

# A47/A11 Thickthorn Junction

**Scheme Number: TR010037**

**Volume 6**

**6.1 Environmental Statement**

**Chapter 15 – Cumulative Effects Assessment**

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed  
Forms and Procedure) Regulations 2009

March 2021

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
Procedure) Regulations 2009**

The A47/A11 Thickthorn Junction  
Development Consent Order 202[x]

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**CHAPTER 15  
CUMULATIVE EFFECTS ASSESSMENT**

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## 15. Cumulative effects assessment

### 15.1. Introduction

- 15.1.1. As part of the Environmental Impact Assessment (EIA) process, this Environmental Statement (ES) chapter presents the cumulative effects assessment (CEA) for the Proposed Scheme. EIAs must include cumulative effects in accordance with the requirements of the EIA Directive (2014/52/EU).
- 15.1.2. Cumulative effects result from multiple actions on receptors over time and are generally additive or interactive (synergistic) in nature. They can also be considered as effects resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Scheme.
- 15.1.3. The assessment has been undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (2020) and the Planning Inspectorate 'Advice Note Seventeen: Cumulative Effects Assessment' (2019).
- 15.1.4. In line with DMRB LA 104, this CEA includes effects from:
- a single project (the Proposed Scheme), which considers numerous different effects impacting a single receptor
  - different projects, in combination with the Proposed Scheme.
- 15.1.5. The study areas for each of the environmental topics, defined in the preceding chapters of this ES set the zone of influence (ZOI) of the CEA for other developments or approved developments and this ranges from 400m to 30km depending on the topic and potential effects.

### 15.2. Competent expert evidence

- 15.2.1. The competent expert for this assessment has over 14 years' experience in UK environmental consultancy. They hold a BSc (Hons) and MSc in relevant environmental subjects. They are a Chartered Waste Manager and have used their EIA knowledge and professional judgement in identifying the likely significant impacts associated with the Proposed Scheme.

### 15.3. Assessment methodology

- 15.3.1. Since the publication of the EIA Scoping Report in February 2018 (**TR010037/APP/6.5**) and Scoping Opinion for the Proposed Scheme (March 2018) (**TR010037/APP/6.6**), the DMRB for cumulative effects has been updated. DMRB LA 104 Environmental Assessment and Monitoring (2019) includes guidance on cumulative effects.

15.3.2. The approach to the assessment remains the same other than a change in terminology, changing from ‘combined’ and ‘cumulative’ to ‘single project’ and ‘different projects’ respectively. The methodology for the assessment follows the DMRB LA 104 and Planning Inspectorate Advice Note Seventeen.

15.3.3. The assessment includes the following:

- review of the preceding chapters of this ES to identify potential multiple different effects impacting a single receptor
- establish the zone of influence (ZOI) of the project together with other projects (using a combination of the traffic model uncertainty log, consultation and desk study)
- establish a list of projects which have the potential to result in cumulative impacts (following the stages 1 and 2 set out in Planning Inspectorate Advice Note Seventeen)
- obtain further information and detail on the list of identified projects to support further assessment

## Study area

### *Single project*

15.3.4. The study area for the assessment of single project effects, for both construction and operation, are defined by the study areas identified within the relevant environmental topics set out in the preceding chapters of this ES.

### *Different projects*

15.3.5. The study area for different projects is a ZOI based on the study areas defined for the topic assessments in ES Chapters 5 to 14 **(TR010037/APP/6.1)**.

15.3.6. This is summarised in Table 15-1: Study area extents (Study area extents) and presented in Figure 15.1 **(TR010037/APP/6.2)**. The table orders the environmental topics by size of ZOI for CEA.

Table 15-1: Study area extents

Discipline topic	Study area	CEA ZOI
Biodiversity	<ul style="list-style-type: none"> <li>• SAC designated for bats: 30km</li> <li>• Statutory sites designated for birds: 10km</li> <li>• Designated sites: 2km</li> <li>• Phase 1 habitat survey: 100m</li> <li>• Great crested newts (GCN) <i>Triturus cristatus</i>: 500m</li> <li>• Surveys for breeding birds and wintering birds: 500m</li> <li>• Aquatic invertebrates from within wetland sites that could be directly impacted by the Proposed Scheme: 50m</li> <li>• Surveys for other ecological receptors, including badger <i>Meles meles</i> and reptiles: 50m</li> <li>• Barn owl <i>Tyto alba</i> nests that could be directly impacted or disturbed by the Proposed Scheme: 1.5km</li> </ul>	<ul style="list-style-type: none"> <li>• 2km from the DCO boundary covers the remaining receptors</li> </ul>

Discipline topic	Study area	CEA ZOI
	<ul style="list-style-type: none"> <li>Bats – flight paths, foraging areas or roosts in trees and buildings: 50m</li> </ul>	
Cultural heritage	Archaeological potential and history context: 1km from the DCO boundary.	
Material assets and waste	The estimated materials availability and waste capacity data used in the material assets and waste chapter are based on future regional demand. Not included in the different projects assessment to avoid double counting.	Not applicable
Climate	<p>As the construction and operational phase traffic data includes traffic associated with other developments, the emissions assessment reported within the climate chapter is inherently cumulative. Not included in the CEA to avoid double counting.</p> <p>The study area for climate resilience is informed by other environmental topic assessments study areas. Therefore, no additional ZOI extents are required beyond that identified within the topics included in this table.</p>	Not applicable

15.3.7. Further information on the study areas for the technical assessments are found within each of the technical Chapters 5 to 15 in the ES (TR010037/APP/6.1). The biodiversity ZOI covers the ZOI for multiple species and designated sites, as detailed in table 8-2 of ES Chapter 8 Biodiversity.

### Single project

15.3.8. Single receptors or resources are identified where the combined action of a number of different environmental topic-specific activities have a residual effect. Professional judgement is used to assess temporal combination effects such as permanent construction impacts and operational phase impacts.

15.3.9. Effects that are moderate adverse or beneficial and above are considered significant. However, the CEA has considered all residual effects (that is those that are predicted to remain after mitigation) over and including minor or slight which have been included within the tables. Multiple minor effects considered further to determine whether in combination there is potential for a significant single project cumulative effect.

15.3.10. Receptor groups have been identified and considered in relation to the combined effects:

- human receptors (residential and community facilities, all travellers)
- ecological receptors
- the water environment
- landscape and visual receptors
- geology and soils
- heritage assets

- 15.3.11. This assessment has also grouped receptors located within close proximity, that could be affected by a variety of impacts. These receptors have been identified in the preceding chapters as impacted by the Proposed Scheme.
- 15.3.12. Potential interactions across receptors or receptor groups were identified by reviewing the impacts identified within each environmental topic assessed in the preceding chapters of this ES and using professional judgement and experience.
- 15.3.13. To avoid duplication of information or assessment, these specific aspects are not considered further in the CEA as they have been dealt with in the relevant chapters already.
- Cultural Heritage (ES Chapter 6) and Biodiversity (ES Chapter 8) **(TR010037/APP/6.1)** assessments considered the potential interactions of effects relating to construction and operational noise and air quality, and construction dust on receptors.
  - Biodiversity (ES Chapter 8) **(TR010037/APP/6.1)** includes consideration of effects on the water environment in relation to ecological receptors.
  - Population and Human Health (ES Chapter 12) **(TR010037/APP/6.1)**, considers identified effects from other environmental topics (air quality, landscape and visual, noise and access) to assess health outcomes.
  - Climate (ES Chapter 14) **(TR010037/APP/6.1)** includes specific consideration of interrelated climate impacts informed by other environmental topics (road drainage and water environment, material assets and waste).

