11 Effect Interactions

11.1 Introduction

11.1.1 This chapter assesses the interaction of individual effects of the Development upon identified receptors / resources from multiple technical topics in the EIA (known as 'intra-project' effects). This chapter forms part of the cumulative assessment provided within this ES.

11.1.2 An explanation of the approach to the assessment of inter-project effects of the Development with other cumulative schemes is provided in Chapter 3: EIA Methodology. The inter-project cumulative assessments are provided in each technical chapter of this ES (Chapters 7 – 10 and Volume II).

11.2 Methodology

11.2.1 There is no consistent guidance or standardised approach to the assessment of effect interactions. However, it is recognised that the Development could have the potential to give rise to impacts upon a number of different receptors, some of which have the potential to combine to become significant effects.

11.2.2 Table 11.1 indicates where effect interactions could potentially occur between topics that have been scoped into the EIA. Topics scoped out of the EIA (as set out in Chapter 3: EIA Methodology) are not considered in this assessment as no effects and therefore potential for effect interactions are expected. These out-of-scope topics are therefore not considered further in this chapter.

11.2.3 Some topics take a receptor-based approach which inherently considers effect interactions. This includes Chapter 10: Population and Human Health which considers air quality, noise and other impacts as part of its assessment on population and human health receptors. Chapter 7: Climate Change and Greenhouse Gas Emissions is also an effect interaction assessment as it considers the emissions from traffic introduced by the construction and operational stage as well as air quality emissions from the Development. As such, these topics are not considered further in this assessment as the effect interactions have already been assessed and reported in the relevant technical topic chapter.

Table 11.1: Effect Interactions Scoped into EIA

Topic	Climate Change and Greenhouse Gases*	Noise and Vibration	Air Quality	Population and Human Health*	Landscape and Visual Impacts
Climate Change and Greenhouse Gases*		N	Y	N	N
Noise and Vibration	N		Y	Y	Y
Air Quality	Y	Y		Y	Y
Population and Human Health*	N	Y	Y		N
Landscape and Visual Impacts	N	Y	Y	N	

N: No potential for effect interactions.

Y: Potential for effect interactions.

*Effect interaction assessment inherent within the topic assessment.

11.2.4 As such the following technical topics are taken forward for further assessment:

- Air Quality;
- Noise and Vibration; and
- Landscape and Visual Impact.

11.2.5 Table 11.2 summarises the receptor-based effect interactions assessment process which has been used for construction (retrospective), operation and decommissioning of the Development for the above topics. The assessment of each stage of the project are considered in subsequent sections (11.3 – 11.5).

Table 11.2: Effect Interactions Assessment Process

Step	Description
Step 1: Identify and categorise receptors	Identify all topic sensitive receptors and their geographical locations based on the study areas and study areas of the respective technical assessments. These are then categorised by type.
Step 2: Identify impacts	Identify all topic impacts associated with sensitive receptor(s) / receptor types.
Step 3: Screen receptors and associated impacts	Undertake a screening exercise upon the identified receptors and impacts. Items are screened out from further assessment if they are: ▪ Receptors where no topic impacts overlap; ▪ Receptors with no temporal overlap with topic impacts; or

Step	Description
	▪ Receptors where topic impacts are identified as 'negligible'.
Step 4: Assess effect interactions	Undertake a qualitative assessment based on professional judgement of the effect interactions.

11.3 Construction Assessment of Effect Interactions (Retrospective)

Step 1: Identify and Categorise Receptors

11.3.1 Based on the topics outlined in paragraph 11.2.4 and the methodologies applied, it is considered that the sole receptor group where there is potential for effect interactions to occur are ground level human receptors (i.e. pedestrians, visitors, residents, workers etc.) within the surrounding area. On this basis, the construction (retrospective) assessment of effect interactions has been limited to this receptor group.

Study Area

11.3.2 The study area, or Zone of Influence (ZoI), for the intra-project interactions assessment was defined by the study areas of these environmental topic assessments, which are discussed in the relevant topic chapters, and summarised in Chapter 3: EIA Methodology.

11.3.3 The study area for the assessment of Noise and Vibration and Air Quality[i] extends to the Site and immediate locality (up to 380m and 350m respectively), while the study area for Landscape and Visual effects has a broader extent – approximately 5km from the centre of the Site.

11.3.4 Consequently, there is a spatial overlap with all topics within a circa 380m[ii] radius of the Site, and therefore all effects on receptors within a 380m radius of the Site are considered. Beyond this distance it is not considered that there is any potential for intra-project interactions as there would be no spatial overlap between environmental topics.

Step 2: Identify Impacts

11.3.5 The assessment focuses on those individual receptors that could have been affected by multiple effects from more than one technical topic. Therefore, the baseline for the effect interactions assessment comprises the residual Noise and Vibration, Air Quality, and Landscape and Visual effects, affecting:

- Occupants and visitors of properties in close proximity to the Site boundary (up to 380m from the Site boundary), users of nearby open space and pedestrians and cyclists on the surrounding road network (up to 380m from the Site boundary).

