further 6,300 indirect and 10,800 catalytic job opportunities would be generated further down the supply chain, which are anticipated to be captured within the wider study area.
- 17.9.211 Operational employment opportunities would provide long-term employment where the workforce is likely to reside in the wider study area. As a result, the overall magnitude of impact on health and wellbeing from employment opportunities would be medium. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **moderate beneficial** which is significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes in Exposure to Light

- 17.9.212 There would be permanent lighting associated with completion of the operation-phase of the Project. As stated in Chapter 8: Landscape, Townscape and Visual Resources, lighting would be prominent at the following locations/for the following receptors as vegetation designed to screen visual effects is not fully matured:
- River Mole public right of way;
 - National Cycle Route 21 and open space through Riverside Garden Park;
 - Meadowcroft House;
 - railway passengers; and
 - Horley residential edge.
- 17.9.213 Transient receptors travelling along the River Mole public right of way, through Riverside Garden Park, the road/railway network and occupiers of an office building (Meadowcroft House) are not considered to be sensitive in a health and wellbeing context as there is no potential for consistent sleep disturbance (which would be the case at residential receptors).
- 17.9.214 At approximately 95 residences in Horley's residential edge, lighting columns, lit signs and vehicle lights would be visible filtered through vegetation against a backdrop of skyglow from the airport. It is unlikely that residents would experience a perceptible change in summer due to the screening effects of intervening vegetation when in leaf; by the summer of 2048, there is unlikely to be any discernible change in view at receptors due to mitigation planting growth. However, in winter, Chapter 8: Landscape, Townscape and Visual Resources reports a minor adverse effect during the day and at night, which would not be significant.
- 17.9.215 As a result, the magnitude of impact on health and wellbeing from changes in light exposure would be low. In the context of a high sensitivity receptor, the significance of the resultant effect is considered **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Water Quality, Flood Risk and Ground Conditions

Water Quality and Flood Risk

- 17.9.216 During the design year (2038), the Project has the potential to impact surface water both adversely and beneficially. As determined by Chapter 11: Water Environment, in most cases (adversely or beneficially), the significance of effect is established to be minor (not significant).
- 17.9.217 The Project also has the potential to adversely impact groundwater quality. However, the significance of effect, as determined by Chapter 11: Water Environment, is anticipated to be negligible/minor (not significant) in all circumstances.
- 17.9.218 In terms of flood risk, there is potential for both adverse and beneficial impacts on offsite residential receptors. As determined by Chapter 11: Water Environment, changes in surface water runoff from the introduction of additional impermeable areas and changes in drainage strategy are likely to have a minor adverse effect (not significant), while improvements to fluvial flood risk from mitigation are likely to have a moderate/major beneficial effect (significant).
- 17.9.219 Overall, following the implementation of additional mitigation (as detailed in Chapter 11: Water Environment), the magnitude of impact on health and wellbeing is considered to be negligible. In

the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor beneficial** which is not significant in terms of the EIA Regulations.

Ground Conditions

- 17.9.220 As stated in Chapter 10: Ground Conditions, any remediation activities would be completed by 2038.
- 17.9.221 As a result, the magnitude of impact on health and wellbeing is considered to be negligible. In the context of a high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse** which is not significant in terms of the EIA Regulations.

Health and Wellbeing Effects from Changes to Local Healthcare Capacity

Port Health

- 17.9.222 As previously stated, baseline Port Health statistics are outlined in Section 17.6 and show that while the increase in calls to Gatwick Control Centre between 2015 and 2018 correlates with an increase in passenger throughput per annum, the number of passengers who have been taken to hospital has shown a general decrease and the number of passengers who have continued their journey has increased.
- 17.9.223 As such, it is clear that the residual impact on external healthcare providers is not solely a function of passenger throughput, as the intervention, triage and care provided can significantly reduce the need for ambulance call outs. It is proposed that at ES stage, a forecast of Port Health statistics based on passenger throughput in the design year (2038) will be explored.

Occupational Health

- 17.9.224 While occupational healthcare for the operational workforce is covered under the Health and Safety at Work Act 1974, existing and future occupational health provision will be explored at the ES stage.

Conclusion

- 17.9.225 As a result, the overall magnitude of impact on health and wellbeing from changes to local healthcare capacity would be negligible. In the context of a uniformly high sensitivity receptor, the significance of the resultant effect is considered to be **minor adverse**, which is not significant in terms of the EIA Regulations.

