

Chapter 13: Effect Interactions

INTRODUCTION

- 13.1 This chapter of the ES summarises the likelihood for intra-project effects or ‘effect interactions’. Effect interactions occur as a result of interactions between multiple individual effects associated with just one project on a particular receptor i.e. the combination of individual effects, for example effects in relation to noise, airborne dust and traffic on a receptor. Note that inter-project i.e. effects in combination with other developments or ‘cumulative schemes’ have been discussed separately throughout this ES (in **ES Volume 1, Chapters 6 to 12** and **ES Volume 2**) as appropriate and have not been re-iterated within this ES chapter to avoid repetition.
- 13.2 There is no established EIA methodology for assessing the nature and scale of effect interactions on a receptor. However, the European Commission¹ (EC) has produced guidelines to assist EIA practitioners in developing an approach which is appropriate to a project. These guidelines have been used to develop an approach which uses the defined residual effects of the Proposed Development to determine the potential for effect interactions.
- 13.3 These residual effects are reliant on mitigation measures (as identified throughout this ES), which have been assumed to be undertaken/adopted.
- 13.4 The approach to defining effect interactions, involves tabulating the residual effects of the Proposed Development against receptors or, where more appropriate, receptor groups to identify the potential for effect interactions. Residual effects that are beneficial or adverse in nature and that are minor, moderate or major in scale have been considered. Residual effects that are negligible in scale and neutral in nature have been omitted, as these effects are, by definition, imperceptible and insignificant. It is not considered that there would be a scenario where multiple negligible effects could lead to a significant effect interaction.
- 13.5 A quantitative approach has not been undertaken to the assessment of effect interactions. Instead, the potential for an effect interaction is discussed qualitatively using professional judgement to determine whether the potential effect interactions (i.e. combination of individual effects) results in an inter-project cumulative effect on the receptor in question.
- 13.6 Intra project cumulative effects or effect interactions arising from the demolition and construction works and the completed and occupied Proposed Development are discussed in the following sections of this ES chapter.
- 13.7 Adverse residual effects are shaded in ‘orange’, beneficial residual effects are shaded in ‘green’ and neutral effects are shaded in ‘blue’ for ease of identification.

DEMOLITION AND CONSTRUCTION

- 13.8 Table 13.1 presents the intra-project cumulative effects assessment associated with the demolition and construction works of the Proposed Development and, identifies the potential for effect interactions.
- 13.9 Where the potential for an effect interaction is identified, this is discussed in more detail below.

Table 13.1 Potential for Effects Interactions – Demolition and Construction

Receptor	Residual Effects	Scale and Nature	Potential for Intra-Project Cumulative Effects / Effect Interactions
Existing Residential Dwellings	Noise and Vibration Construction noise from demolition and construction activities to the following receptors: - Cobbles; - Hazel House; - Beech House; - 62-66 Westfield Avenue; - 54-60 Westfield Avenue; - 51-63 Westfield Avenue; - 1 & 3 Westfield Grove; - 67 & 78 Granville Road;	Minor to Major Adverse (Significant)	Yes Potential for interactions to occur between construction noise from demolition and construction activities, construction traffic noise, vibration, daylight and sunlight.
	Noise and Vibration Construction noise from demolition and construction activities to the following receptors: - Kingfield Close (Pond House, Kingfield Cottage, The Cedars, Nut Cottage and Penlan); and - Kingfield Drive (Cotwolds, Chinthurst and 7 Kingfield Drive).	Minor to Moderate Adverse (Significant)	
	Noise and Vibration Vibration effects during piling to the following receptors: - Hazel House, - 63a and 63 Westfield Avenue; - 1 Westfield Grove; - 67 Granville Road; - Penlan; - Nut Cottage; and - The Cedars.	Minor Adverse (Not Significant)	
	Noise and Vibration Noise from construction traffic to the following receptors: - Kingfield Road (Cobbles); - Westfield Avenue (Hazel House, Beech House, 62-66 Westfield Avenue, 54-60 Westfield Avenue and 51-63a Westfield Avenue); and - Kingfield Close (Pond House, Kingfield Cottage, The Cedars, Nut Cottage and Penlan).	Minor Adverse (Not Significant)	
	Daylight Reduction in daylight received by residential properties.	Negligible to Moderate Adverse (Significant)	
	Sunlight Reduction in sunlight received by residential properties.	Minor Adverse (Not Significant)	
Introduced Residential Receptors	Noise and Vibration Construction noise from demolition and construction activities to Block 1.	Minor Adverse (Not Significant)	No (No effects to interact with).

