

A47 Wansford to Sutton Dualling

Scheme Number: TR010039

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

July 2021

Infrastructure Planning

Planning Act 2008

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

A47 Wansford to Sutton
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT
Chapter 15 – Cumulative effects assessment

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15. Cumulative effects assessment

15.1. Introduction

- 15.1.1. Highways England (the Applicant) has submitted an application for a development consent order (DCO) for the A47 Wansford to Sutton Scheme (hereafter referred to as 'the Proposed Scheme'). The Proposed Scheme comprises the dualling of a section of the A47 between Wansford to Sutton; improvements to the A47 Wansford junction; creation of the A47 Sutton Heath roundabout to replace the Nene Way roundabout; associated side road alterations; and walking, cycling and horse-riding connections.
- 15.1.2. This section of A47 road is currently unable to cope with the high traffic volume and there are limited opportunities to overtake slower moving vehicles on the single carriageway. The Proposed Scheme aims to reduce congestion related delay, improve journey time reliability and increase the overall capacity of the A47. Full details of the Proposed Scheme are provided in Environmental Statement Chapter 2 (**TR010039/APP/6.1**).
- 15.1.3. The key elements of the Proposed Scheme include:
- approximately 2.6km of new dual carriageway constructed largely offline of the existing A47, including the construction of two new underpasses
 - a new free-flow link road connecting the existing A1 southbound carriageway to the new A47 eastbound carriageway
 - a new link road from the Wansford eastern roundabout to provide access to Sacrewell Farm, the petrol filling station and the Anglian Water pumping station
 - closure of the existing access to Sacrewell Farm with a new underpass connecting to the farm from the link road provided
 - a new slip road from the new A47 westbound carriageway also providing access to the petrol filling station
 - a link road from the new A47 Sutton Heath roundabout, linking into Sutton Heath Road and Langley Bush Road
 - new junction arrangements for access to Sutton Heath Road and Langley Bush Road
 - closure of the existing accesses to the A47 from Sutton Heath Road, Sutton Drift and Upton Road
 - new passing places and limited widening along Upton Drift (also referenced as Main Road)
 - new walking and cycling routes, including a new underpass at the disused railway
 - new safer access to the properties on the A1, north of Windgate Way
 - installation of boundary fencing, safety barriers and signage
 - new drainage systems including:
 - two new outfalls to the River Nene

- a new outfall to Wittering Brook
 - extension of the A1 culvert at the Mill Stream
 - realignment and extension of the A47 Wansford sluice
 - drainage ditch interceptors
 - new attenuation basins, with pollution control devices, to control discharges to local watercourses
 - River Nene compensatory flood storage area
 - works to alter or divert utilities infrastructure such as electricity lines, water pipelines and telecommunications lines
 - temporary compounds, material storage areas and vehicle parking required during construction
 - environmental mitigation measures
- 15.1.4. 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).
- 15.1.5. 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.
- 15.1.6. 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).
- 15.1.7. 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.
- 15.1.8. 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 2km depending on the topic and potential effects.

15.2. Competent expert evidence

- 15.2.1. The technical lead for the preparation of this chapter, has 16 years relevant experience and the appropriate qualifications (Chartered Environmentalist, CEnv).

15.3. Assessment methodology

- 15.3.1. Since the publication of the EIA Scoping Report in February 2018 (TR010039/APP/6.5) and Scoping Opinion (March 2018) (TR010039/APP/6.6), the DMRB for cumulative effects has been updated. DMRB LA 104 Environmental Assessment and Monitoring (2019) includes requirements for cumulative effect assessments.
- 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 (TR010039/APP/6.1).
- 15.3.6. A 2km study area has been selected for the assessment of cumulative effects with different projects as this ensures impacts for all topics are identified. This is summarised in Table 15-1: Study area extents and presented in Figure 15.1 (TR010039/APP/6.2). The table orders the environmental topics by size of ZOI.

