

An aerial photograph of Gatwick Airport's northern runway and taxiway. The runway is a long, straight concrete strip with white markings, including the number '26' and the letter 'L'. Several aircraft are visible on the taxiway and runway. In the foreground, a large white Airbus A380 is taxiing. To its left, a smaller white aircraft is also taxiing. Further back, another white aircraft is visible. In the bottom left corner, a red and white easyJet aircraft is taxiing. The surrounding area includes green grass, paved taxiways, and airport buildings in the distance. A control tower is visible on the right side of the image.

YOUR LONDON AIRPORT
Gatwick

Our northern runway: making best use of Gatwick

Preliminary Environmental Information Report
Appendix 15.9.2: In-combination Climate Change Impacts (ICCI) Assessment
September 2021

Table of Contents

1	In-combination Climate Change Impacts Assessment	1
2	Glossary	12

1 In-combination Climate Change Impacts Assessment

1.1 Introduction

- 1.1.1 This document forms Appendix 15.9.2 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in the Chapter 5: Project Description.
- 1.1.2 The in-combination climate change impacts (ICCI) assessment is presented in Table 1.1.1 below. The assessment considers the extent to which climate change exacerbates an effect on an environmental receptor.
- 1.1.3 The ICCI assessment follows the same approach to assessing impacts and determining significance as for each of the PEIR disciplines, but with the added consideration of future climate change projections.
- 1.1.4 The full ICCI methodology is presented in Section 15.4 of Chapter 15: Climate Change and Carbon. Phase 1 aims to screen out any ICCIs that are considered to unlikely to occur and therefore do not require further assessment. Only ICCI considered to be likely have been presented in the table below.
- 1.1.5 The likelihood of each potential ICCI occurring was assessed using expert judgement based on the climate hazard assessment and the likelihood of the climate impact changing an effect already identified by another PEIR discipline.
- 1.1.6 Phase 2 assesses the consequence of the likely ICCI's identified in Phase 1 to determine significance of each ICCI.