¹ European Community (1999); Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

Receptor	Residual Effects	Scale and Nature	Potential for Intra-Project Cumulative Effects / Effect Interactions
Pedestrians and Cyclists	Wind Microclimate Thoroughfares	Negligible to Moderate Beneficial (Not Significant)	No (No effects to interact with).
Pedestrians	Wind Microclimate Entrances	Negligible to Minor Beneficial (Not Significant)	No (No effects to interact with).
Townscape and Landscape Receptors	Townscape Character Areas TCA1 – Westfield	Moderate Adverse (Significant)	No (No effects to interact with).
	Townscape Character Areas TCA3 – Woking Town Centre South and Mount Hermon	Minor Adverse (Not Significant)	
	Landscape Character Areas LCA1 – Hoe Stream Valley	Minor to Moderate Adverse (Not Significant)	
Views	Visual RV2 - Woking Leisure Centre entrance; RV5 – Loop Road Sports Field; RV7 – Westfield Avenue; and RV8 – Hoe Valley Linear Park.	Moderate Adverse (Significant)	No (No effects to interact with).
	Visual RV1 – Junction of Wych Hill Lane and Claremont Avenue; and RV8 - Hoe Valley Linear Park.	Minor to Moderate Adverse (Not Significant)	
	Visual RV3 – Elmbridge Lane; RV6 – Westfield Road; RV9 - Hawthorn Road; RV10 - Wych Hill Lane; RV11 - Brooklyn Road; RV12 - St Peters Recreation Ground; RV13 - River Wey footbridge; RV15 - Claremont Avenue; RV16 – The Moorlands; and RV17 - Rydens Way.	Minor Adverse (Not Significant)	
	Visual RV14 - Surrey Hills AONB	Minor Neutral (Not Significant)	
Climate Change	GHG Emissions GHG emissions as a result of demolition and construction activities	Adverse (Significant)	Yes (Can interact with all effects).

13.10 Table 11.1 shows that there is the potential for effect interactions to take place during the demolition and construction of the Proposed Development; effect interactions are limited to existing residential receptors.

13.11 Effects interactions to existing residential receptors have the potential to occur between construction traffic noise, construction noise from demolition and construction activities and vibration from piling. Significant adverse effect interactions have the potential to occur in relation to the following properties: Cobbles, Hazel House, Beech House, 62-66 Westfield Avenue, 54-60 Westfield Avenue, 51-63 Westfield Avenue, 1 Westfield Grove, 67 Granville Road, Pond House, Kingfield Cottage, The Cedars, Nut Cottage and Penlan.

13.12 Additionally, noise and vibration effects could interact with reductions in daylight and sunlight as the construction of the Proposed Development progresses to cause a significant adverse effect interaction. However, due to the timescale of the effects they are unlikely to occur at the same time – as daylight and sunlight effects would occur near the end of the construction phase whilst noise and vibration effects are likely to be experienced prior to this point. Therefore, an effect interaction is unlikely to occur.

COMPLETED DEVELOPMENT

13.13 Table 13.2 presents the intra-project cumulative effects assessment associated with the completed and occupied Proposed Development and, identifies the potential for effect interactions.