Further Mitigation

- 17.9.226 Mitigation measures proposed during 2038 focus on limiting environmental precursors to potential health and wellbeing outcomes to a level which is not considered significant. As a result, the measures proposed as part of the Project would preclude any significant adverse health and wellbeing effects. No further mitigation or enhancement measures are recommended at this stage.

Future Monitoring

- 17.9.227 Generally, recommended monitoring focuses on environmental precursors to potential health and wellbeing outcomes. As a result, any recommended monitoring measures relating to health and wellbeing are described within the relevant topic chapters. However, it is anticipated that public

health event data and emergency call out rates from Port Health will be made available to the community liaison group to further communicate the measures in place to protect public health and minimise impacts on local health care providers.

Significance of Effects

17.9.228 No further mitigation or monitoring is required; therefore, the significance of effects would remain as presented above.

2047

17.9.229 All health and wellbeing determinants addressed within this chapter (other than changes in transport nature and flow rate, and associated traffic noise impacts) have assessed the following main assessment years, capturing the worst-case health and wellbeing effects:

- initial construction phase (2024-2029);
- first full year of opening (2029);
- interim assessment year (2032); and
- design year (2038).

17.9.230 As shown in Table 17.9.13, changes in risk factors associated with air noise in 2047 (ie hypertension, annoyance and sleep disturbance) do not materially change the population health outcomes assessed when compared to the main assessment years. Similarly, levels of ground noise and therefore, the health and wellbeing effects of ground noise with the Project in 2047, would be lower than those in 2038.

Table 17.9.13: Noise Exposure Health Parameters (2047 with Project when compared to the 2047 baseline) – Population Attributable Fraction (PAF)

Health Parameter	Estimated number of cases (PAF – 2047 Baseline scenario)	Estimated number of cases (PAF – 2047 with Project scenario)	Total change (PAF – estimated number of cases)
Risk factors			
Hypertension prevalence (a)	45	57	+12
Hypertension prevalence (b)	80	102	+22
Highly annoyed	1,274	1,626	+352
Highly sleep disturbed	1,100	1,277	+176
Health outcomes			
Stroke incidence and mortality	<1	<1	0
CHD incidence	<1	<1	0
IHD incidence and mortality	<1	<1	0
Dementia incidence	<1	<1	0
Depression and anxiety prevalence	55	70	+15

- 17.9.231 Regarding potential health and wellbeing effects from changes in lifestyle factors (ie access to open space for physical activity and recreational opportunities), the main assessment years show no effects following the first full year of opening (2029). This is on the basis that any temporary or permanent impacts on public open space would be in effect and mitigation measures applied would be established. On this basis, there would be no effects in 2047.
- 17.9.232 Similarly, remediation activities are only associated with the construction phase. On the basis that the Project would be fully operational, there would be no effects in 2047.
- 17.9.233 As previously stated in relation to permanent lighting associated with completion of the operational phase of the Project, it is unlikely that residents would experience a perceptible change in summer due to the screening effects of intervening vegetation when in leaf. By the summer of 2047 specifically, there is unlikely to be any discernible change in view at receptors due to mitigation planting growth.
- 17.9.234 The additional impermeable area created and below ground structures required (eg foundations) as part of the Project would not change between the design year 2038 and 2047. Furthermore, by 2038 any mitigation measures applied would be established. On this basis, the potential effects associated changes in water quality and flood risk have been accounted for in the main assessment scenarios.
- 17.9.235 The direct, indirect and induced employment and associated health and wellbeing benefits generated are directly correlated with passenger throughput. On the basis that passenger throughput would not materially increase beyond the design year (2038), the effects in 2047 would not exceed those described in the main assessment years.
- 17.9.236 Similarly, while the throughput of passengers associated with the Project is associated with an increase in calls to Gatwick Control Centre, the number of passengers who have been taken to hospital has shown a general decrease. On this basis, the potential impact on healthcare capacity in 2047 is not anticipated to exceed those described in the main assessment years.