Table 1.1.1: In-combination Climate Change Impacts Assessment

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
Historic Environment (Chapter 7)	Increase in frequency and intensity of heavy rainfall events/ flooding	Waterlogged deposits/ paleo-channels could be impacted by changes in river flows and routes	Mitigation will be undertaken during construction to ensure that waterlogged conditions are maintained. Based on our current understanding the consequence of this ICCI is minimal. Ground investigation will be completed for the Environmental Statement (ES) and will confirm the level of mitigation required, and this ICCI classification will therefore be reviewed during the ES.	Not significant
	Drier/drought conditions	Drought conditions could lead to a drying out of the ground which would lead to the loss of significance of sites as they will be less well preserved but alternatively changes in soil moisture due to hotter conditions could also uncover new archaeological finds (such as cropmarks and parch marks)		Not significant
	Drier/drought conditions	Potential shrinkage of ground could affect foundations of buildings	Potential shrinkage is unlikely because ground conditions comprise Weald clay and sands. Additionally, buildings in the vicinity have shallow or no footings; therefore, limited foundations available to be impacted by drying out of soils. The consequence of this ICCI is considered to be minimal.	Not significant
	Increase in frequency and intensity of heavy rainfall events/ flooding	This could lead to flooding and subsequent damage to the building fabric (ie timber framed buildings)	The design of the Project will not increase flood risk to the local area and therefore the consequence of this ICCI is considered to be minimal.	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
	Drier/drought conditions	Excavation during construction could lead to drying out of waterlogged ground	Spraying of fines during the excavation as part of the construction phase will maintain waterlogged conditions. Based on our current understanding the consequence of this ICCI is minimal. Ground investigation will be completed for the ES and will confirm the level of mitigation required, and this ICCI classification will therefore be reviewed during the ES.	Not significant
	Increase in frequency and intensity of heavy rainfall events/ flooding	Increased likelihood of rainfall events could lead to soil erosion negatively impacting the historic landscape	Mitigation to ensure that arable and pasture boundaries are maintained can minimise soil erosion therefore retaining the wider historic landscape. The consequence of this ICCI is deemed minimal.	Not significant
Landscape, townscape and Visual Resources (Chapter 8)	Drier/drought conditions	Some plants may not survive repeated drought conditions leading to loss of vegetation and defoliation. Plants could become more vulnerable to disease, which could further disrupt views to and from the site.	The planting proposals include matric planting, using a native species planting pallet. This will include planting of several different species, including drought resistant species, to maximise resilience of plants against pests and disease. Based on our current understanding, the consequence of this ICCI is considered minimal. Mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
		Drought tolerant trees (ie native woodland) may become more prevalent and therefore change landscape character	Drought tolerant species will be included as part of the planting proposals to minimise the risk of drought to tree species and ensure minimal impact to the landscape character. Based on our current understanding, the consequence of this ICCI is considered minimal.	Not significant
		Wetland adjacent to the River Mole may disappear (also dependent on elevation and spilt type) and certain soil types may be less readily available.	During the construction phase, mitigation will be included in the Code of Construction Practice (CoCP) to limit the amount of dewatering (Chapter 10: Ground conditions) to reduce the drying out of wetland areas during the construction phase During operation, flood attenuation areas and new ponds will be designed to have permanently damp and wet areas to support species reliant on these conditions and reduce the potential for these areas to dry out during drought conditions.	Not significant
	Hotter and wetter conditions	Could lead to an increase in pests and diseases, leading to loss of vegetation and defoliation making species more susceptible to external stress	Based on our current understanding, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES. The planting proposals will include matric planting, using a native species planting pallet. This will include planting of several different species to maximise resilience of the plant species against pests and disease. Additionally, planting proposals for species selection will specify selection of drought-resistant species. Based on our current understanding, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Increase in frequency and intensity of heavy rainfall events/ flooding	Flood events can be disruptive and cause erosion, therefore leading to loss of species in certain areas,	Flood risk mitigation in the form of flood compensation and storage areas will be developed as part of the Project to minimise erosion rates during flood events. The consequence of this ICCI is considered to be minimal.	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
		because soils become water-saturated and can no longer support existing species		
Ecology and Nature Conservation (Chapter 9)	Hotter and wetter conditions	Leading to an increase in invasive species in the local area and/ or increase in the risk of pests and diseases to ancient woodland and/or other habitats	Planting proposals (Chapter 8: Landscape, townscape and visual effects) will incorporate multiple plant and tree species to reduce the risk of potential invasive species dominating the native species at the site and maximising resilience against potential for pests and diseases. Additionally, planting proposals for species selection will specify selection of drought-resistant species. Based on our current understanding, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Drier/ drought conditions	Reduction in river flows and water levels could impact invertebrates, fish and water voles and otters	Flood risk mitigation (Chapter 11: Water Environment) includes re-alignment of the River Mole channel providing a more natural profile, improving the plan form and increasing resilience to future drought events. The consequence of this ICCI is considered to be minimal.	Not significant