13.14 Where the potential for an effect interaction is identified, this is discussed in more detail below.

Table 13.2 Potential for Effects Interactions – Completed Development

Receptor	Residual Effects	Scale and Nature	Potential for Intra-Project Cumulative Effects / Effect Interactions
WBC housing need / demand	Socio-Economics Provision of 1,048 residential units contributing to policy targets	Moderate Beneficial (Significant)	No (No effects to interact with).
Local Economy	Socio-Economics Additional spending by residents	Minor Beneficial (Not Significant)	Yes (Potential for effect interactions with spending on the local economy).
	Socio-Economics Generation of additional employment	Minor Beneficial (Not Significant)	
Leisure Provision	Socio-Economics Improvement of leisure provision	Minor Beneficial (Not Significant)	No (No effects to interact with).
Education Provision	Socio-Economics Impact on primary education provision	Minor Adverse (Significant)	Yes (Potential for effect interactions to occur with regards to education provision).
	Socio-Economics Impact on secondary education provision	Minor Adverse (Not Significant)	
Public Realm	Socio-Economics Additional pressure on local open spaces	Minor Adverse (Not Significant)	Yes (Potential for effect interactions to occur with regards to public realm).
	Socio-Economics Additional pressure on local play space	Minor Adverse (Not Significant)	
Existing Residential Receptors	Noise and Vibration Increase in road traffic noise at existing properties along Kingfield Road (Cobbles), Westfield Avenue (Hazel House, Beech House, 62-66 Westfield Avenue, 54-60 Westfield Avenue and 51-63a Westfield Avenue) and Kingfield Close (Pond House, Kingfield Cottage, The Cedars, Nut Cottage and Penlan.	Minor Adverse (Not Significant)	Yes (Potential for effect interactions with increased noise levels, reductions in daylight and sunlight).
	Noise and Vibration Noise resulting from crowd dispersion along Guildford Avenue/Claremont Avenue, Kingfield Avenue, White Rose Lane and within Woking Park.	Minor Adverse (Not Significant)	
	Noise and Vibration	Minor	

Receptor	Residual Effects	Scale and Nature	Potential for Intra-Project Cumulative Effects / Effect Interactions
	Increase in stadium noise at existing properties: Pond House; Kingfield Cottage; The Cedars; Nut Cottage; Penlan; 67 & 78 Granville Road; 1, 3, 51, 53 & 55 Westfield Avenue.	Adverse (Not Significant)	
	Daylight Reduction in daylight received by existing residential properties: Elm View, Kingfield Road; 2 Westfield Road; Beech House, Sycamore Avenue; and Hazel House, Sycamore Avenue.	Negligible to Moderate Adverse (Not Significant)	
	Daylight Reduction in daylight received by existing residential properties: Cotswolds, Kingfield Road; Penlan, Kingfield Green; 67 Granville Road; 1 Westfield Grove; 54, 56, 58, 60, 61, 62, 64 & 66 Westfield Avenue; Ash House, Acer Grove	Negligible to Minor Adverse (Not Significant)	
	Sunlight Reduction in sunlight received by Hazel House, Sycamore Avenue	Negligible to Minor Adverse (Not Significant)	
	Air Quality Increased levels of nitrogen dioxide at limited residential receptors	Negligible to Moderate Adverse (Not Significant*)	No (No effects to interact with).
Introduced Residential Receptors	Noise and Vibration Site suitability (internal noise levels during match days)	Minor Adverse (Not Significant)	Yes (Potential for effect interactions to occur in relation to noise levels experienced by introduced receptors).
	Noise and Vibration Public Address for Emergency Announcements	Minor Adverse (Not Significant)	
Pedestrians and Cyclists	Wind Microclimate Almost all thoroughfare locations would have suitable wind conditions during the windiest season, ranging from suitable for strolling use to sitting use.	Negligible to Moderate Beneficial (Not Significant)	No (No effects to interact with).
Pedestrians	Wind Microclimate The majority of entrances on-site would have wind conditions suitable for the intended use, ranging from suitable for standing use to sitting use during the windiest season.	Negligible to Minor Beneficial (Not Significant)	No (No effects to interact with).
Road Users	Solar Glare Instances of reflection will occur briefly at four viewpoints as a result of the Proposed Development: - V1: Travelling east on A247 - V2: Travelling east on A247 - V3: Travelling west on Kingfield Road/A247 - V4: Travelling north on Westfield Avenue.	Negligible to Minor Adverse (Not Significant)	No (No effects to interact with).
Surface Water Drainage System	Surface Water Drainage Increase in surface water runoff (with the added effect of climate change)	Negligible to Minor Beneficial (Not Significant)	No (No effects to interact with).