Table 15-1: Study area extents

Discipline topic (TR010039/APP/6.1)	Study area	CEA ZOI
Biodiversity	<ul style="list-style-type: none"> Designated sites: 2km Phase 1 habitat survey: 100m Great crested newts (GCN) <i>Triturus cristatus</i>: 500m Surveys for breeding birds and wintering birds: 500m Aquatic invertebrates from within wetland sites that could be directly impacted by the Proposed Scheme: 50m Surveys for other ecological receptors, including XXXXXXXXXX <i>Meles meles</i> and reptiles: 50m Barn owl <i>Tyto alba</i> nests that could be directly impacted or disturbed by the Proposed Scheme: 1.5km Bats – flight paths, foraging areas or roosts in trees and buildings: 50m 	<ul style="list-style-type: none"> 2km from the Proposed Scheme boundary
Cultural heritage	<p>Archaeological potential and history context: 1km from the Proposed Scheme boundary</p> <p>Zone of Visual Influence: approx. 1.3km</p>	2km from the Proposed Scheme boundary
Landscape and visual effects	1km from the Proposed Scheme boundary	2km from the Proposed Scheme boundary
Geology and soils	1km from Proposed Scheme boundary	2km from the Proposed Scheme boundary
Road drainage and the water environment	<p>1km from the Proposed Scheme boundary</p> <p>Assessment for road runoff and accidental spillages includes traffic associated with other developments and is therefore inherently cumulative. This aspect is not included in the CEA to avoid double counting.</p>	2km from the Proposed Scheme boundary
Noise and vibration	<p>The vibration study area is a maximum of 100m from the construction works. The noise study area is a maximum of 600m from the Proposed Scheme boundary.</p> <p>As the construction and operational phase traffic data includes traffic associated with other developments, the air quality impact assessment reported within the air quality chapter is inherently cumulative. Not included in the CEA to avoid double counting.</p>	1.2km from the Proposed Scheme boundary
Population and human health	500m from the Proposed Scheme boundary	1km from the Proposed Scheme boundary
Air quality	<p>200m from construction activities for dust and vehicle emissions.</p> <p>As the construction and operational phase traffic data includes traffic associated with other developments, the air quality impact assessment reported within the air quality chapter is inherently cumulative. Not included in the different projects assessment to avoid double counting.</p>	400m from construction activities
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	As the construction and operational phase traffic data includes traffic associated with other developments, the emissions assessment reported within the climate chapter	Not applicable

Discipline topic (TR010039/APP/6.1)	Study area	CEA ZOI
	<p>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>	

15.3.7. Further information on the study areas for the technical assessments are found within each of the technical Chapters 5 to 14 in the ES (TR010039/APP/6.1). The biodiversity ZOI covers multiple species and designated sites, as detailed in Table 8-2 of Chapter 8 Biodiversity (TR010039/APP/6.1).

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 have been included within the tables, with 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.

- Chapter 6 Cultural Heritage and Chapter 8 Biodiversity (**TR010039/APP/6.1**) considered the potential interactions of effects relating to construction and operational noise and air quality, and construction dust on receptors.
- Chapter 8 Biodiversity (**TR010039/APP/6.1**) includes consideration of effects on the water environment in relation to ecological receptors.
- Chapter 12 Population and human health (**TR010039/APP/6.1**), considers effects from other environmental topics (air quality, landscape and visual, noise and access) to assess health outcomes.
- Chapter 14 Climate (**TR010039/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 Appendix 15.1 (Long list) (**TR010039/APP/6.3**)
 - Stage 2: Identify shortlist of ‘other developments’ for the cumulative effects assessment.
 - Stage 3: Information gathering
 - Stage 4: Assessment
- 15.3.16. A search for ‘Tier 2’ projects was also completed on the Cambridgeshire County Council and Peterborough City Council planning portals and no further projects with potential effects were identified within the study area.
- 15.3.17. 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

- 15.3.18. 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.
- 15.3.19. The topics and the intrinsically cumulative aspect of the operational assessment, noted in Table 15-1, are included in the following ES chapters (**TR010039/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
- Chapter 14 Climate

15.3.20. 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.

15.3.21. ES Chapter 5 Air quality (**TR010039/APP/6.1**) did not identify any significant cumulative residual effects on human or ecological receptors within Section 5.10 'Assessment of likely significant effects', as a result of the Proposed Scheme.