		The wetter areas, the River Mole corridor, the biodiversity wetland area and ponds around the site could be showing signs of lower water levels during summer and complete drying out occurring earlier in ponds resulting in the reduction of species populations that live in these habitats	The flood attenuation areas and new ponds will be designed to have permanently damp and wet areas to support species reliant on these conditions, eg the construction of a new pond will create suitable breeding sites for great crested newts, increasing breeding area and subsequently population of this species. Creating a more stable population that is less likely to be affected by drought conditions in future. The consequence of this ICCI is considered to be minimal.	Not significant
		decline in distinctive wet grasslands communities (relevant to habitats proposed within the flood attenuation areas)	The design of flood attenuation features (Chapter 11: Water Environment) will ensure sufficient storage of flood waters to minimise drying out of "wet" habitats. The consequence of this ICCI is therefore considered to be minimal.	Not significant
Geology and Ground Conditions (Chapter 10)	Increased intensity of extreme precipitation events; increase in mean winter rainfall	Flash flooding during construction works when soils are exposed could lead to erosion of soils	Erosion of soil from flooding events during construction works will be mitigated by covering exposed soil and stockpiles and ensuring the timely reinstatement of hardstanding and vegetation to minimise the risk of soil erosion. Given the implementation of these mitigation measures, the consequence of this ICCI is considered minimal.	Not significant
		Impacts on human health and controlled waters receptors in relation to the contamination of surface waters from accidental spillages to the ground during construction	Environmental measures are in place during construction to ensure appropriate storage and handling of materials and products are in line with the Control of Pollution Regulations 2001. This impact is possible but the end use of the Project will be hardstanding and best practice measures will be in place should any spillages occur during operation. The consequence of this impact is considered to be minimal.	Not significant
		Damage to newly installed infrastructure from aggressive ground conditions (such as sulphate attack on concrete) or swelling and shrinkage of ground during construction and operation could be	The Project will be designed in accordance with requirements of relevant UK and European design standards. Detailed design will account for the ground type and water table level as well as projections of future flooding, calculated as part of the flood modelling assessment, that will feed into the design of below ground structures. Based on our current understanding the	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
		exacerbated by climate change. Increased surface water flooding could increase potential for sulphate attack or lead to water clogging and corrosion of structures.	consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	
	Drier / drought conditions	Dry and windy conditions during construction could increase dust generation during construction	Mitigation measures included within the CoCP will include damping down to prevent the generation of dust, therefore the consequence of this ICCI is considered to be minimal.	Not significant
	Increased temperatures	Potential for increased volatisation of volatile organic compound (VOC) contamination under warmer temperatures	No significant VOC contamination has been identified at present, ground investigation has been proposed and if any VOC contamination is identified then it will be remediated. Based on our current understanding, the consequence of this ICCI is considered minimal. Ground investigation will be completed for the ES and will confirm the level of mitigation required, if considered necessary, and this ICCI classification will therefore be reviewed during the ES.	Not significant
Water Environment (Chapter 11)	Increased frequency or severity of drought and flood events	Potential to alter the hydrological regime of watercourses resulting if different patterns of erosion and deposition	It is likely that the adjustment to the hydrological regime would remain localised and of relatively low magnitude given the channel types. Overall, the potential effect of climate change is unlikely to change the outcome of the assessment and the consequence of this ICCI is considered to be minimal.	Not significant
	Increased drought intensity	Potentially drier summers could lead to increasing soil moisture deficit and reduce groundwater storage and thus overall groundwater levels	The CoCP will ensure dewatering activities are minimised during construction to limit any reduction in groundwater recharge. Changes in future groundwater recharge have been considered in the Water Environment assessment. Environment Agency (EA) Climate Change scenarios have been used to show there is no change to the significance of the ICCI identified. Based on our current understanding, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Increased intensity of extreme precipitation events Increased mean winter rainfall	Changes in groundwater flow and levels	It is likely that the adjustment to the hydrological regime would remain localised and of relatively low magnitude given the channel types. Overall, the potential effect of climate change is unlikely to change the outcome of the assessment and the consequence of this ICCI is considered to be minimal.	Not significant
	Increase in frequency and intensity of heavy rainfall events/ flooding	Increased flood risk, increased discharge volume, increased surface water run-off	Flood mitigation areas and additional surface water storage areas will be constructed to reduce the risk of flooding during construction works and where required temporary buildings will be protected from flood risk with a bund. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