## Different projects

- 15.3.14. The assessment methodology for cumulative effects involves identification of incremental changes likely to be caused by potential 'other developments' together with the Proposed Scheme.
- 15.3.15. The assessment of cumulative effects follows Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment with the four stages of assessment:
- Stage 1: Establish the ZOI and identify a long list of 'other developments'. This is available in ES Appendix 15.1 (Long list) (TR010037/APP/6.3)
  - Stage 2: Identify shortlist of 'other developments' for the cumulative effects assessment. This is available in ES Appendix 15.2 (Short list) (TR010037/APP/6.3)
  - Stage 3: Information gathering
  - Stage 4: Assessment
- 15.3.16. The ZOI is based on the study areas of the environmental topics detailed in the preceding chapters of this ES **(TR010037/APP/6.1)** and summarised in Table 15-1: Study area extents.
- 15.3.17. Following consultation with Norfolk County Council and Broadland District Council, additional projects were added to the scope as detailed in Table 15-5.



Four windfarm projects were also recommended for consideration. These are all located beyond the study area, however the windfarms have been included in the assessment due to known potential cumulative construction impacts with the Proposed Scheme. The Planning team at Norwich City Council also recommended inclusion of University of East Anglia developments 15/00121/F and 16/00099/MA, however these are outside of the ZOI.

- 15.3.18. A search for 'Tier 2' projects was also completed on Suffolk County Council's planning portal and no further projects with potential effects were identified within the study area.
- 15.3.19. Other projects occurring along the A47 were initially considered following scoping opinion feedback. However, none are within the ZOI and therefore not progressed further in this assessment.

### *Environmental topics*

- 15.3.20. Some environmental topics in the preceding chapters of this ES, have relied wholly, or in part, on the forecasts derived from the traffic model. As the traffic model includes future developments, the assessments of the Proposed Scheme's effects within these topics have included cumulative effects by default and therefore the impacts are already reported within their assessments.
- 15.3.21. The topics and the intrinsically cumulative aspect of the operational assessment, noted in Table 15-1, are included in the following ES chapters **(TR010037/APP/6.1)**:
- Chapter 5 (Air Quality)
  - Chapter 11 (Noise and Vibration)
  - Chapter 13 (Road Drainage and the Water Environment) for road runoff and accidental spillages
- 15.3.22. In line with the DMRB LA 104 good practice principles, these are not included in the scope of operational effects for the CEA to avoid duplication of information and/or assessment of effect.
- 15.3.23. The air quality ES Chapter 5 **(TR010037/APP/6.1)** did not identify any significant effects on human or ecological receptors as a result of the Proposed Scheme.
- 15.3.24. The noise and vibration ES Chapter 11 **(TR010037/APP/6.1)** did not identify any significant effects during operation of the Proposed Scheme on noise and vibration receptors.
- 15.3.25. The road drainage and the water environment (RDWE) ES Chapter 13 **(TR010037/APP/6.1)** did not identify any significant residual effects during operation of the Proposed Scheme on RDWE receptors.



*Other developments*

- 15.3.26. A search for developments in the south east of England was carried out using the Planning Inspectorate website. Developments within the ZOI were included in the long list of developments as shown in Table 1 of ES Appendix 15.1 **(TR010037/APP/6.3)**.
- 15.3.27. As part of the transport forecasting, a list of potential developments, with varying degree of certainty that the development will occur, informs the future traffic scenarios. This list is referred to as an uncertainty log, located in the Chapter 4 Transport Assessment in the Case for the Scheme **(TR010037/APP/7.1)**. Only those developments that are considered as being ‘Near Certain’ and ‘More Than Likely’ are used in the traffic model (Table 15-2) (certainty of developments).
- 15.3.28. Developments from the Planning Inspectorate Nationally Significant Infrastructure Projects (NSIP) website and traffic uncertainty log were used to inform the cumulative effects in combination with consultation, publicly available information and professional judgement.

Table 15-2: Certainty of developments


Certainty of outcome	Development Status
Near Certain: The outcome will happen or there is a high probability of it occurring.	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction.
More Than Likely: The outcome is likely to happen but some uncertainty.	Development application within the consent process and in accordance with the development plan.
Reasonably Foreseeable: The outcome may happen but significant uncertainty.	Identified within a development plan and, although not directly associated with the project, may occur if the project is implemented.
Hypothetical: There is considerable uncertainty whether the outcome would ever happen.	Conjecture based upon currently available information. Discussed on a conceptual basis. One of a number of possible inputs in an initial consultation process.

Source: A47/A11 Thickthorn Junction Chapter 4 Transport Assessment in the Case for the Scheme **(TR010037/APP/7.1)**.

- 15.3.29. The developments are grouped into tiers, reflecting the likely degree of certainty attached to each development, with Tier 1 being the most certain as shown in Table 15-3: (Assigning certainty to ‘other existing development and/or approved development’), from a table in the Planning Inspectorate Advice Note Seventeen. Tier 3 developments are least certain, and most likely to have limited publicly available information to inform assessments.

15.3.30. Rather than reporting every interaction, the assessment of cumulative effects focuses on the main significant effects and aims to differentiate between permanent or temporary, positive or negative and other existing or more than likely / near certain major developments.

Table 15-3: Assigning certainty to ‘other existing development and/or approved development’

Tier	Likely degree of certainty	
Tier 1	Under construction*  Permitted Application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented.  Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.	Decreasing level of detail likely to be available  
Tier 2	Projects on the Planning Inspectorate’s Programme of Projects where a Scoping Report has been submitted.	
Tier 3	Projects on the Planning Inspectorate’s Programme of Projects where a Scoping Report has not been submitted.  Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as the move closer to adoption) recognising that much information on any relevant proposals will be limited.  Identified in other plans and programmes (as appropriate) which set the framework for future development consents / approvals, where such development is reasonably likely to come forward.	

Source: Planning Inspectorate: Advice note seventeen.

\* where other projects are expected to be completed before construction of the proposed Nationally Significant Infrastructure Project and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment.

15.3.31. Where significant cumulative effects beyond those identified as residual effects from the Proposed Scheme in isolation, have been identified, additional mitigation would be recommended.

### Significance criteria

15.3.32. The assessment of significance of the cumulative effects has been determined in accordance with the significance criteria contained in Table 3.7, DMRB LA 104. Typically, the greater the environmental sensitivity or value of the receptor or resource, and the greater the magnitude of impact, the greater the effect. Consequently, a highly valued resource suffering a major detrimental impact would result in a very large adverse effect.

15.3.33. For the purpose of the cumulative effects assessment, the value of a resource and magnitude of impact is determined according to the criteria set within the preceding chapters of the ES.

15.3.34. The significance of effect is then carried forward from preceding environmental chapters to enable an assessment of combined significance, as well as to identify the significance of cumulative effects with other developments. Typical descriptors of cumulative significance are included in Table 15-4: which reflects

the approach. The overall significance is determined with mitigation included. Where an effect is moderate or above (adverse or beneficial), it is deemed to be significant.