15.3.22. ES Chapter 11 Noise and vibration (**TR010039/APP/6.1**) did not identify any significant cumulative residual effects during operation of the Proposed Scheme on noise and vibration receptors. This is explained within Section 11.10 'Assessment of likely significant effects',

15.3.23. ES Chapter 13 Road drainage and the water environment) (RDWE) (**TR010039/APP/6.1**) did not identify any significant cumulative residual effects during operation of the Proposed Scheme on RDWE receptors. This is explained within Section 13.10 'Assessment of likely significant effects',

15.3.24. ES Chapter 14 Climate (**TR010039/APP/6.1**) did not identify any significant cumulative residual effects on human or ecological receptors as a result of the Proposed Scheme. This is explained within Section 14.10 'Assessment of likely significant effects',

Other developments

15.3.25. 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 Appendix 15.1 (**TR010039/APP/6.3**).

15.3.26. 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 Chapter 4 of the Transport Assessment (**TR010039/APP/7.4**). 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).

15.3.27. Developments from the Planning Inspectorate Nationally Significant Infrastructure Projects (NSIP) website, the Cambridgeshire County Council and Peterborough City Council planning portals and the 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 Wansford to Sutton Dualling Chapter 4 Transport Assessment Report (TR010039/APP/7.3).

- 15.3.28. 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: from a table in the Planning Inspectorate Advice Note Seventeen (2019). Tier 3 developments are least certain, and most likely to have limited publicly available information to inform assessments.
- 15.3.29. 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 maybe considered as part of both the construction and operational assessment.

15.3.30. 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

15.3.31. 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.

15.3.32. 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.

15.3.33. 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"> • Permanent and far reaching for receptors of high value. • Localised for a receptor of very high value. • Temporary for receptor of very high value.
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"> • Permanent and far reaching for receptors of medium value. • Localised for receptors of high value. • Temporary for a receptor of high value.
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"> • Permanent and far reaching for receptors of low value. • Localised for receptors of medium value. • Temporary for a receptor of medium value.
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 LA 104

15.3.34. 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 2 pieces of woodland of 1 ha, resulting in 2 ha cumulative woodland loss) or synergistic (2 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

- 15.3.35. The proposed assessment methodology for cumulative effects was described in Chapter 15 Scoping Report (**TR010039/APP/6.5**) issued to the Planning Inspectorate in February 2018.
- 15.3.36. The scope of this assessment reflects comments received within the Scoping Opinion (2018) (**TR010039/APP/6.6**).
- 15.3.37. Peterborough City Council and Cambridgeshire County Council were contacted to comment on the long list of developments detailed within Appendix 15.1 (**TR010039/APP/6.3**). A follow-up phone-call to Peterborough City Council and email to Cambridgeshire County Council were made. At the time of submission, no response had been received.

Limitations and assumptions

- 15.3.38. 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).
- 15.3.39. 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 15-5 and the operation effects in Table 15-6.

Table 15-5: 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 (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
Human receptors residents, including community and private assets, sensitive receptors and vulnerable groups	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.	Moderate adverse Due to the physical loss of the building Wansford Railway Station (WAN01) (Old Station House) there are impacts to setting and context of the area which cannot be fully mitigated by the recording works.	Visual construction impacts are expected at the following private properties: Large adverse Sutton Lodge Moderate adverse Windgate Way Heath House Lower Lodge Farm Willowhayne House Properties on north-eastern fringe of Sutton village (including Manor Farm) Stibbington (properties at Old Great north Road) Community and commercial receptors: Large adverse Sacrewell Farm Visitor Centre	Not included in scope of geology and soils assessment.	Not included within scope of assessment.	Moderate adverse The demolition of Old Station House will result in a significant effect, however this is moderate as the house is currently derelict.	No significant effects identified	No significant effects identified	Moderate adverse A significant cumulative effect is anticipated on Old Station House due to multiple effects on the receptor. The cumulative effect is deemed to be 'moderate' as opposed to 'large' as the building is derelict. Neutral No further significant cumulative effects on single receptors within the Human receptors group during construction are expected as a result of the Proposed Scheme.
Human- all travellers (vehicle, walkers, cyclists and horse riders)	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.	Visual construction impacts are expected at the following public right of ways: Large adverse The Nene Way riverside footpath Footpath network north of Sacrewell Farm visitor centre Footpath through Sacrewell Farm visitor centre	Not included in scope of geology and soils assessment.	Not included in scope of materials assessment.	Moderate adverse There will be a significant effect resulting from a journey length increase for vehicle users when accessing Lower Lodge Farm from the A47 as a result of the Proposed Scheme. Moderate adverse There will be significant effect on WCH users due to the permanent removal	No significant effects identified	Not included in scope of RDWE assessment.	Neutral No significant cumulative effects on single receptors within the Human- all travellers group during construction are expected as a result of the Proposed Scheme.