		Increase the risk of fluvial and surface water flooding	Mitigation to reduce flood risk includes compensatory flood storage areas and construction of additional pond areas. Environment Agency climate change allowances have been used as part of the design to reduce flood risk. Highways assets have been designed to a 1 in 100 year event with a 70% climate change allowance and all other assets have been designed to a 1 in 100 year event with a 35% climate change allowance in line with the corresponding design lives of the assets. The consequence of this ICCI is therefore considered to be minimal.	Not significant
		storm runoff from the small contributing areas discharging to the foul sewerage system would increase the flows in the network and potentially exceed the capacity of the gravity sewers or pumping stations	The potential impact was tested using the Design Year 2038 case as this exhibits the highest normal flows in the system. The Environment Agency predicts an upper end potential increase in precipitation of 20 per cent for the year 2039 and the storm flows were increased by this percentage and the performance of the system was compared to the equivalent baseline, and also the absolute impact was assessed. The increase to the storm flows increases the overall flows in the foul sewerage system by approximately 10 per cent: as a result, there are some minor increases to surcharging of the gravity pipes, and the pumps have to run for longer in order to deal with the flow, but there is no predicted flooding or significant detriment to the operation of the network. Compared to the incremental baseline with the same rainfall uplift applied, the flows are 7 per cent lower and the predicted stress on the network is considerably less due to the proposed mitigation works and changes in land use associated with the Project which will divert storm flow out of the foul system. The impact on the foul sewerage system does not change as there is no increased risk of flooding, but the system will experience higher degrees of surcharge. Based on this assessment the consequence of this ICCI is considered to be minimal	Not significant
	Increased intensity of extreme summer drought and winter precipitation events and pluvial flooding	Increased intensity of flooding could increase erosion of sediments into the water, reducing water quality and increasing pollutant load Summer droughts could also reduce water quality from reduced dilution of pollutants during the summer therefore increasing pollutants when precipitation events occur	Construction works will have a limited impact on water quality due to mitigation measures implemented through the CoCP. Based on our current understanding, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Extreme events (cold spells during winter)	The potential for cold spells of the same magnitude as today and the increase in air traffic movements could increase the use of deicer and lead to more contaminated runoff into water bodies	Whilst it is important to note that winters are anticipated to become warmer on average, cold spells will still occur. To mitigate the impact of increased contaminated runoff during cold spells when more de-icer is used, a discharge control monitoring system will be constructed to store additional contaminated runoff. Given the implementation of these mitigation measures, the consequence of this ICCI is considered minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
Traffic and Transport (Chapter 12)	Increased frequency of extreme weather events (inundation from flooding)	Airfield construction: Increase construction traffic in relation to the airfield plus flooding which could lead to road closures and delay in the construction process of the airfield	<p>There is additional traffic on the network related to the airfield construction, but traffic modelling shows that this is manageable. Capacity on the highway network therefore stays the same. Flood mapping shows that there is limited surface water (pluvial) flood risk along the A23 with exception of the North Terminal roundabout.</p> <p>The approach for mitigating potential flood risk during construction works will be defined at a later design stage and include input from the contractor. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES</p>	Not significant
		Highway construction: Increased construction traffic and temporary road closures during highway construction works plus flooding could increase stress on network	<p>There will be limited additional traffic on the network related to the highway construction works but there will be redistribution effects on the airport and background traffic related to narrow lane running and lane closures. Whilst the drainage has been resolved for the end state junction design, drainage and flood risk during construction has not yet been considered in detail.</p> <p>The Project Description (Chapter 5) states that temporary drainage will be provided during construction to prevent any temporary increase in flood risk because of the works. This is likely to consist of SuDS features and possibly some drainage and pumps. The approach for mitigating potential flood risk during construction works will be fully refined at a later design stage and include input from the contractor. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.</p>	Not significant
	<p>Increased temperatures</p> <p>Increased frequency and magnitude of heatwaves</p>	Open windows due to increased temperatures leads to negative impact on human health from traffic fumes	<p>Traffic modelling shows there will be limited additional traffic on the network related to the highway and airfield construction works. There is not considered to be any additional negative impacts to human health and no change in the significance of the impact. During construction the consequence of this ICCI is considered to be negligible.</p> <p>Noise insulation (Chapter 14: Noise), will be offered to qualifying buildings which will also act as mitigation against potential traffic fumes. Details of this will be included in the CoCP. In addition, the Air Quality assessment (Chapter 13: Air Quality) shows that the future vehicle mix will have a greater proportion of cleaner fuel sources (ie electric vehicles) which will reduce the impact of traffic fumes. Given the implementation of these mitigation measures, the consequence of this ICCI is considered to be minimal.</p>	Not significant

