

15 Impact Interactions

15.1 Introduction

- 15.1.1 Significant environmental effects can result from incremental changes caused by the interactions between effects resulting from a development.
- 15.1.2 The direct and indirect effects of the Proposed Development have been assessed within the relevant topic chapters of the ES prepared by suitable technical specialists. Environmental effects are assessed relative to the topic under consideration. This approach can lead to the interaction of effects being reported in separate chapters but the collective effect on the same environmental resource(s) not being considered.
- 15.1.3 In response, this chapter, prepared by Stantec, summarises the principal findings of each topic chapter of the ES to enable assessment of the potential for impact interactions.

15.2 Methodology

- 15.2.1 The assessment methodology (as further discussed in **Chapter 5**) involves the identification of impact interactions associated with the construction and operational phases of the Proposed Development upon one or more environmental resources. This is undertaken using a qualitative appraisal process. Receptors have been grouped into 'Natural Resources' and 'Human Beings and Society' categories.
- 15.2.2 A summary of further mitigation measures is provided in **Table 16.1** and **Table 16.2** which has been used to help identify where there is a likelihood for potential significant adverse impact interactions to occur. This has been determined by considering the capacity of the receptors to accommodate the changes likely to occur as a result of the identified impacts.

15.3 Construction Effects

- 15.3.1 As set out in **Chapter 5**, careful management of the construction works is proposed, including through the implementation of a Framework Construction Environmental Management Plan (CEMP) (**Appendix A.9**). The Framework CEMP will implement proven industry standard construction practices. A Construction Traffic Management Plan (CTMP) will be prepared before construction commences on Site and will be secured through a planning condition as part of the CEMP. With effective mitigation applied through the Framework CEMP, adverse effects of construction will be minimised.
- 15.3.2 As a result, the majority of the construction effects identified in **Chapters 7 – 14** are not significant. The following sections discuss, in more detail, impact interactions and effects associated with the construction phase.

Natural Resources

- 15.3.3 The interactions of construction impacts from habitat loss, dust pollution, changes to noise levels, dust, hydrology and lighting on ecological receptors are considered. The implementation of the CEMP reduces the effect on many sensitive receptors during construction to minor adverse or negligible, which is not significant. These receptors include Hayes Wood Local Wildlife Site (LWS), bats, badgers and dormice. Receptors where adverse construction effects cannot be reduced below significant levels are barn owls and skylark. The biodiversity assessment inherently considers impact interactions on ecological receptors as it deals with noise, dust, lighting and human presence. A CEMP will be prepared for each phase of the development to mitigate adverse effects on retained receptors that are both on and off site during any activities associated with construction and will be secured through a

planning condition. This includes careful timing of vegetation clearance to avoid breeding bird season, pollution prevention from run off, encroachment of vehicles and personnel into restricted areas, and the control of other environmental pollutants such as dust, noise, light and litter to reduce impacts. For example, night work will be limited to reduce lighting, lighting strategies will be designed to reduce light spill and methods to prevent dust such as spraying, vegetation planting or covering of soil storage will be implemented.

- 15.3.4 GHG emissions have the potential to impact the global atmosphere. All GHG emissions should be considered significant and therefore, even with the further mitigation outlined above, the residual effect of the Proposed Development on climate change during construction remains as moderate adverse. Emissions during construction are associated with emissions from the combustion of fossil fuels on Site during construction activities, land clearance and enabling activities and purchased electricity for welfare facilities and lighting. The Proposed Development will implement mitigation measures to reduce these emissions through responsible and sustainable construction practices. Construction activities, including transport, energy consumption and plant emissions will be monitored and managed through a CTMP and CEMP. The ES has also documented how a changing climate could affect the Proposed Development.