¹ Non- significant effects within the Chapter 11 Noise and Vibration (TR010039/APP/6.1) are reported solely as 'Not significant'. Further detail can be found within the ES Chapter.
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Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
				<p>Moderate adverse</p> <p>East to west footpath between Sarewell Farm and Sutton Heath Road</p> <p>East to west footpath west of Stibbington</p>			<p>of the cycle facilities at A47/ A1 roundabouts.</p> <p>Moderate beneficial</p> <p>There will be a beneficial significant effect for WCH due to the diversion of Wansford Hereward Way Permissive 3 and Wansford Hereward Way Permissive 2 along the new access road for Sacrewell Farm (for users approaching from Wansford).</p> <p>Moderate adverse</p> <p>There will be a significant effect on WCH due to the removal of the A47/Upton Road / Peterborough Road roundabout (cycle movements between Ailsworth and Upton).</p> <p>Very large beneficial</p> <p>There will be a beneficial significant effect for WCH due to the removal of A47/Upton Road / Peterborough Road roundabout (cycle movements between Southorpe and Ailsworth via Upton).</p> <p>Slight adverse</p> <p>Journey length increases for the following:</p> <ul style="list-style-type: none"> • A1 for properties on Windgate Way • Increase to the A1 for properties on Great North Road • Increase for private property Health House • Increase for residential properties located on Sutton Drift in Sutton. 			

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
							<ul style="list-style-type: none"> • Increase for residential properties located on Church Walk in Upton • Additional access to Mill House on Great North Road due to link road to Sacrewell Farm <p>Slight beneficial effects are anticipated due to the removal of severance between community and commercial facilities to the north and south of the A47, due to the Proposed Sacrewell Link Road.</p> <p>Slight adverse</p> <p>Increase to access the Wansford Picnic Area from the A47.</p> <p>Slight adverse</p> <p>Increase to access St Michael & All Angels Church in Upton.</p> <p>Neutral</p> <p>No change in access to Thornhaugh Parish Church, Parish St Mary the Virgin Wansford Church, Wansford Pharmacy, Wansford Surgery and Wansford Post Office as a result of the Proposed Scheme.</p> <p>Neutral</p> <p>No change in access to Wansford Pasture and Standen Pasture Nature Reserve.</p> <p>Slight beneficial</p> <p>Journey length decrease to Stamford Heavenly Chocolates, Origin 8 Deli Cafes and Sacrewell Heritage Museum due to the new link road.</p>			

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
							<p>No change</p> <p>No change in access to Processors and Growers, Glyn's Driving Tuition, James Driver Training, Wansford Airport Taxi Service, Cross Keys Hotel and In Step Foot Clinic.</p> <p>Slight adverse</p> <p>Journey length increase to Longfoot M F & Son.</p> <p>Slight adverse effects are anticipated on the following WCH route:</p> <p>Wansford Hereford Way Permissive 2 and 3</p> <p>Slight beneficial effects are anticipated on the following WCH route:</p> <p>New link between A47/ A1 eastern roundabout and petrol filling station.</p> <p>Slight beneficial</p> <p>Permanent stopping up of Wansford 4 and replacement with new section of footpath.</p>			
Ecological receptors (designated sites, protected species and existing habitats)	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>Moderate adverse</p> <p>Permanent loss of hedgerows and deciduous woodland.</p> <p>Moderate adverse</p> <p>Permanent loss of hedgerows and deciduous woodland.</p> <p>Neutral</p> <p>Potential indirect impacts on Site of Special</p>	Not included in scope of cultural heritage assessment.	No significant effects are anticipated.	No significant effects anticipated.	Not included in scope of materials assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	Moderate adverse	Neutral
									<p>Deterioration or loss of the aquatic environments and deterioration in water quality at Wittering Brook. Due to construction of proposed outfalls, Wittering Brook culvert and associated minor watercourse realignment, A1 Mill stream culvert extension, drainage ditch interception, Mill Stream re-meandering, and flood compensatory area.</p>	<p>No significant cumulative effects on single receptors within the ecological receptors group during construction are expected as a result of the Proposed Scheme.</p>