Discipline	Phase 1		Phase 2		
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects	
	Increased frequency of extreme weather events (ie flooding)	Adverse effect from increased stress on the existing road network in combination with frequency of extreme weather events causing flooding of roads	Highway improvement schemes have been developed as part of the Project design and will reduce the stress on the existing network. In addition, new highway infrastructure will be designed to appropriate climate change allowances, minimising any future flood risk to the highway network during operation of the Project. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant	
	Increased temperatures	Bitumen materials are susceptible to softening in heatwaves	Highways assets will be designed to standard road material specifications in line with the design life of the asset and climate change regulations as set out in the Design Manual for Roads and Bridges (DMRB). The effects of warmer temperatures on road materials in future is therefore considered to be negligible.	Not significant	
	Increased number of hot days				
Air Quality (Chapter 13)	Increased frequency and magnitude of heatwaves				
	Increased number of hot days	There may be increased dust production during the construction phase due to extended dry periods of weather. There could also be a reduction in the availability of water for dust suppression measures.	This would be mitigated as far as reasonably practicable through dust suppression methods in the CoCP. Given the implementation of these mitigation measures, the consequence of this ICCI is considered minimal.	Not significant	
		An increase in hot, dry weather conditions has the potential to change concentrations of pollutants (eg NO _x , PM10, PM2.5 and ozone (O ₃)).	Any increase in pollutant concentrations as a result of the increase in number of hot days would be offset by the expected long-term reduction in concentrations arising from cleaner fuels and engines for aircraft and road transport.	This hazard is not expected to change the results of the air quality assessment and is not expected to cause a significant effect. No additional mitigation is required. Based in on the findings of this assessment the consequence of this ICCI is considered to be minimal.	Not significant
		The conditions are likely to cause an increase in O ₃ , which will affect NO ₂ concentrations.			
An increase in the number of hot days leading to changes in wind speed and direction, has the ability to affect local pollutant levels during construction and operation.	There is uncertainty in future climate projection of changes in wind speed and direction. Increase in channeling that may be caused by changes in wind direction will increase concentrations at some receptors and decrease these at others. Due to the uncertainty of the future projections of wind data this hazard will not change the results of the air quality assessment and will not cause a significant effect. No additional mitigation is required. Based on our current understanding, the consequence of this ICCI is considered minimal.	Not significant			
Increased likelihood of extreme weather events (i.e. extreme hot or cold temperatures)	Change in auxiliary power unit (APU) usage, under extreme weather conditions.	Current practice for limiting APU usage in hot weather includes pre-cooling aircraft at the stand to reduce the need to use APU when taxiing to the runway and getting aircraft to take off in a timely manner, reducing the time of aircraft taxiing so that the cooling system uses energy from the aircraft engines rather than the APU. This is considered sufficient mitigation and this ICCI is considered to be not significant.	Not significant		