Risk Perception

Health Effects from Electro-Magnetic Fields (EMF)

- 17.9.237 The Project includes the reorientation and distribution of the airport substation and grid infrastructure, with the potential to modify EMF. However, as stated in the Department for Energy and Climate Change (DECC) Voluntary Code of Practice (DECC, 2012), compliance with the ICNIRP public exposure guidelines set to protect health is assumed for electricity distribution infrastructure, overhead power lines or underground cables operating at ≤ 132 kV, without the need for more detailed assessment. This is on the basis of evidence published by the Energy Networks Association (ENA) showing that by design such infrastructure is not capable of causing exceedance of the public exposure guideline limits.
- 17.9.238 As outlined by the ENA (National Grid, n.d.), based on a worst-case hypothetical design (ie L7 pylon design with 7 m clearance, 1.4 kA per circuit and untransposed phasing), the pylon would produce 3.6 kV/m electric field and 46 μ T magnetic field. Therefore, this worst-case pylon design, and all practical pylons at 132 kV and below, are compliant by design. On this basis, the 33 kV required by the Project would remain below the ICNIRP exposure guidelines set to be protective of human health.

- 17.9.239 Any electricity supply infrastructure included as part of the Project would operate at ≤ 132 kV and would therefore comply with the guideline exposure limit set to protect public health.

Extended Operational Hazards

- 17.9.240 Extended operational hazards include the risk from major accidents, fuel storage, changes to Public Safety Zones¹⁰, and the transmission of communicable diseases.
- 17.9.241 The risks associated with fuel storage are covered throughout Appendix 5.3.3: Major Accidents and Disasters whereby the sources and hazards are clearly identified, and emergency responses outlined. Effects in relation to Public Safety Zones will be considered once the outcome of the Civil Aviation Authority's consultation on standardising Public Safety Zones is known.
- 17.9.242 The potential risk from communicable disease transmission is currently managed by implementation of the International Health Regulations which place a legally-binding requirement for 196 countries, including all Member States of the World Health Organization (WHO), to prevent and respond to acute public health risks that have the potential to cross trans-national boundaries and threaten people worldwide. Measures include:
- surveillance to establish any potential transboundary risk;
 - informing national travel recommendations, airlines and ports of any heightened risk and acute symptoms to screen for;
 - refusal for travel by airlines should symptoms be prevalent at the country of origin;
 - visual screening for acute symptoms taking place during boarding and on-board flights; and
 - cataloguing of any health condition mid-flight other than air sickness by airline staff, which is signed off by the pilot-in-command and relayed to the destination for instruction (eg diversion, priority landing, quarantine and/or medical assistance upon arrival).
- 17.9.243 Public Health England (PHE) is the National Focal Point for the International Health Regulations, monitoring international communicable health risks to the UK, and providing regular epidemiological updates, assessing potential risk, offering travel advice and briefing health services on the symptoms, health conditions and clinical interventions to be aware of. PHE also has various specialist advice and diagnostic units (eg the Imported Fever Service or Rare and Imported Pathogens Laboratory) to assist doctors with managing cases where travellers have returned to the UK with infectious diseases.
- 17.9.244 Overall, the Project has no influence on the approach to dealing with international communicable disease transmission and does not alter the hazard profile, international regulatory requirement, PHE duty, or measures in place to monitor, prevent, contain and respond to the transmission of international communicable disease.

Health Effects from Pests

- 17.9.245 Infrastructure projects can alter habitats and food chains that might attract opportunistic species that are typically regarded as pests. Without management, airports could provide good year-round habitats for insects, rodents, rabbits, deer, foxes and birds that could theoretically present an aircraft maintenance hazard and can pose a direct collision hazard to aircraft moving on the

¹⁰ Public Safety Zones are defined as "areas of land at the ends of the runways at the busiest airports, within which development is restricted in order to control the number of people on the ground at risk of death or injury in the event of an aircraft accident on take-off or landing"

ground and in flight. Such species can further attract raptors presenting an associated strike hazard.

- 17.9.246 However, the potential hazard is well known, understood and already addressed at Gatwick Airport through existing design and management measures. Further to this, the CoCP will ensure the risk of pest/vermin infestation would be reduced by ensuring any putrescible waste (eg food waste) is stored appropriately and regularly collected, and effective preventative pest control measures are implemented.

17.10. Potential Changes to the Assessment as a Result of Climate Change

- 17.10.1 The primary impacts associated with climate change include increased temperatures, increased atmospheric CO₂ and increased incidence of extreme weather events. These primary impacts affect several environmental functions (such as water availability, salinization, varying crop yields, wildfires, ozone/PM concentrations, and migration patterns) which could plausibly alter the prevalence of a range of health and wellbeing outcomes.
- 17.10.2 Of particular relevance in this context is the modification of atmospheric emission dispersion, related concentration hazard exposure and consequent changes in cardiovascular/respiratory disease prevalence associated with climate change driven meteorological variations.
- 17.10.3 However, at this stage it is not possible to predict future changes in climate change driven meteorological variations which have the potential to influence health and wellbeing. While the effects of climate change outlined above have the potential to exacerbate existing health and wellbeing outcomes at a population level, there are clear limitations associated with predicting future meteorological variations that influence health and wellbeing. Despite this, the effects of climate change likely to be realised during the operational lifetime of the Project are not expected to materially alter the conclusions of this assessment.