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
		<p>Scientific Interest & National Nature Reserves through pollution of habitat</p> <p>Neutral</p> <p>Indirect impacts on Ancient woodland during construction through increased air pollution.</p> <p>Neutral</p> <p>Potential of indirect impacts on Wildlife Trust reserves, local wildlife sites and potential wildlife sites through the pollution of habitat.</p>							<p>Slight adverse and Neutral effects anticipated for Biodiversity due to construction activities, on:</p> <ul style="list-style-type: none"> • Mill Stream • Wittering Brook • River Nene • Ordinary watercourses • Ponds • Mill Stream floodplain • Wittering Brook floodplain • River Nene floodplain • Lincolnshire Limestone Formation • Grantham Formation • Rutland Formation • River Terrace Deposits • Alluvium • Designated sites • Downgradient unlicensed abstractions 	
The water environment	Not included in scope of air quality assessment.	No significant effects	Not included in scope of cultural heritage assessment.	No significant effects are anticipated.	Slight adverse effects are anticipated on the following: <ul style="list-style-type: none"> • Surface waters - River Nene 	No significant effects anticipated.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	Slight adverse and Neutral effects anticipated for 'Water supply and quality', 'value to economy', 'conveyance of flow', 'recreation', and biodiversity' due to	Slight adverse A non-significant cumulative effect is anticipated on the River Nene due to impacts from geology and soils and Road Drainage. This is not anticipated

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
					<ul style="list-style-type: none"> Ground- Principal and Secondary Aquifers 				construction activities, on: <ul style="list-style-type: none"> Mill Stream Wittering Brook River Nene Ordinary watercourses Ponds Mill Stream floodplain Wittering Brook floodplain River Nene floodplain Lincolnshire Limestone Formation Grantham Formation Rutland Formation River Terrace Deposits Aluvium Designated sites Downgradient unlicensed abstractions 	to be significant due to mitigation which has been proposed to ensure the effects are minimal. Neutral No significant cumulative effects on single receptors within the water environment group during construction are expected as a result of the Proposed Scheme.
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.	Large adverse Significant effects are expected on Nassaburgh Limestone Plateau Large adverse Significant effects are expected at Nene Valley Large adverse effects are expected	Not included in scope of geology and soils assessment.	Not included in scope of materials 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.	Neutral No significant cumulative effects on single receptors within the landscape and visual receptors group during construction are expected as a result of the Proposed Scheme.

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
				<p>at the following viewpoints: during construction:</p> <ul style="list-style-type: none"> • Sutton • Riverside open space • Riverside footpath (Nene Way) • Footpath at Windgate Way <p>Moderate adverse effects are expected at the following viewpoints:</p> <ul style="list-style-type: none"> • Footpath west of Stibbington • Sacrewell Farm • Sutton Crossways Track • Lower Lodge Farm • Footpath west of Sutton (Nene Way) • Footpath west of Sutton Heath Road • Black Swan Hill <p>Slight adverse effects are expected at the following viewpoints:</p> <ul style="list-style-type: none"> • Footpath at Bunkers Hill <p>Neutral effects are expected at the following viewpoints:</p> <ul style="list-style-type: none"> • Footpath south of Upton 						

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
				<ul style="list-style-type: none"> Thornhaugh (opposite church) 						
Geology and soils	Not included in scope of air quality assessment.	No significant effects anticipated.	Not included in scope of geology and soils assessment.	Not included in scope of landscape assessment.	<p>Very large adverse</p> <p>Agricultural soils- Grade 2 due to permanent land-take</p> <p>Moderate adverse</p> <p>Agricultural soils- Grade 2 Due to temporary land-take</p> <p>Moderate adverse</p> <p>Agricultural soils- Grade 3a- Due to temporary land-take</p> <p>Slight adverse</p> <p>Agricultural soils- Grade 3a- Due to temporary land-take</p> <p>Moderate adverse</p> <p>Agricultural soils Grade 3b- Due to permanent land-take</p> <p>Minor adverse</p> <p>Agricultural soils Grade 3b- due to temporary land-take</p> <p>Neutral</p> <p>Users of the A47 during construction.</p> <p>Slight adverse</p> <p>Users of the adjacent land areas etc (offsite receptors)</p>	No significant effects anticipated.	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.	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the geology and soils receptors group during construction are expected as a result of the Proposed Scheme.</p>
Heritage assets	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment.	For significance of all receptors, please refer to Appendix 6.1 (TR010039/APP/6.3). Moderate adverse	No significant effects are anticipated.	Not included in scope of geology and soils assessment.	Not included in scope of materials 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.	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the heritage assets receptor group during</p>