Human Beings and Society

- 15.3.5 Existing local residents, including those already living within the Site, are the most sensitive human receptors to potential temporary impact interactions during the construction phase of the Proposed Development. The Noise and Vibration assessment identifies that local residents in the immediate surrounding area of the Site, including receptors along Cleve Road, Brentry, Charlton Common, Fishpool Hill, Passage Road, Catbrain Hill, Charlton Hayes, and Brabazon Phase 1 could experience up to minor noise effects during construction. Effects of construction vibration will be negligible. The Air Quality assessment identifies that air quality effects on local residents in the immediate surrounding area of the Site would not be significant during construction. The transport assessment concluded that there would be no significant transport effects during construction. Local residential receptors may experience significant adverse visual effects in relation to views from Catbrain Hill, Fishpool Hill and Southmead Road, reducing to minor effects for residents on Bishopthorpe Road, in Charlton Hayes. Implementation of CEMPs will mitigate short-term effects, for example through measures to control dust and noise activities, and to control construction working hours and lighting of construction activities.
- 15.3.6 The socio-economics assessment identified beneficial effects to the population and economy through the creation of construction jobs.
- 15.3.7 The main sources of direct GHG emissions during construction relate to the combustion of fossil fuels during the transportation of building materials and waste by Heavy Goods Vehicles (HGV) to and from the Site, as well as powering construction plant engines and equipment. And emissions land clearance. The temporary construction office and welfare facilities for construction workers and temporary lighting on the Site will require electricity purchased from the National Grid. This will result in indirect GHG emissions generated from the burning of fossil fuels to deliver electricity to the National Grid.
- 15.3.8 There is anticipated to be an increase of average annual temperature and decrease in average annual precipitation over the construction period. Climate hazards have the potential to disrupt or delay the construction programme and affect suitable working hours due to unsafe conditions for workers and potential damage to equipment or works. The risk of climate hazards, for example from heatwaves or periods of heavy precipitation may increase during the construction period however it is expected that these will be managed through standard construction and health and safety practices outlined in the CEMP, such as securing material/equipment and not undertaking works during periods of extreme rainfall. The effect of climate change on the Proposed Development during the construction phase is therefore likely to be negligible and not significant.

15.3.9 No further impact interactions have been identified for these receptors.

15.4 Operation Effects

Natural Resources

- 15.4.1 The Proposed Development has been designed to retain high-quality trees, incorporate the Filton Wood 30m buffer, implement the new green infrastructure framework, and establish new parks and associated tree planting including street tree planting, which would positively contribute to the Site appearance and character integration of the new townscape character resulting in a moderate beneficial effect after 15 years. The green infrastructure will increase the coverage of the Site with habitat that can be used by bats, common bird species and hedgehog to move through the environment where they have previously been unable to due to the expanse of land and lack of linking habitats. The biodiversity assessment inherently considers impact interactions on ecological receptors as it deals with noise, dust, lighting and human presence. The boundaries of the Proposed Development will remain largely intact and be enhanced and bolstered through planting. This will provide beneficial impacts upon bats, common bird species and hedgehogs. In addition, this would contribute to the protection of Listed buildings including: Pillbox and WWI Hangars 16U and 16M, resulting in a moderate beneficial effect.
- 15.4.2 A Landscape and Ecology Management Plan (LEMP) will be produced to detail the planting throughout the Site for the benefit of wildlife. An Ecological Mitigation and Management Strategy (EMMS) will also be prepared for the Site and will include consideration of the maintenance/management measures associated with onsite ecological receptors that are to be retained, enhanced, and created within the Proposed Development and will include any landscape proposals not specifically associated with the ecological management.
- 15.4.3 The Flood Risk Assessment concluded that the Proposed Development is sustainable from a flood risk perspective. With regards to ground conditions and contamination, with implementation of the remediation strategy agreed for the extant planning consent, effects are negligible.