17.11. Cumulative Effects

Zone of Influence

- 17.11.1 The zone of influence (Zol) for health and wellbeing has been identified based on the spatial extent of likely effects. Following the same approach applied in the main assessment, the Zol for health and wellbeing remains consistent with the inter-related technical disciplines that the health and wellbeing topic relies upon.

Screening of Other Developments and Plans

- 17.11.2 The Cumulative Effect Assessment (CEA) takes into account the impact associated with the Project together with other developments and plans. The projects 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 the 'CEA short list' of developments (see Appendix 19.4.1). 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.
- 17.11.3 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). Further details of the screening process for the inclusion of other developments and plans in the short list and a description of the Tiers is provided in Chapter 19: Cumulative Effects and Inter-relationships.

- 17.11.4 The specific developments scoped into the CEA for health and wellbeing remain consistent with the inter-related technical disciplines that the health and wellbeing chapter draws from and builds upon. Full details of each of the developments is provided in Appendix 19.4.1.

Cumulative Effects Assessment

Cumulative Health and Wellbeing Effects from Changes to Air Quality

- 17.11.5 As stated in Chapter 13: Air Quality, the traffic data used to inform air quality modelling and the assessment for all scenarios include traffic forecasts generated for all known future developments. As a result, the air quality assessment and consequent health and wellbeing assessment incorporates cumulative impacts. As such, no further cumulative assessment is necessary.

Cumulative Health and Wellbeing Effects from Changes in Noise Exposure

- 17.11.6 Chapter 14: Noise and Vibration considers combined effects (ie noise generated from multiple sources all of which are associated with the Project) and cumulative effects (noise generated from multiple sources associated with other developments).
- 17.11.7 Regarding combined effects, there is the potential for different sources of noise to combine, which will vary by scenario dependent on which sources of noise are relevant to that scenario. For example, construction, air, ground and road traffic noise sources are only relevant for the first full year of opening (2029) and the interim assessment year (2032) where construction activities are ongoing while operational activities increase.
- 17.11.8 During these early years of operation, combined noise effects are likely to be minor on the basis that changes in air, ground and road traffic noise in the early years of operation are small compared to the likely levels of construction noise that are required to generate significant short-term effects at particular receptors. Therefore, no further cumulative health and wellbeing effects are anticipated.
- 17.11.9 During operation (after construction activities cease), there is potential for air, ground and traffic noise impacts to combine. However, combined traffic noise effects are expected to be minor, on the basis that road traffic noise increases near the highway improvements would be mitigated by design and traffic noise increases elsewhere and are expected to be small.

- 17.11.10 In addition, there is the potential for operational ground and air noise impacts to combine at receptors in the vicinity of the airport. However, these properties would be included within the noise insulation scheme which is designed to mitigate significant effects associated with noise. Therefore, no further cumulative health and wellbeing effects are anticipated.
- 17.11.11 Other than the Heathrow Third Runway project, the relevant cumulative developments identified in Table 14.11.1 of Chapter 14: Noise and Vibration are all residential whereby, rather than contribute to noise levels, there would be an increase in the number of people exposed to changes in noise associated with the Project. If all cumulative developments were to be built, there would be up to an additional 15,268 dwellings. However, the majority of the residential development sites are to the south of the airport and in most cases fall within the lower air noise contour bands or in areas where air noise levels will reduce. On this basis, despite an increase in the number of people in the vicinity of the Project, cumulatively, the increase in exposure is not expected to quantify a measurable change in health and wellbeing effects.
- 17.11.12 The Heathrow Third Runway project would increase aircraft noise over a wide area including in the area between the two airports. At PEIR stage, the design of the airspace required to facilitate a third runway at Heathrow is not sufficiently developed to allow for a cumulative noise assessment and as such, no health and wellbeing assessment is possible. As GAL progresses its work and prepares its final documents, including the Environmental Statement, which will accompany the application for development consent, the status and information available regarding the Heathrow Third Runway project will be reviewed, and the ES noise assessment will consider the implications, where feasible and appropriate.