Receptor	Air quality	Biodiversity	Cultural heritage	Landscape and visual	Geology and soils (including agricultural)	Material assets and waste	Population and human health (including agricultural landholdings)	Noise and vibration ¹	Road drainage and the water environment (RDWE)	Significance of combined effects on single receptors
			Demolition of the locally listed former Wansford Railway Station (WAN01) will result in a moderate adverse effect as a written record will not fully mitigate the asset.							construction are expected as a result of the Proposed Scheme.
Overall single project effect for the Proposed Scheme during construction									Neutral	

Table 15-6: 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	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
Human receptors (residents, including community and private assets, sensitive receptors and vulnerable groups)	No significant effects. Of the 22 human receptors identified within the air quality study area for the Proposed Scheme, there are no exceedances of the NO ₂ annual mean objective in the opening year with and without the Proposed scheme.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	Visual construction impacts are expected at the following human receptors, during the opening year: Moderate adverse Stibbington (properties at Old Great North Road with rear views across the valley) Moderate beneficial Deep Springs By year 15 of operation: Moderate beneficial Deep Springs Moderate adverse Sacrewell Farm visitor centre	Assessed within the human health assessment of the Population and human health chapter (TR010039/APP/6.1).	No significant effects anticipated.	No significant effects are expected.	No significant effects are expected.	Not included in scope of RDWE assessment.	Neutral No significant cumulative effects on single receptors within the Human receptors group during operation are expected as a result of the Proposed Scheme.

² Non- significant effects within the Chapter 11 Noise and Vibration (TR010039/APP/6.1) are reported solely as 'Not significant'. Further detail can be found within the ES Chapter.
Planning Inspectorate Scheme Ref: TR010039
Application Document Ref: TR010039/APP/6.1

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
				<p>Slight beneficial</p> <ul style="list-style-type: none"> Sutton Lodge Properties on northern east fringe of Sutton (including Manor Farm) 						
Human- all travellers (vehicle, walkers, cyclists and horse riders)	No significant effects identified.	Not included in scope of biodiversity assessment	Not included in scope of cultural heritage assessment.	<p>Slight adverse effects are expected on the following viewpoints during Year 15 of operation:</p> <ul style="list-style-type: none"> Riverside footpath (Nene Way) Footpath west of Sutton Heath Road Footpath at Windgate Way Black Swan Hill <p>Neutral effects are expected on the following viewpoints during Year 15 of operation:</p> <ul style="list-style-type: none"> Footpath west of Stibbington Sacrewell Farm Footpath south of Upton Footpath west of Sutton Thornhaugh Footpath at Bunkers Hill <p>Slight beneficial effects would remain in year 15 at the following road receptors:</p>	Not included in scope of geology and soils assessment.	Not included in scope of materials assessment.	<p>Slight beneficial</p> <p>New combined footway/cycleway on the new link road from the proposed A47 roundabout to Peterborough Road.</p> <p>Slight beneficial</p> <p>New underpass at the disused railwayline that is suitable for pedestrians and cyclists.</p>	No significant effects are expected.	Not included in scope of RDWE assessment.	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the human receptors (all travellers) group during operation are expected as a result of the Proposed Scheme.</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
				<ul style="list-style-type: none"> Users of the A47 Sutton Drift 						
Ecological receptors (designated sites, protected species and existing habitats)	<p>No significant effects identified.</p> <p>Four designated sites were considered in the assessment however the change in nitrogen deposition for the sites is not expected to result in significant effects.</p>	<p>Neutral</p> <p>Indirect impacts during operation on Sites of Special Scientific Interest & National Nature Reserves from surface water run-off, sedimentation and , water level changes and air quality.</p> <p>Neutral</p> <p>Impact from nitrogen deposition on Site of Special Scientific Interest & National Nature Reserves.</p> <p>Neutral</p> <p>Indirect impacts on Ancient Woodland during operation through increased air pollution.</p> <p>Neutral</p> <p>Indirect impacts on Wildlife Trust reserves, local wildlife sites and potential wildlife sites during operation from surface water run-off, sedimentation, water level changes and air quality.</p> <p>Neutral</p> <p>Indirect impacts on all CWS sites</p>	Not included in scope of cultural heritage assessment.	No significant effects are expected.	Not included in scope of geology and soils assessment.	No significant effects anticipated.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.	<p>Large beneficial</p> <p>Potential changes to the conveyance of flow in the fluvial floodplain and loss of fluvial floodplain, restriction or redirection of the water body and watercourses causing increased localised flooding to the Proposed Scheme.</p> <p>Increased or redirected flood risk to other and risk to flood-sensitive receptors near to overloaded system and downstream.</p> <p>Deterioration or loss of aquatic environments.</p> <p>Slight adverse and Neutral effects anticipated for Biodiversity due to construction activities, on:</p> <ul style="list-style-type: none"> Mill Stream Wittering Brook River Nene Ordinary watercourses Ponds Mill Stream floodplain Wittering Brook floodplain River Nene floodplain 	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the ecological receptors group during operation are expected as a result of the Proposed Scheme.</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
		<p>during operation from surface water run-off, sedimentation, water level changes, air pollution gradually degrading habitats.</p> <p>Indirect impacts on NERC Act (2006) S41 priority habitats from pollution of habitat from air quality, surface water runoff, water level changes, sedimentation and accidental spillages.</p> <p>Neutral</p> <p>Indirect impacts on Cambridgeshire Priority Habitats through the pollution of habitats.</p> <p>Neutral</p> <p>Indirect impacts upon on botanical composition during operation.</p> <p>Neutral</p> <p>Reduction in abundance of Terrestrial Invertebrates due to the presence of a physical barrier which will reduce dispersal of species. Potential risk of mortality of individuals through pollution.</p> <p>Neutral</p>							<ul style="list-style-type: none"> • Lincolnshire Limestone Formation • Grantham Formation • Rutland Formation • River Terrace Deposits • Alluvium • Designated sites • Downgradient unlicensed abstractions 	