Table 15-4: Significance criteria

Significance category	Typical descriptors of effect
Very large (adverse or beneficial)	Where the balance of the effects of the Proposed Scheme or combined effects of the Proposed Scheme in association with other existing or more than likely / near certain future major development upon an individual or collection of environmental receptors would be very highly significant (positive or negative). Effects would be permanent and far reaching for receptors of very high value.
Large (adverse or beneficial)	Where the balance of the effects of the Proposed Scheme or combined effects of the Proposed Scheme in association with other existing or more than likely / near certain major future developments upon an individual or collection of environmental receptors would be highly significant (positive or negative). Effects would be: <ul style="list-style-type: none"> <li>• Permanent and far reaching for receptors of high value.</li> <li>• Localised for a receptor of very high value.</li> <li>• Temporary for receptor of very high value.</li> </ul>
Moderate (adverse or beneficial)	Where the balance of the effects of the Proposed Scheme or combined effects of the Proposed Scheme in association with other existing or more than likely / near certain major future developments upon an individual or collection of environmental receptors would be significant (positive or negative). Effects would be: <ul style="list-style-type: none"> <li>• Permanent and far reaching for receptors of medium value.</li> <li>• Localised for receptors of high value.</li> <li>• Temporary for a receptor of high value.</li> </ul>
Slight (adverse or beneficial)	Where the balance of the effects of the Proposed Scheme or combined effects of the Proposed Scheme in association with other existing or more than likely / near certain major development upon an individual or collection of environmental receptors would be noteworthy but not significant (positive or negative). Effects would be: <ul style="list-style-type: none"> <li>• Permanent and far reaching for receptors of low value.</li> <li>• Localised for receptors of medium value.</li> <li>• Temporary for a receptor of medium value.</li> </ul>
Neutral	Where the balance of the effects of the Proposed Scheme or the combined effects of the Proposed Scheme in association with other existing or more than likely / near certain future major developments is neither positive nor negative.

Adapted from table 3.7, DMRB LA104

15.3.35. Significance descriptors have also been aligned with the considerations included within Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment. Consideration is given to the following:

- The duration of effect, for example, will it be temporary or permanent
- The extent of effect, for example, the geographical area of an effect
- The type of effect, for example, whether additive (loss of two pieces of woodland of 1ha, resulting in 2ha cumulative woodland loss) or synergistic

(two discharges combine to have an effect on a species not affected by discharges in isolation)

- The frequency of the effect
- The value and resilience of the receptor affected
- The likely success of mitigation

## Consultation

15.3.36. The proposed assessment methodology for cumulative effects was described in Chapter 15 of the EIA A47/ A11 Thickthorn Junction Scoping Report **(TR010037/APP/6.5)** issued to the Planning Inspectorate in February 2018.

15.3.37. The scope of this assessment reflects comments received within the Scoping Opinion for the Proposed Scheme (2018) **(TR010037/APP/6.6)**.

15.3.38. Consultation was carried out with Norfolk County Council in 2018 and it was agreed that the uncertainty log developed for the traffic model was suitable for the environmental assessment. Further consultation was undertaken with South Norfolk Council and Norfolk County Council in December 2020 to confirm the approach of the CEA and to incorporate any further inputs. Responses were received from the following:

- Planning team at Broadland District Council and South Norfolk Council
- Planning team at Norwich City Council
- Landscape and Ecology teams at Norfolk County Council
- Norfolk County Council as Lead Local Flood Authority

15.3.39. Table 15-5 details the measures taken within the assessment to implement consultee responses.

Table 15-5: Consultation

Consultee	Measures
Planning team - Broadland and South Norfolk District Councils	<ul style="list-style-type: none"> <li>• Uncertainty log supplied to traffic team to be used to develop long list.</li> </ul>
Planning team at Norwich City Council	<ul style="list-style-type: none"> <li>• University of East Anglia developments 15/00121/F and 16/00099/MA is outside the biodiversity ZOI (approximately 2.9km north east of the Proposed Scheme). Therefore, has not been included in the assessment of cumulative effects with the Proposed Scheme.</li> </ul>
Landscape and ecology teams at Norfolk County Council	<ul style="list-style-type: none"> <li>• Planning application numbers added to the long and short list (appendices 15.1 and 15.2)</li> <li>• Inclusion of cross reference to ZOI table in ES chapter 8 <b>(TR010037/APP/6.1)</b> to demonstrate inclusion of species</li> </ul>

Consultee	Measures
	and designated sites study areas within biodiversity ZOI selected for cumulative assessment. <ul style="list-style-type: none"> <li>• Inclusion of Easton Chalk Pit SSSI in identifying cumulative single project and different project effects.</li> <li>• Applications beyond 2km ZOI which have not been deemed likely to cause significant cumulative effects with the Proposed Scheme have been removed from the long list.</li> <li>• The Core Sustainance Zone guidance used to assist in determining the ecology ZOI.</li> </ul>
Lead Local Flood Authority	<ul style="list-style-type: none"> <li>• No specific feedback provided.</li> </ul>

### Limitations and assumptions

- 15.3.40. Limitations to the assessment and uncertainty are in relation to the diminishing certainty of future developments and for the developments where only limited information is publicly available. This limitation has been addressed as far as possible through professional judgement and adopting a worst case approach (that is, when the construction start and finish dates are not available for the other developments, it has been assumed that either part or all of the construction phase will fall within the same period as the Proposed Scheme construction activities, reflecting a worst case scenario approach).
- 15.3.41. For developments with ‘more than likely’ uncertainty or above are absent from the local planning authority and the Planning Inspectorate portal (that is, Tier 3 defined in Planning Inspectorate Advice Note Seventeen) it is assumed that the development(s) are not likely to have significant effects on the environment, therefore Neutral effects have been assigned for these projects.

### 15.4. Assessment of single project effects

- 15.4.1. The predicted environmental effects for both construction and operational phases of the Proposed Scheme are taken into consideration with the inclusion of any proposed mitigation from the preceding chapters of the ES. A summary of the reported construction effects are described in Table 15-6 and the operation effects in Table 15-7.

Table 15-6: Potential single project effects between topics on receptors during construction of the Proposed Scheme

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
<p><b>Human receptors residents, including community and private assets, sensitive receptors and vulnerable groups</b></p>	<p>The construction traffic assessment is screened out of the air quality assessment. No significant effects on receptors were identified during the construction dust assessment.</p>	<p>Not included in scope of biodiversity assessment.</p>	<p>Not included in scope of cultural heritage assessment.</p>	<p>Visual construction impacts are expected at the following private properties:</p> <p><b>Very large adverse</b></p> <p>██████████ ██████████ at Cantley Lane South</p> <p><b>Large adverse</b></p> <p>██████████ ██████████</p> <p><b>Large adverse</b></p> <p>The six northern-most properties (in a horse-shoe formation) at the north eastern end of Cantley Lane South (closest to and potentially visually enclosed by the replacement Cantley Lane</p>	<p>Not included in scope of geology and soils assessment.</p>	<p><b>Large adverse</b></p> <p>Loss of public open space proposed as part of the Cringleford Residential Development.</p> <p><b>Slight adverse</b></p> <p>Change to access and increased journey length to Thickthorn junction for private properties on Cantley Lane, Cantley Lane South, north and south of the Cantley Stream and north of the railway line.</p> <p><b>Slight adverse</b></p> <p>Change to access and increased journey length to</p>	<p><b>Minor beneficial</b></p> <p>Six residential dwellings along Cantley Lane South are predicted to experience a decrease in noise levels are between -1.0dB and -2.2dB.</p> <p><b>Moderate</b></p> <p>During construction the following residential properties are expected to experience impacts from construction noise: ██████████ ██████████ ██████████ ██████████ ██████████</p>	<p>Not included in scope of RDWE assessment.</p>	<p><b>Slight adverse</b></p> <p>The following residential properties may experience cumulative adverse effects from impacts relating to visual, noise and increased journey lengths:</p> <p>Properties on Cantley Lane (notably ██████████ ██████████ ██████████)</p> <p>Properties on Cantley Lane South</p>



Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
				<p>Footbridge (Cringleford) ramp and embankment.</p> <p><b>Moderate adverse</b></p> <p>The additional six properties at north western end of Cantley Lane South</p> <p><b>Slight adverse</b> effects may be experienced at properties close to the proposed main construction compound off Norwich Road (East Lodge Thickthorn Lodge and the five properties located at Thickthorn Hall). Effects may also be experienced from upper storey windows of properties on the western</p>		<p>Thickthorn junction for business 'Leavers Driving Tuition' on Cantley Lane South.</p>	<p><b>(Not significant)</b></p> <p>During construction phase 5 (night-time box push method) and phase 1, the following residential properties are expected to experience impacts from construction noise: [REDACTED]</p>		

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
				fringes of Cringleford.					
<b>Human- all travellers (vehicle, walkers, cyclists and horse riders)</b>	The construction traffic assessment is screened out of the air quality assessment. No significant effects on receptors were identified during the construction dust assessment.	Not included in scope of biodiversity assessment.	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b> Significant visual effects during construction are predicted at footpaths Hethersett FP1 and Cringleford FP4. This will occur due to views of construction activity and haul routes in various directions and over short distances.	Not included in scope of geology and soils assessment.	<b>Moderate adverse</b> Diversion of Cringleford footpath 4a during construction.  <b>Moderate beneficial</b> Stopping up of Cringleford Bridleway BR5.	No significant effects identified	Not included in scope of RDWE assessment.	<b>Neutral</b> Significant cumulative effects on human receptors (travellers) during construction are not expected as a result of the Proposed Scheme.
<b>Ecological receptors (designated sites, protected species and existing habitats)</b>	The construction traffic assessment is screened out of the air quality assessment. No significant effects on	<b>Moderate adverse</b> NERC Act (2006) priority habitats:  Due to loss of hedgerows	Not included in scope of cultural heritage assessment.	Not included in scope of landscape assessment.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	<b>Slight adverse</b> Loss or deterioration of aquatic environment due to Cantley Stream realignment.	<b>Neutral</b> Significant cumulative effects on ecological receptors during construction are not expected as a

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
	receptors were identified during the construction dust assessment.	and deciduous woodland.							result of the Proposed Scheme.
<b>The water environment</b>	Not included in scope of air quality assessment.	No significant effects	Not included in scope of cultural heritage assessment.	<b>Neutral</b> The realignment of the Cantley Stream would impact the character, however by year 15 this section will have matured to more closely reflect baseline conditions.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	<b>Neutral/ Slight adverse</b> Effects on Cantley Stream, Intwood Stream, the River Yare during construction due to pollution from accidental spillage or leakage of fuel and oils, placement of construction materials etc.	<b>Neutral</b> Significant cumulative effects on water environment receptors during construction are not expected as a result of the Proposed Scheme.
<b>Landscape and visual</b>	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment.	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b> Effects on landscape features.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	Not included in scope of RDWE assessment.	<b>Neutral</b> Significant cumulative effects on landscape and visual receptors

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
									during construction are not expected as a result of the Proposed Scheme.
<b>Geology and soils</b>	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment.	Not included in scope of geology and soils assessment.	Not included in scope of landscape assessment.	<b>Moderate adverse</b> effects expected on agricultural soils.	Not included in scope of population and human health assessment. Potential pollution pathways already cumulatively assessed under human health.	Not included in scope of noise and vibration assessment.	Not included in scope of RDWE assessment.	<b>Neutral</b> Significant cumulative effects on geology and soils during construction are not expected as a result of the Proposed Scheme.
<b>Heritage assets</b>	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment.	<b>Large adverse</b> During construction, temporary impacts on the setting of the scheduled monument Two Tumuli are expected through visual,	No significant effects on heritage assets identified.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	Not included in scope of RDWE assessment.	<b>Large adverse</b> The scheduled monument at Two Tumuli may experience significant cumulative effects from alteration of the landscape

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment (RDWE)	Significance of combined effects
			noise and light intrusion.  <b>Slight adverse</b>  Residual temporary construction effects are expected on six grade II listed buildings (Thickthorn Hall NHLE1050575 and its Kitchen Garden Walls NHLE1169537, The Round House NHLE 1169110, North House and The Farmhouse NHLE1050567, Cantley House NHLE1306560, and Milestone No. 4 NHLE 1050573)						setting and visual, noise and light intrusion during construction.
<b>Overall single project effect for the Proposed Scheme during construction</b>								<b>Slight adverse</b>	

Table 15-7: Potential single project effects between topics on receptors during operation of the Proposed Scheme

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
Human receptors (residents, including community and private assets, sensitive receptors and vulnerable groups)	No significant effects.  50 of the 155 human receptors identified are expected to show a decrease in air quality, 88 show an improvement and 17 experienced no change in air quality during operation of the Proposed Scheme.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b>  The six northern-most properties (in a horse-shoe formation) at the north eastern end of Cantley Lane South.  <b>Moderate adverse</b>  ██████████ ██████  Large adverse ██████████ ██████████ and Cantley Lane South	Not included in scope of geology and soils assessment.	Non-significant effects, slight beneficial effects due to journey time savings for residents, community facilities and businesses when travelling via Thickthorn junction.	No significant effects are expected.	Not included in scope of RDWE assessment.	<b>Neutral</b>  During operation, significant cumulative impacts on residential properties and human receptors are not expected to result from the Proposed Scheme.
Human- all travellers (vehicle, walkers, cyclists and horse riders)	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	<b>Slight adverse</b>  Effects on PRoW would be non-significant during operation.	Not included in scope of geology and soils assessment.		No significant effects are expected.	Not included in scope of RDWE assessment.	<b>Neutral</b>  Significant cumulative effects on human receptors (all travellers) during

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
									operation are not expected as a result of the Proposed Scheme.
Ecological receptors (designated sites, protected species and existing habitats)	No significant effects identified.  Intwood Carr County Wildlife Site (CWS), Meadow Farm CWS, Earlham Colney CWS and Bowthorpe March CWS and Local Nature Reserve (LNR) were considered in the assessment.	<b>Large adverse</b>  Two veteran trees are to be removed in Thickthorn Park for construction of the A47 link road and Cantley Lane link road.	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b>  Trees T32, T35, T36 and T37 along Cantley Lane South are to be removed, including some large, mature and valuable individual roadside trees which contribute to rural character in this location.  Two veteran trees (T13 and T14) to be removed in Thickthorn Park for construction of the A47 link road and Cantley Lane link road.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	<b>Slight adverse</b>  Loss or deterioration of aquatic environment due to Cantley Stream realignment.	<b>Slight adverse</b>  The loss of trees at Cantley Lane South and Thickthorn Park (including veteran trees) has potential to cause a significant cumulative effect on Thickthorn park. Visual changes to Cantley Lane South, the realignment of Cantley stream and potential loss or deterioration of aquatic habitat here may result in an adverse cumulative effect.



Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
The water environment	Not included in scope of air quality assessment.	No significant effects identified.	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b> Cantley Stream will be redirected over a length of approximately 200m, affecting views.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment. Potential pollution pathways already cumulatively assessed under human health.	Not included in scope of noise and vibration assessment.	<b>Neutral/ Slight adverse</b> Effects on Cantley Lane Stream, Intwood Stream, the River Yare during construction due to pollution from accidental spillage or leakage of fuel and oils, placement of construction materials etc.	<b>Slight adverse</b> Effects on Cantley Stream due to visual changes and potential pollution/ spillage during construction may have a cumulative effect on Cantley Stream however this is unlikely to be significant due to best practice measures and mitigation in place.
Landscape and visual	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	<b>Moderate adverse</b> A variation of landscape alterations at Cantley Lane South are expected to cause effects to landscape features here.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	Not included in scope of RDWE assessment.	<b>Neutral</b> Significant cumulative effects on landscape and visual receptors during construction are not expected as a result of the

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
				<p><b>Slight adverse</b></p> <p>Impact on landscape features due to removal of existing vegetation, particularly areas of woodland and prominent individual trees, realignment of Cantley Stream, highway diversions around Cantley Lane South, introduction of large scale earthworks and the presence of construction plant, materials, machinery and construction compounds, considered to be not significant.</p>					Proposed Scheme.
Geology and soils	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	Not included in scope of landscape and	No significant effects are anticipated.	Not included in scope of population and human health assessment.	Not included in scope of noise and	Not included in scope of RDWE assessment.	<p><b>Neutral</b></p> <p>No effects identified.</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
				visual assessment.		Potential pollution pathways already cumulatively assessed under human health.	vibration assessment.		
Heritage assets	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment	<p><b>Moderate adverse</b></p> <p>A result of permanent alteration of the setting of 'Two Tumuli' scheduled monument would occur from construction of the Cantley Lane link road, including potential noise and visual intrusion.</p> <p><b>Slight adverse</b></p> <p>The following receptors have been identified to experience non-significant residual operational effects two grade II listed buildings</p>	Not included in scope of landscape and visual assessment.	Not included in scope of geology and soils assessment.	Not included in scope of population and human health assessment.	<p><b>Moderate beneficial (not significant)</b></p> <p>A decrease in noise levels during operation is expected at the northern and southern Tumuli. The decrease at the northern Tumuli is expected to be -3.3dB.</p>	Not included in scope of road drainage and the water environment assessment.	<p><b>Neutral</b></p> <p>Effects on the scheduled monument Two Tumuli due to visual changes and beneficial noise effects during operation may have a cumulative effect, however this is unlikely to be significant due to best practice measures and mitigation in place.</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Population and human health	Noise and vibration	Road drainage and the water environment	Significance of combined effects
			(Thickthorn Hall NHLE1050575 and its Kitchen Garden Walls NHLE1169110) and associated undesignated heritage assets within the setting of Thickthorn Hall (MNF11805, MNF65395, MNF33732, MNF9352, MNF47810), two undesignated heritage assets (MNF16885 site of limekilns and tramway, and MNF11805 Lodge House), and Historic Landscape Character within and adjacent to the Proposed Scheme DCO boundary.						
<b>Overall single project effect for the Proposed Scheme during operation</b>								<b>Slight adverse</b>	

## Summary of single project effects

### Construction

- 15.4.2. During construction, additive cumulative effects are expected on some human receptors and heritage receptors. **Slight adverse** cumulative effects are expected to residential properties on Cantley Lane notably [REDACTED], and properties on Cantley Lane South due to temporary visual intrusion, construction noise, and temporary increased journey length to access Thickthorn Junction.
- 15.4.3. Additive **Slight adverse** cumulative effects are also expected at Two Tumuli scheduled monument, which may experience temporary cumulative effects due to the alteration of its cultural heritage setting, visual effects, noise and vibration increase and light intrusion during construction of the Proposed Scheme. Whilst the effects individually have been classified as Large Adverse, the cumulative effect is not deemed to be significant.

### Operation

- 15.4.4. During operation, cumulative effects are expected on some ecological receptors. Thickthorn Park may experience synergistic **Slight adverse** cumulative effects, due to the loss of trees at Cantley Lane South and Thickthorn Park (including two veteran trees), visual changes at Cantley Lane South including realignment of Cantley Stream, and the potential deterioration or loss of aquatic environment at the Cantley Stream.
- 15.4.5. Mitigation measures to reduce significant effects during construction and operation are outlined in Table 15-8.

Table 15-8: Design, mitigation and enhancement measures

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
<b>Human receptors residents, including community and private assets, sensitive receptors and vulnerable groups</b>	During construction, residential properties on Cantley Lane, notably [REDACTED], may experience adverse effects from impacts relating to visual, noise and increased journey lengths.	During operation, significant cumulative impacts on residential properties and human receptors are not expected to result from the Proposed Scheme.	Mitigation has not been recommended as no significant effects have been identified.
<b>Human- all travellers (vehicle, walkers, cyclists and horse riders)</b>	During construction, significant cumulative impacts on human receptors (all travellers) are not expected to result from the Proposed Scheme.	During operation, significant cumulative impacts on human receptors (all travellers) are not expected to result from the Proposed Scheme.	Mitigation has not been recommended as no significant effects have been identified.
<b>Ecological receptors (designated sites,</b>	During construction, significant cumulative	The loss of trees at Cantley Lane South and Thickthorn	To mitigate the loss of trees, the reduction of as much

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
<b>protected species and existing habitats)</b>	impacts on ecological receptors are not expected to result from the Proposed Scheme.	Park (including veteran trees) has potential to significantly cumulatively effect Thickthorn Park.  Visual changes to Cantley Lane South, the realignment of Cantley stream and potential loss or deterioration of aquatic habitat here may result in an adverse cumulative effect.	permanent habitat loss as possible has been embedded in the design.  Areas of land clearance will be replanted with native trees.  Pollution prevention will be mitigated as in ES Chapter 13: Road Drainage and Water Environment <b>(TR010037/APP/6.1)</b> .
The water environment	Effects on Cantley stream due to visual changes and potential pollution/ spillage during construction may have a cumulative effect on Cantley Stream.	During operation, significant cumulative impacts on the water environment are not expected to result from the Proposed Scheme.	Mitigation measures to be utilised during construction are detailed in the EMP <b>(TR010037/APP/7.4)</b> including pollution prevention measures in the construction drainage design, emergency response procedures and provision of spill kits.
Landscape and visual	During construction, significant cumulative impacts on landscape and visual receptors are not expected to result from the Proposed Scheme.	During operation, significant cumulative impacts on landscape and visual receptors are not expected to result from the Proposed Scheme.	Mitigation has not been recommended as no significant effects have been identified.
Geology and soils	During construction, significant cumulative impacts on geology and soils are not expected to result from the Proposed Scheme.	During operation, significant cumulative impacts on geology and soils are not expected to result from the Proposed Scheme.	Mitigation has not been recommended as no significant effects have been identified.
Heritage assets	Two Tumuli scheduled monument may experience significant cumulative effects from alteration of the landscape setting and visual, noise and light intrusion during construction.	A result of permanent alteration of the setting of Two Tumuli scheduled monument would occur from construction of the Cantley Lane link road, including potential noise and visual intrusion.	Construction would be carried out using industry best practice and in accordance with the implementation of an Environmental Management Plan (EMP) <b>(TR010037/APP/7.4)</b> to minimise potential adverse effects from noise and vibration as well as dust and accidental damage. Compliance with the EMP <b>(TR010037/APP/7.4)</b> will be secured by a requirement in the DCO. No specific measures outside these best-practice measures are recommended for temporary effects on heritage assets.