Cumulative Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

- 17.11.13 As stated in Chapter 12: Traffic and Transport, the cumulative traffic and transport effects are included in the future baseline scenarios. As a result, the traffic assessment and consequent health and wellbeing assessment incorporates cumulative effects. As such, no further cumulative assessment is necessary.
- 17.11.14 For the ES, the traffic model will be updated to capture any change to the list of cumulative developments. The health and wellbeing assessment will also be updated to remain consistent with key traffic model outputs and conclusions relating to severance, pedestrian and cyclist amenity, and accidents and safety.

Cumulative Health and Wellbeing Effects from Changes in Lifestyle Factors

- 17.11.15 As stated in Chapter 18: Agricultural Land Use and Recreation, the proposed development of the Horley Business Park is set out in Policy HOR9 'Horley Strategic Business Park' of the adopted Reigate and Banstead Development Management Plan 2018-2027. If the proposed development proceeds, it would be subject to a number of requirements and considerations including:
- the retention or re-routing of public footpath 362a (Sussex Border Path) across the site to maintain a pedestrian link from Balcombe Road to the footbridge across the railway;
 - upgrading and extension of pedestrian/cycle routes from the Business Park to Horley town centre and Gatwick Airport station; and
 - provision and delivery of the public open space area.
- 17.11.16 These requirements and considerations are noted in Chapter 18: Agricultural Land Use and Recreation and are not anticipated to have any significant cumulative impacts on the Sussex

Border Path. As such, the resultant effect on health and wellbeing is also not anticipated to be significant.

Cumulative Health and Wellbeing Effects from Changes in Socio-economic Factors

- 17.11.17 As stated in Chapter 16: Socio-economic Effects, the construction or operation of any identified cumulative development (including Heathrow Third Runway) is not anticipated to change the construction and operational effects conclusions for the Project. As a result, there would be no likely cumulative effects on health and wellbeing.
- 17.11.18 Regarding the Heathrow Third Runway project specifically, the impact zone defined for potential effects shows that there is only overlap in one local authority area (Elmbridge Borough in Surrey). However, analysis shows that there would remain a surplus of labour supply in the area to meet demand for both the Project and Heathrow Third Runway.

Cumulative Health and Wellbeing Effects from Changes in Exposure to Light

- 17.11.19 No cumulative effects relating to exposure to light have been identified by Chapter 8: Landscape, Townscape and Visual Resources for any assessment scenario. As a result, there would be no likely cumulative effects on health and wellbeing.

Cumulative Health and Wellbeing Effects from Changes to Water Quality, Flood Risk and Ground Conditions

- 17.11.20 As stated in Chapter 10: Ground Conditions and Chapter 11: Water Environment, it is assumed that any approved developments would include embedded mitigation, further mitigation (if required) and remediation (where appropriate) to ensure there is no harmful impact from exposure to ground conditions or upon water quality and flood risk. As such, the resultant effect on health and wellbeing is not anticipated to be significant.

Cumulative Health and Wellbeing Effects from Changes in Local Healthcare Capacity

- 17.11.21 It is recognised that the demand on the local labour market due to construction of the Project may deplete the amount of local resources available for construction of all approved developments and therefore increase the requirement for commuting workers to meet this demand.
- 17.11.22 However, the occupational health needs of the partially commuting workforce will be explored as part of the ES, and mitigation provided where appropriate. Ultimately, mitigation provided would serve both the local and commuting construction workforce, having a potentially beneficial impact on local healthcare capacity. On this basis, the net effect is not anticipated to be significant.

17.12. Inter-Related Effects

- 17.12.1 The purpose of the health and wellbeing chapter is to draw from and build upon technical outputs presented for a range of environmental and socio-economic health determinants. As such, there are several inter-relationships between health and wellbeing and other topics, namely: Chapter 8: Landscape, Townscape and Visual Resources; Chapter 10: Ground Conditions; Chapter 11: Water Environment; Chapter 12: Traffic and Transport; Chapter 13: Air Quality; Chapter 14: Noise and Vibration; Chapter 16: Socio-economic Effects; and Chapter 18: Agricultural Land Use and Recreation. A summary of these inter-relationships is provided below.