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
Noise and Vibration (Chapter 14)	Increase frequency of heatwaves	Climate Change may require greater cooling or warming of aircraft as they taxi which could increase APU usage.	APU noise is considered to be insignificant in relation to the engine noise when taxiing, and when the aircraft are at the stands, they generally do not operate the APU as they are connected to Ground Power Units (GPUs). Any change, therefore, in the use of the APU as a result of climate change, assuming there is no increase in its use at the stands, would be insignificant in terms of the assessment and results presented in Chapter 14: Noise. Based on our current understanding, the consequence of this ICCI is considered minimal.	Not significant
		Potential to exacerbate noise effects (leading to more sleep disturbance) on communities in terms of individual dwellings and on a wider community, due to windows being open more often when temperatures are warmer	As part of the Project, Gatwick's Noise Insulation Scheme will be extended to a three tier scheme to also offer ventilation in the form of acoustic ventilators that allow fresh air in when the windows are closed but do not increase noise. This scheme provides acoustic and ventilation provision to reduce noise impacts and any potential future risk of overheating for dwellings that sign up to the scheme. Given the implementation of these mitigation measures, the consequence of this ICCI is considered minimal.	Not significant
	Increased temperatures	Could affect aircraft performance and hence climb rates which could alter noise levels on the ground	An increase in temperature would have an insignificant increase on aircraft performance and there is not considered to be a change in noise level on the ground. Based on our current understanding the consequence of this ICCI is considered to be minimal.	Not significant
	Increased temperatures and changes in humidity	Potential effect on noise levels during construction caused by change in the sound absorption properties of the air, arising from an increase in temperature and humidity	Construction noise will be limited to daytime hours and construction traffic routes will be chosen to avoid villages and minor roads minimising the negative impacts of noise to local residents. In addition, Gatwick are offering a Noise Insulation Scheme as part of the project to reduce additional noise. With the implementation of these measures, the consequence of this ICCI is considered to be minimal.	Not significant
		Changes in temperature and humidity could affect the propagation of noise from airborne aircraft to the ground, and subsequently noise levels at receptors.	Modelling an increase in temperature in summer temperature of 4 degrees Celsius (with a corresponding reduction in relative humidity of 8%) gave noise levels within 1 dB of current weather conditions, so these effects are likely to be insignificant. Changes in climate could increase heatwaves in the summer months and lead to more residents opening windows more frequently for cooling in the day and at night. This could lead to greater impacts in terms of disturbance to indoor activities and sleep. The proposed enhanced noise insulation scheme for homes within the forecast $L_{eq, 16 \text{ hour}} 54 \text{ dB}$ daytime noise contour includes acoustic ventilators to allow residents to keep windows closed. The scheme is voluntary, and it may be that climate change would increase uptake, allowing for greater mitigation of noise impacts. With the implementation of these measures the consequence of this ICCI is considered to be minimal.	Not significant
	Change in wind speed and direction	Could change the runway modal split and associated changes to ground noise.	The results of modelling runway modal splits from 50% to 90% westerly are given in Chapter 14: Noise and show variations in contours areas of 3% for daytime $L_{eq, 16 \text{ hour}} 51 \text{ dB}$ contours and 2% for night-time $L_{eq, 8 \text{ hour}} 45 \text{ dB}$ contours. The variation in contours populations are 22% for daytime $L_{eq, 16 \text{ hour}} 51 \text{ dB}$ contours and 2% for night-time $L_{eq, 8 \text{ hour}} 45 \text{ dB}$ contours. An increase in wind speed could reduce noise impacts at ground level as there would be more uplift causing aircraft to rise sooner and therefore become quieter more quickly. It is not known to what extent climate	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
				change could affect runway modal split, but this analysis suggests that in itself it is not likely to have major changes in the noise impacts of the Project. Based on our current understanding the consequence of this ICCI is considered to be minimal.
Climate Change and Carbon (Chapter 15)	Change in jet stream	Change flight times due to changes in the strength of the jet stream, requires more energy to during flights travelling against the direction of the jet stream (i.e. London to New York)	Future changes in the strength of the jet stream remain uncertain and it is likely that GAL and aircraft operators already have, and will further develop as needed, operational processes in place that can adequately deal with changes in the jet stream and the associated increase in carbon emissions of some journeys. If the strength of the jet stream does change then GAL and aircraft operators should be aware that this could have an impact on carbon emissions and may require additional offsetting or alternative methods to ensure additional emissions have been adequately mitigated.	Not significant
	Increased temperatures/ droughts	Increased water use in hotels and office buildings during drought periods	By 2050 the water sector is expected to be largely decarbonised, therefore any increase in water consumption is not expected to contribute to additional carbon emissions. In addition, design of airport building is likely to consider a water strategy that would seek to reduce water consumption during operation. Once the design is sufficiently progressed, we will be better able to review the significance of this ICCI. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Increased temperatures, increased number of hot days (heatwaves)	Increased overheating risk, therefore increased use of cooling systems in terminal buildings, offices and hotels, increasing carbon emissions	By 2050 the electricity sector is expected to be largely decarbonised, therefore any increase in energy from cooling system usage is not expected to contribute to additional carbon emissions. In addition, the design of mechanical ventilation systems may choose lower carbon options (eg passive system) that would mitigate increased carbon emissions. This ICCI will be reviewed once the design of mechanical ventilation for airport buildings have been sufficiently developed and any change in the significance and associated mitigation will be developed as part of the ES.	Not significant
Socio-economic Effects (Chapter 16)	Increase in frequency and intensity of heavy rainfall events/ flooding	Access to the site being severed from flooding during construction works	Mitigation is expected to be designed to reduce the risk of flooding during construction works. The design of this mitigation will be undertaken between the PEIR and ES. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