Human Beings and Society

- 15.4.4 There will be residual beneficial effects to the population, housing and economy as a result of the provision of new housing, jobs, community services, schools and commercial development.
- 15.4.5 Increases in traffic generated as a result of the Proposed Development have been assessed with regards to their impact on users of the Site within the noise and air quality assessments. The change in noise levels at noise sensitive receptors as a result of traffic generated by the Proposed Development is likely to be negligible. Effects to air quality as a result of the operational development are also negligible.
- 15.4.6 Effects on drivers, pedestrians and cyclists using the Site have been identified as minor adverse with regards to severance, driver delay, accidents and safety; and negligible with regards to fear and intimidation. Moderate beneficial effects, which are significant, were identified for pedestrian and cyclist delay, enabled through the delivery of high quality pedestrian and cycle links throughout the Proposed Development that will end the Site being a major barrier to pedestrian and cycle movements in the area.
- 15.4.7 Adverse effects, some of which are significant, are identified with regards to public transport capacity for buses, but it should be noted that this is based on provision planned through the extant planning consent. As phases of development come forward public transport capacity will be reassessed closer to the time and mitigation put in place to reduce effects to acceptable levels. With regards to Mass Rapid Transport and Rail capacity, residual effects of no greater than minor adverse have been identified, which are not significant. As for bus

capacity, new MRT and Rail services are expected to accommodate an increased demand which will be reassessed closer to the time.

- 15.4.8 The Proposed Development will alter views for those living in the areas surrounding the Site. Beneficial, long-term visual effects which are of moderate levels of significance, and therefore are significant, are assessed for Hayes Way (Brabazon roundabout); Filton Golf Course; A38 Gloucester Road and the A38 Approach. Adverse, long term visual effects which are of major levels of significance, and therefore significant, are assessed for people's views from Catbrain Hill and Fishpool Hill, which are on or close to the Site boundary. Moderate levels of significance, that are significant and adverse are identified for the Earth Structure and the western end of Blaise Castle Estate. Visual effects which are long term and of minor levels of significance (not significant) are assessed for views from Hayes Way (Concorde Roundabout), Haw Wood, the public right of way from the golf course to Brentry, Bristol Parkway Station, Southmead Road, Bishopthorpe Road, Dragon Road corner in Winterbourne, Charlton Boulevard and the Mall at Cribbs Causeway. A negligible effect was assessed for effects on people's views from Okebourne Open Space.
- 15.4.9 Generally visual effects are reduced by Year 15 when all planting on the Site is established.
- 15.4.10 The assessment identified a minor adverse effect resulting from operational GHG emissions. The mitigation for the Proposed Development is in line with local policy and is considered to be in line with measures necessary to achieve the UK's trajectory towards net zero. It is recognised that climate change has the potential to impact, and be impacted by, many of the disciplines assessed including transport, biodiversity, and air quality. Therefore, a coordinated approach is needed for climate change mitigation measures to provide climate resilience within the Proposed Development. It is considered that, with the implementation of embedded mitigation measures and careful consideration of climate change mitigation and adaptation measures at the design stages, the effects identified within the topic chapters will not be exacerbated as a result of climate change and in-combination effects are therefore negligible. For example, mitigation in regard to high winds involves implementing soft landscaping and screening which has benefits from a wind microclimate and climate change resilience perspective. The implementation of EMMS and planting strategy would reduce moderate adverse effects to minor.
- 15.4.11 Operational noise affecting proposed noise sensitive residential properties could experience up to minor noise effects during operation and the overall impact on internal noise levels in the proposed dwellings would be negligible. The noise effects on proposed employment and mixed-use areas and proposed schools would be negligible.
- 15.4.12 No further impact interactions have been identified for these receptors.

15.5 Summary

- 15.5.1 A limited number of significant adverse impact interactions have been identified for any sensitive receptors assessed within topic chapters of this ES during the construction and operational phases of the Proposed Development, and mitigation has been proposed where required to reduce effects as far as possible. Several beneficial effects have also been identified both during construction and operation of the Proposed Development.