## 15.5. Assessment of different project effects

- 15.5.1. Only those developments that have been included in the shortlist have been brought through to the assessment of different project effects.
- 15.5.2. The developments listed below have been included in the assessment of different project effects as the South Norfolk Council Planning Portal shows them to have had an environmental statement produced, therefore they have been classified as Tier 1 developments.
- 15.5.3. The remainder of the shortlist developments are Tier 3 as explained in Table 15-3. A search was undertaken for scoping reports for the shortlisted developments and none were identified. Therefore, a 'very high level' assessment is appropriate as per the Stage 4 of the methodology outlined by Planning Inspectorate Advice Note Seventeen.
- 15.5.4. For the other developments, all are absent from the local planning authority and National Infrastructure Planning website. It is therefore reasonable to assume that these developments are unlikely to have significant effects on the environment.

### Cringleford Residential Development

- 15.5.5. Land to the north-east and south-east of Thickthorn Junction has planning permission for housing developments. Round House Park would provide 1,000 dwellings and is currently on course for construction as part of the Greater Norwich Development Partnership's Joint Core Strategy (Cringleford Neighbourhood Development Plan, 2014).
- 15.5.6. This is in addition to a minimum of 1,200 dwellings allocated in Cringleford. This includes planning permission 2014/00025 from South Norfolk Council (which was allowed on appeal and subsequently varied by planning permission 2017/2120). Potential adverse and beneficial cumulative effects of the Proposed Scheme with the Cringleford Residential Development have been identified in Table 15-8.

#### *Construction*

#### *Biodiversity*

- 15.5.7. The biodiversity ES chapter for the Cringleford Residential Development states that after proposed mitigation has been implemented, residual effects on species, designated sites and habitats are non-significant, with effects stated as either neutral, minor adverse for birds or negligible for great crested newt (GCN). Effects on species, designated sites and habitats for the Proposed Scheme are also non-significant with proposed mitigation in place. The following County Wildlife Sites (CWS) are located within the ZOI for both the Cringleford Residential Development and the Proposed Scheme:

- Meadow Farm Meadow



- Intwood Carr
- Riding School Meadow
- Eaton Street
- Eaton Island
- Bluebell Marsh
- UEA Marsh
- UEA Butterfly Meadow
- UEA Broad

15.5.8. Effects on CWS from the Cringleford Residential development are deemed to be minor adverse, however are neutral with screening planting, a dust management plan and a 25m buffer strip in place. Effects on CWS from the Proposed Scheme are not deemed significant, therefore cumulative effects are not expected.

#### *Cultural heritage*

15.5.9. The ES Chapter 8 (Biodiversity) for the Cringleford Residential Development states that the site has low archaeological value. Residual effects on cultural heritage receptors are deemed to be non-significant (neutral/ slight). A large adverse setting impact on the 'Two Tumuli in Big Wood' scheduled monument is identified resulting from the Proposed Scheme during construction, however this is unaffected by the Cringleford Residential Development, therefore unlikely to result in additive or synergistic residual cumulative effects.

#### *Geology and soils*

15.5.10. During construction, the ES chapter for 'ground contamination' for the Cringleford Residential Development identifies construction residual effects of negligible for effects on residential areas and construction workers from ground contamination. No significant effects are identified for the Cringleford Residential Development or the Proposed Scheme during construction, therefore cumulative effects are not anticipated.

#### *Landscape*

15.5.11. During construction, neither the ES chapter for 'landscape and visual impacts' for the Cringleford Residential Development nor the ES for the Proposed Scheme identify significant residual effects on designated landscapes, landscape features, settlements, public rights of way or residential receptors. Therefore, significant cumulative effects are not expected.

#### *Population and human health*

15.5.12. The ES chapter for 'Socio-economics' for the Cringleford Residential Development identifies there to be negligible residual effects on population, healthcare, housing and open space during construction of the Proposed Scheme.

15.5.13. An area of public open space is proposed to the north of the A47 on the southern boundary of the Cringleford Residential Development, as part of this development. Due to permanent land-take requirements of the Proposed Scheme, one of the football pitches to be provided as part of this development will not be constructed. This has been classified as a large adverse effect (significant). As this requirement to provide a certain area of public open space is a planning obligation associated with the Cringleford Residential Development, a significant cumulative effect on the provision of public open space is anticipated as a result of the construction of the Proposed Scheme. However, this cumulative effect is identified and assessed within the Population and human health chapter, therefore is not assessed further in this chapter.

#### *Road Drainage and the water environment*

15.5.14. During construction, the Cringleford Residential Development ES chapter for 'water resources and flood risk' temporary mitigation measures employed will ensure the development has a negligible effect on the water environment with mitigation in place. Therefore, significant cumulative effects are not expected.

#### *Operation*

##### *Biodiversity*

15.5.15. Operational effects on biodiversity are reported under construction to avoid the duplication of assessment.

##### *Cultural heritage*

15.5.16. The ES chapter on cultural heritage for the Cringleford Residential Development states that little further impact is expected during operation. Therefore, no cumulative effects are expected with the Proposed Scheme during operation.

##### *Geology and soils*

15.5.17. During operation, the ES chapter for 'ground contamination' for the Cringleford Residential Development identifies operational residual effects of negligible, for ground contamination, hazardous ground gas risk and impact of ground contamination on below ground structures. All residual effects identified as a result of the Proposed Scheme on ground contamination have been classified as Neutral. Therefore, cumulative effects are not anticipated.

##### *Landscape*

15.5.18. During operation, no significant adverse effects have been identified for designated landscapes, landscape features, settlements, public rights of way or residential receptors. Some minor- moderate beneficial effects have been identified on landscape features by year 15 of operation, due to tree and shrub planting along the A11 corridor and through street landscaping.

### *Population and human health*

15.5.19. The significant cumulative effect reported under construction for population and human health, regarding land-take of the proposed public open space due to the Proposed Scheme will also be present during operation. Other effects expected during operation on population and human health as a result of the Proposed Scheme are anticipated to be non-significant, except for a moderate adverse effect predicted at Cringleford footpath 4A. The footpath is being permanently diverted to the new Cantley Lane Footbridge (Cringleford). Residual effects of the Cringleford Residential development are neutral. No additional significant cumulative effects are predicted with the Proposed Scheme.

### *Road Drainage and the water environment*

15.5.20. During operation, effects on the Cringleford Residential Development on water resources and from flood risk are expected to be negligible with proposed mitigation in place. Effects on road drainage and the water environment from the Proposed Scheme are not significant with mitigation in place. No significant cumulative effects are not predicted from the Cringleford Residential Development with the Proposed Scheme.

## **Thickthorn Park and Ride extension**

### *Construction*

15.5.21. A request for an EIA screening opinion was issued in March 2021 to Norfolk County Council for an extension to the existing Thickthorn Park and Ride site located adjacent to the west of the existing A41/A11 Thickthorn Junction. The new proposal would include 480 additional parking spaces in addition to benefits such as electric charging points, a park and ride bus stop, cycle stands and cycle parking spaces, motorcycle parking, a toilet block and 30 disabled parking bays.

15.5.22. The request for an EIA screening opinion states that the proposal does not constitute EIA development. Whilst the project falls within the ZOI for all disciplines as per section 15.3 (Assessment Methodology) of this chapter, the proposal has been classified as a Tier 3 development. As Norfolk County Council have not yet provided a response for the EIA Screening Opinion, assessment of the cumulative effects with the Proposed Scheme has not been undertaken.