[i] Within the Air Quality assessment, ecological receptors were considered with a spatial scope of up to 10km from the Site, but for the purpose of this chapter only human receptors are considered as no effects on ecological receptors were identified.
[ii] 380m has been used for the purposes of this assessment (rather than 350m) to ensure a worst-case assessment.

Step 3: Screen Receptors and Associated Impacts

11.3.6 Only beneficial or adverse residual effects identified in the technical chapters classified as being minor, moderate and major or significant have been considered. Residual effects considered negligible, neutral, no change or not significant are not considered as they would likely have been imperceptible to receptors. As such, it is reasonable to conclude there would have been no effect interactions.

11.3.7 For the retrospective construction assessment of the Development, effects that are of 'minor' significance or greater have only been identified for construction vibration and views and visual environment within the Landscape and Visual Assessment for Views 1-4, 9 and 11. However, Views 9 and 11 are in excess of 380m from the Site and therefore there is no spatial overlap with the construction vibration effects (See Step 1) and therefore these receptors (i.e. Views 9 and 11) are not considered further within this assessment.

11.3.8 All construction noise, construction traffic noise and construction air quality effects would have been negligible. All landscape character effects and effects to views and visual environment from all other viewpoints have been assessment as 'not significant'. As such, detailed assessments of these construction effects are not included within the effect interactions assessment.

11.3.9 Table 11.3 provides an assessment of the effect interactions likely to have been experienced by each receptor group for the construction (retrospective) phase.

Table 11.3: Potential Effect Interactions – Construction (retrospective) Development

Receptor (1)	Chapter (2)	Residual Effect (as reported in Topic Chapter) (3)	Assessment of Effect Interaction (4)
Occupants and visitors of properties in close proximity to the Site boundary, users of nearby open space and pedestrians and cyclists on the surrounding road network (up to 380m from the Site boundary).	Chapter 8: Noise and Vibration	Temporary negligible to minor adverse effects from construction vibration.	Based on the residual construction effects outlined within column 3 of this table, there is potential for effect interactions on identified receptors. Potential effects are discussed in further detail under Step 4: Assess effect interactions.
	Volume II: LVIA	Temporary significant adverse effects for the views and visual environment in relation to Views 1-4.	

Step 4: Assess Effect Interactions

11.3.10 Residents of surrounding properties within 380m of the Site and users of the local road network and open space would have experienced residual vibration and landscape and visual effects during construction works. In practice, the exact location and duration of construction activities would have varied as the Development is built out meaning individual residential receptors will experience fluctuations in the magnitude of the aforementioned effects over the course of the construction period. Although effects have been identified as potentially acting on one receptor group for a specific period of time, the nature of these effects are not considered to be synergistic.

11.3.11 Therefore, the lack of synergistic interaction along with the varying effect source location and intensity during construction is unlikely to result in effects greater than individual residual effects identified for vibration and landscape and visual in isolation. As such, a neutral effect interaction which would not be significant.

11.4 Operational Development Assessment of Effect Interactions

Step 1: Identify and categorise receptors

11.4.1 Based on the scoped in topics and the methodologies applied, the sole receptor group where there is potential for effect interactions to occur are ground level human receptors (i.e. pedestrians, visitors, residents, workers etc.) within the surrounding area. On this basis, the operational Development assessment of effect interactions is limited to this receptor group.

Study Area

11.4.2 The study area for the assessment of Noise and Vibration extends to the Site and immediate locality up to 380m. The detailed air quality dispersion modelling included specific sensitive receptors (existing and future) within the immediate vicinity of the Site and a cartesian grid of 65m resolution centred on the Site up to 2.5km from the Site. The study area for Landscape and Visual Assessment of effects is approximately 5km from the centre of the Site.

11.4.3 Consequently, there is a spatial overlap with all topics within a circa 380m radius of the Site, and therefore all effects on receptors within a 380m radius of the Site are considered. From 380m to 2.5km, only intra-project interactions between air quality and landscape and visual are considered. Beyond 2.5km it is not considered that there is any potential for intra-project interactions as there is not spatial overlap between topics.

Step 2: Identify Impacts

11.4.4 The baseline for the effect interactions assessment is formed of the residual Air Quality, Noise and Vibration, Landscape and Visual Assessment effects affecting:

- Occupants and visitors of properties in close proximity to the Site boundary (up to 2.5km from the Site boundary), users of nearby open space and pedestrians and cyclists on the surrounding road network (up to 2.5kms from the Site boundary).

Step 3: Screen Receptors and Associated Impacts

11.4.5 For the operational Development, effects that are of 'minor' significance or greater have only been identified for operational noise within the ES. All air quality effects are negligible/insignificant, and all landscape and visual effects are no change or not significant. As such, detailed assessments of these operational effects are not included within the effect interactions assessment.

11.4.6 Given that only one technical topic assessment (operational noise) has identified a single residual effect of minor significance or greater for the operational Development, there is therefore no potential for an effect interaction to occur with other technical topics. As a result, no effect interaction is predicted for the operational phase of the Development.

11.5 Decommissioning Assessment of Effect Interactions

11.5.1 Due to the nature of any future decommissioning, it is reasonable to expect that the potential for effects interactions would be the same as for the construction phase.