- Health and traffic/transport – a change in transport nature (ie increasing presence of HGVs) can cause negative mental and social health and wellbeing impacts through reducing pedestrian amenity (and potentially causing intimidation effects). In addition, an increase in overall traffic flow rate can increase risk of accident and injury.
- Health and air quality – there is a linear relationship between exposure to air pollutants and attributed health outcomes, such as hospital admission/mortality rate from respiratory and cardiovascular diseases.
- Health and noise or vibration – there is a complex relationship between noise/vibration and attributed health outcomes, such as hospital admission/mortality rate from cardiovascular disease and mental health conditions (eg depression, anxiety and dementia). Noise/vibration can affect health both directly (in extreme circumstances – less common), and indirectly (through annoyance or sleep disturbance). However, the health effects from noise/vibration can also be affected by tonality and type of noise (eg low frequency noise, infrasound and amplitude modulation).
- Health and light – exposure to light at night can increase risk of sleep disturbance, with consequent health and wellbeing effects.
- Health and water quality – water contaminated by heavy metals and/or toxins can cause a range of health and wellbeing effects depending on the type of pollutant and mode of exposure. In addition, waterborne diseases (eg cholera) are spread through contaminated water.
- Health and floods – floods can have direct impacts on health, which range from fatalities to diseases associated with exposure to contaminated water. In addition, floods can have significant social impacts associated with displacement of communities.
- Health and land contamination – land contaminated by heavy metals and/or toxins can cause a range of health and wellbeing effects depending on the type of pollutant and mode of exposure.
- Health and access to open space – open space provides the opportunity for physical activity and recreation, which have health and wellbeing benefits.
- Health and employment – good quality, stable employment is one of the most important determinants of good health and wellbeing. Employment provides a stable income, that can be used to influence a range of lifestyle factors, which can influence health.
- Health and education/training – education and training paves the way to gaining good quality, stable employment.

17.12.2 As these health determinants described within the relevant technical disciplines have informed the health and wellbeing assessment, it can be concluded that all relevant inter-relationships have been fully considered within the health and wellbeing chapter.

17.13. Summary

17.13.1 Overall, no significant health and wellbeing effects (adverse or beneficial) have been identified during the initial construction phase for the range of determinants assessed. Potential health and wellbeing effects from changes in environmental health determinants assessed (ie air quality and transport nature/flow rate) are considered to be of minor adverse significance on the basis that impacts would generally be temporary, intermittent and managed through the implementation of best practice construction methods. In addition, health and wellbeing effects from changes in exposure to temporary lighting have been explored, but predicted to have no change, on the basis that no residential receptors would be impacted.

- 17.13.2 In terms of wider determinants, beneficial health and wellbeing effects have been predicted for changes in lifestyle factors and socio-economic factors during the initial construction phase (ie employment) due to job creation. In addition, impacts on healthcare capacity due to the influx of a non-home-based workforce is intended to be managed internally to ensure that any effect is not significant.
- 17.13.3 The first full year of opening (2029) and the interim assessment year (2032) would include a combination of construction and operation-related health and wellbeing effects. However, health and wellbeing effects associated with environmental determinants (ie air quality, noise and transport) would remain not significant. Similarly, there would be no significant change in exposure to temporary or permanent lighting for residential receptors. The significance of health and wellbeing effects from changes in lifestyle factors would remain minor beneficial and not significant in EIA terms in both assessment scenarios.
- 17.13.4 The significance of health and wellbeing effects from changes in socio-economic factors (ie employment) would increase from minor beneficial in the first full year of opening (2029) to moderate beneficial in the interim assessment year (2032), which is considered significant in EIA terms. This is primarily due to the magnitude of indirect and induced job opportunities expected to be provided.
- 17.13.5 In terms of health and wellbeing effects from changes in healthcare capacity, a number of elements have been assessed (relating to construction and operation), which comprise the increase in demand for local health care services due to the influx of a non-home-based construction workforce, or from emergency call outs associated with increased passenger throughput. Overall, the effect on health and wellbeing is not considered significant, on the basis that any potential increase in demand is intended to be managed internally.
- 17.13.6 Finally, the design year (2038) is an operation only scenario. Health and wellbeing effects associated with environmental determinants would remain not significant. Operational employment opportunities (direct, indirect and induced) would reach their peak and continue to have moderate beneficial health and wellbeing effects, which are considered to be significant in EIA terms. There would no longer be a construction workforce, so any changes to healthcare capacity would be limited to emergency call outs associated with increased passenger throughput, which would not be significant on the basis that any change is intended to be managed internally.