		Access to car parking and land being severed from flooding at the site and in the surrounding area	The Project will include upgrades to local road transport infrastructure and flood risk mitigation will be incorporated into the design of new infrastructure to reduce the flood risk potential in future (See Chapter 12: Traffic and Transport). Assets have been designed to EA climate change allowances (Chapter 11: Water Environment) to ensure there is no increased risk of flooding during operation. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
		Could negatively affect journey times to the site and to nearby locations of employment	<p>Construction works will include mitigation in the form of flood compensation areas (Chapter 11: Water Environment) to ensure there is no increased risk of flooding.</p> <p>The Project will include upgrades to local road transport infrastructure and flood risk mitigation will be incorporated into the design of new infrastructure to reduce the flood risk potential in future (See Chapter 12: Traffic and Transport).</p> <p>Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES</p>	Not significant
	Increase in the frequency of extreme events (heatwaves, flooding)	Adverse effect from the increase in frequency of extreme weather events in combination with direct and indirect job creation during operation leading to increased stress of local infrastructure	The Project will include upgrades to local road transport infrastructure and flood risk mitigation will be incorporated into the design of new infrastructure to reduce the flood risk potential in future (See Chapter 12: Traffic and Transport). Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
		Could change public behaviour and the pattern of use of public spaces.	Mitigation will be provided in the form of re-provision of open space lost as part of the Project. The newly designed public space is likely to enhance existing conditions (see Chapter 18: Agricultural Land Use and Recreation for more detail) and therefore reduce negative effects of extreme events on public behaviour and patterns of use. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Drier/drought conditions	Could lead to loss of vegetation and defoliation of public space	The provision of new areas of open space in the vicinity of the land lost from Riverside Garden Park during the North Terminal Roundabout improvement works, will better address any potential negative impacts and is considered to enhance the baseline. Planting proposals (Chapter 8: Landscape, townscape and visual effects) will incorporate multiple plant and tree species to reduce the risk of drought conditions impacting on local flora. The inclusion of multiple species maximises resilience against drought conditions reducing negative impacts to vegetation in the public realm. Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
Health and Wellbeing (Chapter 17)	Increase in temperatures	Greater number of people sleeping with windows open, may alter propagation characteristics of sound through air.	It is unlikely that changes in humidity and hotter temperatures will increase noise levels in the local area during construction works because mitigation measures include restricting use of noisy plant to daytime where possible, use of low noise plant, location of plant further from noise	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
			sensitive receptors, temporary noise barriers and enclosure of stationary plant. With the implementation of these mitigation measures, the consequence of the ICCI is considered minimal.	
		Potential for ticks and other insects to carry and spread disease to the workforce	There will be provision of an Occupational Health Management plan to mitigate any potential risks to vulnerable receptors during construction and operation. Based on our current understanding the consequence of this ICCI is considered to be minimal. This potential ICCI will be assessed in further detail, during the ES once we have received further information on the contents of the Occupational Health Management Plan.	Not significant
		Change the dispersion of air pollutants in the air reducing local air quality	The Air Quality team indicate that future emissions are likely to be lower in future due to cleaner fuels and therefore this would be less of an issue on health and wellbeing during the operational phase. Based on the current understanding, the consequence of this ICCI is considered to be minimal.	Not significant
	Increase in frequency of extreme weather events (eg drought, flooding, heat waves)	Potential impact of flooding and increased storm events leading to isolation via reduction of active travel options	Surface transport infrastructure will be designed to Environment Agency guidance on Flood risk assessments including climate change allowances (Chapter 11: Water Environment). Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
		Hotter summer extremes and cold winter extremes may increase summer and winter mortality rates	There will be provision of an Occupational Health Management plan to mitigate any potential risks to vulnerable receptors during construction and operation. Based on our current understanding the consequence of this ICCI is considered to be minimal. This classification will be reviewed during the ES, once we have received further information on the contents of the Occupational Health Management Plan.	Not significant
	Increase in frequency and intensity of heavy rainfall events	Increased frequency and intensity of storm events lead to reduced opportunity for the additional workforce to access and enjoy open space and nature, reduced suitability of conditions for active travel options	Surface transport infrastructure will be designed to Environment Agency guidance on Flood risk assessments including climate change allowances (Chapter 12: Water Environment). Based on our current understanding the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Hotter and drier/drought conditions	Potential for temporary buildings to suffer from overheating due to increased temperatures and leading to less ambient working conditions during construction	Mitigation will be designed to ensure temporary buildings are resilient to overheating during construction works. This is addressed in the CCR assessment. Based on this, the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
Agricultural Land Use and Recreation (Chapter 18)	Increased intensity of extreme precipitation events	Increased intensity of rainfall events could result in flash flooding as water won't be able to infiltration into the clay soils fast enough	Exposed soils are not particularly eroding because they are predominantly clay. There will also be a soil management strategy to maintain soil drainage and minimise damage to the soil structure. Given the existing ground conditions and implementation of mitigation measures, the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES	Not significant