15.5.23. During construction of the extension to Thickthorn Park and Ride, some adverse environmental effects are expected. However, with the implementation of mitigation measures outlined within the request for an EIA screening opinion, significant effects are not anticipated from all environmental disciplines, aside from biodiversity for which further surveys to determine likelihood of significant effects are required. This includes surveys regarding bats, broadleaved woodland (low quality, lowland mixed deciduous woodland habitats of principal importance) and scattered broadleaved trees (ancient or veteran). Construction dates for the

proposal are not yet available, therefore significant cumulative effects regarding construction traffic and traffic management cannot be determined.

### *Operation*

15.5.24. The request for an EIA screening opinion states that during the operational phase of the proposed extension to Thickthorn Park and Ride, significant effects are not anticipated. At this stage and in the absence of results of biodiversity surveys required outlined within the screening letter, cumulative effects during operation of the Thickthorn Park and Ride extension with the Proposed Scheme has not been assessed.

### **Hethersett North Village**

15.5.25. The Hethersett North Village development falls within the biodiversity ZOI. The ES for the Hethersett North Village project confirmed that the project is not anticipated to have any significant effect on sites designated for biodiversity during construction.

### *Construction*

15.5.26. Effects on biodiversity receptors are identified to be minor or negligible during construction of the Hethersett North Village scheme. No cumulative effects were identified within the assessment. Therefore, cumulative effects are not expected as a result of construction of the Proposed Scheme with the Hethersett North Village project.

### *Operation*

15.5.27. The ES for the Hethersett North Village project confirmed that the project is not anticipated to have any significant effect on sites designated for biodiversity during operation. It has been anticipated during the biodiversity assessment for the Proposed Scheme that there would be a Neutral effect on designated sites as a result of the Proposed Scheme. Therefore, cumulative effects are not expected as a result of operation of the Proposed Development with the Hethersett North Village project.

### **Newfound Farm (east and west side)**

15.5.28. The Newfound Farm project in Cringleford falls with the ZOI for biodiversity, landscape, cultural heritage and geology and soils. The Newfound Farm development is located approximately 0.5km north west of the Proposed Scheme. The ES for the Newfound Farm project (published 2013) confirmed that the project is anticipated to have a neutral effect on sites designated for biodiversity. The Meadow Farm Meadows CWS is located within 2km of both the Newfound Farm and the Proposed Scheme.

## Construction

- 15.5.29. The biodiversity ES chapter for the Newfound Farm scheme states that during construction, it is considered that the most likely effect on the Meadow Farm Meadows CWS would be from soil run-off during construction. However, effects are not expected to occur due to the use of best-practice measures regarding pollution and run-off. The significance of effects during construction on designated sites, habitats, botany, bats, reptiles, birds, invertebrates, badger, harvest mice, and hedgehog after mitigation has been classified as negligible/neutral, minor negative or minor beneficial, therefore effects with the Proposed Scheme has been classified as **Neutral** and significant cumulative effects with the Proposed Scheme are not expected.
- 15.5.30. The ground conditions ES chapter for the Newfound Farm scheme states that during construction, effects after mitigation are considered to be minor and evidence of contaminated ground is not found. Therefore, impacts are classified as no change and effects with the Proposed Scheme have been classified as **Neutral** and significant cumulative effects on geology and soils with the Proposed Scheme is considered to be unlikely.
- 15.5.31. The cultural heritage ES chapter for the Newfound Farm scheme states that during construction, effects on archaeological remains within the site will be minor negative, due to mitigation by record preservation. Due to the distance from the Proposed Scheme, significant cumulative effects with the Proposed Scheme are not anticipated as the impact is no change, therefore effects with the Proposed Scheme have been classified as **Neutral**.
- 15.5.32. The landscape ES chapter for the Newfound Farm scheme states that there will be a moderate adverse impact on the landscape due to the Proposed Scheme, as the site will change to semi-urban landscape from rural landscape. Effects on landscape character from the Proposed Scheme are expected to be neutral non-significant by year 15 of operation. Therefore, effects with the Proposed Scheme have been classified as **Neutral** and significant cumulative effects on landscape character are not expected as a result of the proposed Scheme.

## Operation

- 15.5.33. There are 15 CWSs close to the Newfound Farm scheme, which were thought to potentially be impacted by increased visitor pressure to the site during operation, however the overall effect has been deemed as neutral. It has been anticipated during the biodiversity assessment for the Proposed Scheme that there would be a neutral effect on the CWS at Meadow Farm Meadows as a result of the Proposed Scheme. The significance of effects during operation on designated sites, habitats, botany, bats, reptiles, birds, invertebrates, badger, harvest mice, and hedgehog after mitigation has been classified as negligible/neutral, minor negative or minor beneficial, therefore the impact is no change and effects with the Proposed

Scheme have been classified as **Neutral** and significant cumulative effects with the Proposed Scheme are not expected.

- 15.5.34. The 'ground conditions' ES chapter for Newfound Farm states that during operation, effects on groundwater conditions after mitigation are not considered to be significant, therefore effects with the Proposed Scheme have been classified as **Neutral** and significant cumulative effects on geology and soils with the Proposed Scheme is considered to be unlikely.
- 15.5.35. The cultural heritage ES chapter for the Newfound Farm scheme states that during operation, effects on setting of designated heritage assets will be negligible and the archaeological record of the area will be enhanced due to investigation of the remains identified, a minor beneficial effect. Therefore, due to the distance from the Proposed Scheme, significant cumulative effects with the Proposed Scheme are not anticipated and effects with the Proposed Scheme have been classified as **Neutral**.
- 15.5.36. Potential for significant cumulative effects on landscape are detailed under construction to avoid duplication of assessment.

### **Norwich Research Park North West site and North East site**

- 15.5.37. The Norwich Research Park North West site falls within the biodiversity ZOI and is located approximately 1.7km north of the Proposed Scheme.

#### *Construction*

- 15.5.38. The ES for the Norwich Research Park North West and North East project confirmed that the project is anticipated to have temporary adverse or negligible effect during construction, with the implementation of mitigation. Cumulative effects are not expected as a result of the Proposed Scheme with the Norwich Research Park North West site and North East sites. Therefore, effects with the Proposed Scheme have been classified as **neutral**.

#### *Operation*

- 15.5.39. The ES for the Norwich Research Park North West project confirmed that the project is anticipated to have temporary adverse, negligible or long term minor beneficial effects in operation. Cumulative effects in operation are not expected as a result of the Proposed Scheme with the Norwich Research Park North West site and North East sites. Therefore, effects with the Proposed Scheme have been classified as **neutral**.

### **Norwich Research Park South West site and South East site**

- 15.5.40. The Norwich Research Park South West and South East sites fall within the biodiversity ZOI and is located approximately 1.7km north of the Proposed Scheme.



## Construction

15.5.41. During construction of the Norwich Research Park scheme, there are residual adverse (minor) effects expected regarding artificial lighting on invertebrates and the loss of foraging habitat for bats. Residual effects of remaining impacts on biodiversity receptors are predicted to be negligible or beneficial. Effects due to artificial lighting on invertebrates during construction from the Proposed Scheme are expected to be minor adverse. Significant cumulative effects on biodiversity during construction are not expected as a result of the Proposed Scheme with the Norwich Research Park scheme, therefore effects with the Proposed Scheme have been classified as **neutral**.

## Operation

15.5.42. During operation of the Norwich Research Park scheme, there are residual adverse (minor) effects expected the loss of foraging habitat for bats. Residual effects of remaining impacts on biodiversity receptors are predicted to be negligible or beneficial. Loss of foraging habitat for bats is identified as major adverse, however after mitigation is there is a slight adverse significance of effect. Significant cumulative effects on biodiversity during construction are not expected as a result of the Proposed Scheme with the Norwich Research Park scheme therefore effects with the Proposed Scheme have been classified as **neutral**.