Receptor	Residual Effects	Scale and Nature	Potential for Intra-Project Cumulative Effects / Effect Interactions
Townscape and Landscape	Townscape Improvement to Townscape Character Area 'TCA1 – Westfield'	Moderate Beneficial (Significant)	No (No effects to interact with).
	Townscape Improvement to Landscape Character Area 'LCA1 – Hoe Stream Valley'	Minor to Moderate Beneficial (Not Significant)	
	Townscape Change to Townscape Character Area 'TCA3 – Woking Town Centre South and Mount Hermon'	Minor Neutral (Not Significant)	
Views	Visual RV3 - Elmbridge Lane; RV6 - Westfield Road; RV9 - Hawthorn Road; RV10 - Wych Hill Lane; RV11 - Brooklyn Road; RV13 - River Wey footbridge; and RV15 - Claremont Avenue.	Minor Beneficial (Not Significant)	No (No effects to interact with).
	Visual RV14 - Surrey Hills AONB	Minor Neutral (Not Significant)	
	Visual RV1 - Junction of Wych Hill Lane and Claremont Avenue; RV8 - Hoe Valley Linear Park;	Minor to Moderate Beneficial (Not Significant)	
	Visual RV2 – Woking Leisure Centre Entrance; RV5 - Loop Road Sports Field; RV7 - Westfield Avenue;	Moderate Beneficial (Not Significant)	
	GHG Emissions GHG emissions as a result of the Proposed Development	Adverse (Significant)	

*The overall significance of effects has been based on the impacts descriptors at individual receptors, the number of properties affected, and professional judgment.

13.15 Beneficial effect interactions have been identified in respect of the local economy. The Proposed Development will provide up to 25 full time equivalent jobs, the net additional employment is deemed a minor beneficial effect. The Proposed Development will also encourage additional spending by residents which is considered to be a minor beneficial effect. The in-combination beneficial effect on the local economy is not significant as the effects are not significant in their own right;

13.16 Adverse effect interactions effects have been identified in respect of:

- Education Provision: As a result of the estimated 195 children living at the Proposed Development who may require primary school places and 60 secondary-age children in the Proposed Development, there will be increased pressure on both primary and secondary education provision. The two effects will interact, thus causing an adverse effect on education provision which is not significant;
- Public Realm: The Proposed Development will cause an adverse effect in relation to open space provision as residents will place additional demand on local open space. Additionally, there will be an adverse effect on play space as a result of the estimated 460 children the Proposed Development will support. As a result, there will be a non-significant adverse effect interaction for public realm;

- Existing Residential Receptors: Potential significant adverse effect interactions are likely to occur for existing residential receptors (Hazel House and Sycamore Avenue), as a result of the Proposed Development causing a reduction in daylight and sunlight. Additionally, there is the potential for effect interactions to occur between stadium noise and road traffic noise at existing properties: Pond House; Kingfield Cottage; The Cedars; Nut Cottage; Penlan; 51, 53 & 55 Westfield Avenue. The adverse effect interaction is not significant. There is also the potential for significant adverse daylight, sunlight and noise effects to interact at Hazel House; and
- Introduced Residential Receptors: There is potential for a non-significant adverse effect interaction to occur between noise effects for introduced residential receptors. However, the use of the public address system for emergency announcements the interaction is likely to be infrequent.

13.17 As set out in the tables above, all GHG emissions are to be determined as **significant**, IEMA guidance² states that *'effects of potential future climate change...are likely to be interrelated to other key EIA topics'*. It is noted therefore that there is therefore the potential for interactions – but that mitigation measures are identified to minimise emissions as far as possible.

² IEMA, 2017, 'Assessing Greenhouse Gas Emission and Evaluating their Significance'
(<https://www.iema.net/assets/newbuild/documents/IEMA%20GHG%20in%20EIA%20Guidance%20Document%20V4.pdf>)