Next Steps

- 17.13.7 At this stage, it is anticipated that the next steps in producing the final health and wellbeing ES chapter will include:
- further testing the conclusions of the health and wellbeing assessment relating to changes in air quality by applying quantitative assessment methods using relevant risk ratios;
 - further assessment relating to the health and wellbeing effects of construction noise and ground noise, drawing from the outputs of noise modelling;
 - explore existing and future occupational healthcare provision at the airport;
 - quantitatively forecast changes to Port Health response at the airport using existing statistics on passenger throughput and response rate; and
 - further development of the cumulative effects assessment for the full range of health and wellbeing determinants.

Table 17.13.1: 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 Phase: 2024-2029							
Health and wellbeing effects from changes in air quality	High	Increase in exposure to construction dust and transport related air pollutants (NO ₂ and PM)	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in noise exposure	High	Increase in noise exposure associated with on-site construction activities	Medium term, temporary	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
		Increase in exposure to noise associated with construction and operational traffic	Medium term, temporary	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
Health and wellbeing effects from changes in transport nature and flow rate	High	Changes to severance	Medium term, temporary	Negligible	Minor adverse	Not significant	
		Changes to pedestrian and cyclist amenity		Low			
		Changes to accidents and safety		Negligible			
Health and wellbeing effects from changes in lifestyle factors	High	Changes to access to green space, recreation and physical activity	Medium term, temporary	Low	Minor beneficial	Not significant	
Health and wellbeing effects from changes in socio-economic factors	High	Increase in direct, indirect and induced employment opportunities	Medium term, temporary	Low	Minor beneficial	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Health and wellbeing effects from changes in exposure to light	High	Increase in exposure to light required for night time construction work	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes to water quality and flood risk	High	Potential depletion of surface water and ground water quality; and increased flood risk from construction activities	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from ground conditions	High	Potential exposure to contaminants from construction activities, which include breaking the ground surface and disturbing soil	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in healthcare capacity	High	Increase in demand for local health care services due to the influx of a non-home-based construction workforce	Medium term, temporary	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
First full year of opening: 2029							
Health and wellbeing effects from changes in air quality	High	Increase in exposure to transport related air pollutants (NO ₂ and PM)	Medium term, temporary (cons.)/long term, permanent (op.)	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in	High	Increase in noise exposure associated with on-site	Medium term, temporary (cons.)	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
construction noise exposure		construction activities and associated transport movements					
Health and wellbeing effects from changes in noise exposure	High	Increase in exposure to air noise associated with additional flights	Long term, permanent	Negligible	Minor beneficial (during the day) and minor adverse (during the night)	Not significant	
		Increase in exposure to ground noise associated with on-site activities	Long term, permanent	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
		Increase in exposure to noise associated with construction and operational traffic	Medium term, temporary (cons.)/long term, permanent (op.)	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
Health and wellbeing effects from changes in transport nature and flow rate	High	Changes to severance	Medium term, temporary (cons.)/long term, permanent (op.)	Low	Minor adverse	Not significant	
		Changes to pedestrian and cyclist amenity		Negligible	Minor adverse	Not significant	
		Changes to accidents and safety		Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in lifestyle factors	High	Changes to access to green space, recreation and physical activity	Medium term, temporary	Low	Minor adverse	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Health and wellbeing effects from changes in socio-economic factors	High	Increase in direct, indirect and induced employment opportunities	Medium term (cons.)/long term, permanent (op.)	Low	Minor beneficial	Not significant	
Health and wellbeing effects from changes in exposure to light	High	Increase in exposure to light required for night time construction work	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes to water quality and flood risk	High	Potential depletion of surface water and ground water quality; and increased flood risk from construction activities	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from ground conditions	High	Potential exposure to contaminants from construction activities, which include breaking the ground surface and disturbing soil	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in healthcare capacity	High	Increase in demand for local health care services due to the influx of a non-home-based construction workforce and/or emergency call outs due to increased passenger throughput; and provision of occupational healthcare	Medium term, temporary (cons.)/long term, permanent (op.)	Negligible	Minor adverse	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Interim assessment year: 2032							