Discipline	Phase 1		Phase 2	
	Climate change hazard	Likely ICCI identified	Consequence of ICCI considering embedded environmental measures/ good practice	Significance of ICCI effects
	Increase in mean winter rainfall		and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	
	Increased temperatures Increased likelihood of heatwaves	Increased warming trends could extend the summer season for outdoor activities which could increase erosion	The soil structure is predominantly clay based which reduces the potential for erosion of soils and there will also be a Soil Management Strategy implemented to minimise degradation of soils. Given the existing ground conditions and implementation of mitigation measures, the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
	Drier/ drought conditions	More walkers during drier weather episodes could deplete current vegetation and increase soil disturbance	The soil structure is predominantly clay based which reduces the potential for erosion of soils and there will also be a Soil Management Strategy implemented to minimise degradation of soils. There will also be a vegetation strategy minimise the loss of vegetation under drier conditions. Given the existing ground conditions and implementation of mitigation measures, the consequence of this ICCI is considered to be minimal. This ICCI will be reviewed during the ES and mitigation may be proposed, if considered necessary, following any Project refinements and further assessment as part of the ES.	Not significant
		Lower water levels in water courses, could reduce the availability of fish for fishing - negative impacts on fishing recreational activities	Flood risk mitigation includes re-alignment of the River Mole channel providing a more natural profile, improving the plan form and increasing resilience of local water bodies to future drought events. Based on our current understanding, the consequence of this ICCI is considered to be minimal.	Not significant
		Land could be used for longer periods and there could be a change in the mix of land uses	Given the land use types and Agricultural policies for Weald Clay it is likely that there will only be minor changes in land use in future. The consequence of this ICCI is therefore considered to be minimal.	Not significant

2 Glossary

2.1 Glossary of Terms

Table 2.1.1: Glossary of Terms

Term	Description
APU	Auxiliary Power Unit
CoCP	Code of Construction practice
EA	Environment Agency
EIA	Environmental impact Assessment

Term	Description
ES	Environmental Statement
GAL	Gatwick Airport Limited
GPU	Ground Power Unit
ICCI	In-Combination Climate Change Impact
O ₃	Ozone
PEIR	Preliminary Environmental information Report
VOC	Volatile Organic Compound