## Hornsea Project Three Offshore Wind Farm

15.5.43. The Orsted Hornsea Project Three Offshore Wind Farm is an NSIP that was awarded development consent in December 2020. The development has been included as a Tier 1 development as construction of the development boundary crosses the DCO boundary for the Proposed Scheme and is likely to coincide with the construction of the A47/A11 Thickthorn Junction.

## Construction

15.5.44. An onshore cable has been proposed for the Hornsea Project Three Offshore Wind Farm which will cross underneath the A11 and B1172. However, horizontal directional drilling will be used to install the cable under the A11 and the B1172 to decrease disruption on these roads and reduce the impact of the installation on the surrounding area<sup>1</sup>.

15.5.45. Construction of the Hornsea Project Three Offshore Wind Farm is anticipated to begin in March 2023, two months after construction is proposed to commence for the A47/A11 Thickthorn Junction. Therefore, there is potential for a cumulative effect to occur due to the volume of construction traffic. The DCO boundaries for

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<sup>1</sup> Hornsea Project Three Offshore Wind Farm (2018). [online] available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-0004196.1.33%20Environmental%20Statement%20Chapter%2033%20Onshore%20Cumulative%20Impacts.pdf>

the Hornsea Project Three and the proposed Scheme cross along the B1172 and the A11. A construction compound and material storage area for the Hornsea Project Three Offshore Wind Farm is proposed to be located off Station Lane, adjacent to the west of the DCO boundary. This will potentially increase construction traffic in this area on the same routes that construction vehicles will use during construction of the Proposed Scheme. At this stage, it has not been anticipated that traffic levels would be high enough to result in a significant cumulative effect. However, further construction information, which is currently unavailable, would be required to more accurately determine the potential for significant construction cumulative effects. At this stage, cumulative effects with the Proposed Scheme are considered to be **neutral**.

### *Operation*

15.5.46. No significant cumulative effects are anticipated during operation of the A47/A11 Thickthorn Junction and Hornsea schemes at this stage, therefore effects with the Proposed Scheme have been classified as **neutral**.

### **Norfolk Vanguard Offshore Wind Farm**

15.5.47. The Norfolk Vanguard Offshore Wind Farm is an NSIP that was accepted for development consent by the Planning Inspectorate in July 2020. Although the development is not within the ZOI selected for the cumulative effects assessment, it has been included as a Tier 1 development as construction of the development is likely to coincide with the construction of the A47/A11 Thickthorn Junction.

### *Construction*

15.5.48. There is potential for a cumulative effect to occur on, pedestrian amenity and road safety, due to an increase in construction-related traffic using the A47, expected for both developments<sup>2</sup>. However, the peak construction traffic is anticipated to occur in 2022 for Norfolk Vanguard Offshore Wind Farm, and January to March 2023 for the A47/A11 Thickthorn Junction. Therefore, whilst there is potential for a cumulative effect to occur, this is not anticipated to be a significant effect and the development has not been assessed further for construction. Therefore, effects with the Proposed Scheme have been classified as **Neutral**.

### *Operation*

15.5.49. Due to the distance between the A47/ A11 Thickthorn Junction and the Norfolk Vanguard Offshore Windfarm, cumulative effects are not anticipated during

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<sup>2</sup> Norfolk Vanguard Offshore Wind Farm Environmental Statement (2018). [online] available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010079/EN010079-001521-Chapter%2033%20Onshore%20Cumulative%20Impacts%20Norfolk%20Vanguard%20ES.pdf>



operation of the schemes. Therefore, effects with the Proposed Scheme have been classified as **Neutral**.

### Norfolk Boreas Offshore Wind Farm

15.5.50. The Norfolk Boreas Offshore Wind Farm is an NSIP that was accepted for development consent by the Planning Inspectorate in July 2019. Although the development is not within the ZOI selected for the cumulative effects assessment, it has been included as a Tier 1 development as construction of the development is likely to coincide with the construction of the A47/A11 Thickthorn Junction.

#### *Construction*

15.5.51. As with the Norfolk Boreas Offshore Wind Farm, there is potential for a cumulative effect to occur on pedestrian severance, pedestrian amenity and road safety, due to an increase in construction-related traffic using the A47<sup>3</sup>. The peak increased traffic flows for the Norfolk Boreas Offshore Wind Farm are expected to occur in 2024, which may coincide with the A47/A11 Thickthorn Junction construction traffic if construction is ongoing in early 2024. However, the traffic volumes are not anticipated to result in a significant cumulative effect, therefore effects with the Proposed Scheme have been classified as **neutral**.

Due to the distance between the A47/ A11 Thickthorn Junction and the Norfolk Vanguard Offshore Windfarm, cumulative effects are not anticipated during operation of the schemes. Therefore, effects with the Proposed Scheme have been classified as **Neutral**.

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<sup>3</sup> Norfolk Boreas Offshore Wind Farm Environmental Statement (2019). [online] available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-000419-6.1.33%20Environmental%20Statement%20Chapter%2033%20Onshore%20Cumulative%20Impacts.pdf>

## 15.6. Monitoring

- 15.6.1. As significant cumulative construction and operational effects are not anticipated as a result of the Proposed Scheme, no monitoring would be required.

## 15.7. Conclusion

- 15.7.1. The assessment for combined effects involved the identification of impact interactions associated with the Proposed Scheme upon separate receptors or resources. The methodology for the assessment of single and different project effects followed DMRB LA 104.
- 15.7.2. In summary, significant single project effects are not expected as a result of the Proposed Scheme. **Slight adverse** cumulative effects are expected on residential properties on Cantley Lane notably 128 Cantley Lane, and properties on Cantley Lane South due to temporary visual intrusion, construction noise, and temporary increased journey length to access Thickthorn junction.
- 15.7.3. **Large adverse** cumulative effects are also expected at Two Tumuli scheduled monument, which may experience significant temporary cumulative effects due to the alteration of its cultural heritage setting, visual effects, noise and vibration increase and light intrusion during construction of the Proposed Scheme.
- 15.7.4. Best standard practice construction approaches in combination with community liaison would help to mitigate the cumulative impact of the effects. A planting design to mitigate visual impacts by screening the property views is presented in the Environmental Masterplan (**TR010037/APP/6.8**).
- 15.7.5. The assessment for cumulative effects has involved the identification of incremental changes likely to be caused by a shortlist of other developments and the Proposed Scheme itself. This assessment has followed the methodology Planning Inspectorate Advice Note Seventeen.
- 15.7.6. The residual cumulative effects during the construction and operational phases of the Proposed Scheme with of all of the other developments are not anticipated to contribute beyond that of the effects identified in the preceding environmental chapters.

## 15.8. References

Design Manual for Roads and Bridges DMRB LA 104 - Environmental assessment and monitoring. (Highways England) Available online at: <https://www.standardsforhighways.co.uk/dmr/search/78a69059-3177-43dc-94bd-465992cfda82>

The Planning Inspectorate (2019) Advice Note Seventeen: Cumulative Effects Assessment Version 2. Available online at:

<https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf>

Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.  
Available online at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>

Department for Transport (2014) National Policy Statement for National Networks: Presented to Parliament pursuant to Section 9 (8). Available online at <https://www.gov.uk/government/publications/national-policy-statement-for-national-networks>

Environmental Impact Assessment (EIA) Directive (85/337/EEC) (2011) as amended by the Council Directives 97/11/EC and 2003/31/EC and codified by 2011/92/EU. Available online at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011L0092>