Health and wellbeing effects from changes in air quality	High	Increase in exposure to transport related air pollutants (NO ₂ and PM)	Medium term, temporary (cons.)/long term, permanent (op.)	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in noise exposure	High	Increase in exposure to air noise associated with additional flights	Long term, permanent	Low	Minor adverse	Not significant	
		Increase in exposure to ground noise associated with on-site activities	Long term, permanent	Low	Minor adverse	Not significant	
		Increase in exposure to noise associated with operational traffic	Long term, permanent	Low	Minor adverse	Not significant	
Health and wellbeing effects from changes in transport nature and flow rate	High	Changes to severance	Medium term, temporary (cons.)/long term, permanent (op.)	Low	Minor adverse	Not significant	
		Changes to pedestrian and cyclist amenity		Low	Minor adverse	Not significant	
		Changes to accidents and safety		Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in socio-economic factors	High	Increase in direct, indirect and induced employment opportunities	Medium term, temporary (cons.)/long term, permanent (op.)	Medium	Moderate beneficial	Significant	
Health and wellbeing effects from changes in exposure to light	High	Increase in exposure to light required for night time construction work	Medium term, temporary	Negligible	Minor adverse	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Health and wellbeing effects from changes to water quality and flood risk	High	Potential depletion of surface water and ground water quality; and increased flood risk from construction activities	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from ground conditions	High	Potential exposure to contaminants from construction activities, which include breaking the ground surface and disturbing soil	Medium term, temporary	Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in healthcare capacity	High	Increase in demand for local health care services due to the influx of a non-home-based construction workforce and/or emergency call outs due to increased passenger throughput; and provision of occupational healthcare	Medium term, temporary (cons.)/long term, permanent (op.)	Negligible	Minor adverse	Not significant	
Design year: 2038							
Health and wellbeing effects from changes in air quality	High	Increase in exposure to transport related air pollutants (NO ₂ and PM)	Long term, permanent	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage	
	High	Increase in exposure to air noise associated with additional flights	Long term, permanent	Low	Minor adverse	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Health and wellbeing effects from changes in noise exposure		Increase in exposure to ground noise associated with on-site activities		Low	Minor adverse	Not significant	
		Increase in exposure to noise associated with operational traffic		Negligible	Minor adverse	Not significant	
Health and wellbeing effects from changes in transport nature and flow rate	High	Changes to severance	Long term, permanent	Negligible	Minor adverse	Not significant	
		Changes to pedestrian and cyclist amenity		Negligible	Minor adverse	Not significant	
		Changes to accidents and safety		Negligible	Minor adverse/beneficial	Not significant	
Health and wellbeing effects from changes in socio-economic factors	High	Increase in direct, indirect and induced employment opportunities	Long term, permanent	Medium	Moderate beneficial	Significant	
Health and wellbeing effects from changes in exposure to light	High	Increase in exposure to light required for night time construction work	Medium term, temporary	Low	Minor adverse	Not significant	
Health and wellbeing effects from changes to water quality and flood risk	High	Potential depletion of surface water associated with flood risk mitigation; potential depletion of ground water quality; and reduced flood risk	Long term, permanent	Negligible	Minor beneficial	Not significant	
Health and wellbeing effects from ground conditions	High	Potential exposure to contaminants during operation following completion of remediation works	Long term, permanent	Negligible	Minor adverse	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short/ medium/ long term/ permanent	Magnitude of Impact	Significance of Effect	Significant/ not significant	Notes
Health and wellbeing effects from changes in healthcare capacity	High	Increase in demand for local health care services due to emergency call outs due to increased passenger throughput; and provision of occupational healthcare	Long term, permanent	Negligible	Minor adverse	Not significant	

17.14. References

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17.15. Glossary

Table 17.15.1: Glossary of Terms

Term	Description
CEA	Cumulative Effects Assessment
CITB	Construction Industry Training Board
CO ₂	Carbon dioxide
CoCP	Code of Construction Practice
CTMP	Construction Traffic Management Plan
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
EMF	Electro-magnetic fields
ES	Environmental Statement
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
ICNIRP	International Commission on Non-Ionizing Radiation Protection

Term	Description
IHD	Ischaemic Heart Disease
JSNA	Joint Strategic Needs Assessment
LOAEL	Lowest Observed Adverse Effect Level
LSOA	Lower Super Output Area
NHS	National Health Service
NOx	Nitrogen oxides
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
ONS	Office for National Statistics
OESBS	Outline Employment Skills and Business Strategy
PAF	Population Attributable Fraction
PAOC	Potential Area of Concern
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
QOF	Quality Outcomes Framework
SOAEL	Significant Observed Adverse Effect Level
WHO	World Health Organization
ZoI	Zone of Influence