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
		<p>Potential risk of mortality of Aquatic Invertebrates from pollution.</p> <p>Neutral</p> <p>Pollution of breeding ponds and loss of terrestrial and breeding habitat.</p> <p>Neutral</p> <p>Reduction in abundance of reptiles due to the presence of a psychical barrier and changes to habitat suitability through pollution.</p> <p>Neutral</p> <p>Direct mortality of breeding birds through traffic collisions and disturbance of nesting locations, and degradation of habitat.</p> <p>Neutral</p> <p>Direct mortality of barn owls through traffic collisions and disturbance of nesting locations, and degradation of habitat.</p> <p>Neutral</p> <p>Direct mortality of wintering birds through traffic collisions and disturbance of nesting locations, and degradation of habitat.</p> <p>Neutral</p>								

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
		<p>Direct mortality of bats through traffic collisions, and disturbance.</p> <p>Neutral</p> <p>Direct mortality of otter through traffic collisions, potential mortality from pollution and disturbance.</p> <p>Neutral</p> <p>Potential risk of mortality of water vole from pollution, avoidance and abandonment of burrows and disturbance from light pollution.</p> <p>Neutral</p> <p>Direct mortality of [REDACTED] through traffic collisions, and disturbance.</p> <p>Neutral</p> <p>Permanent loss of commuting routes and areas of shelter and foraging. Direct mortality of other notable species and Pollution risk of mortality.</p>								

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
The water environment	Not included in scope of air quality assessment.	No significant effects identified.	Not included in scope of cultural heritage assessment.	No significant effects are expected.	<p>Neutral effects are anticipated on the following:</p> <ul style="list-style-type: none"> • Surface waters- River Nene • Ground- Principal and Secondary Aquifers 	No significant effects anticipated.	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.	<p>Large beneficial</p> <p>Impacts to the conveyance of flow at Wittering Brook are expected to be Large beneficial.</p> <p>Large beneficial</p> <p>Impacts to the value to economy of Wittering Brook Floodplain are Large beneficial.</p> <p>Slight adverse and Neutral effects anticipated for 'Water supply and quality', 'value to economy', 'conveyance of flow', 'recreation', and biodiversity' due to operational activities, on:</p> <ul style="list-style-type: none"> • Mill Stream • Wittering Brook • River Nene • Ordinary watercourses • Ponds • Mill Stream floodplain • Wittering Brook floodplain • River Nene floodplain • Lincolnshire Limestone • Rutland Formation • River Terrace Deposits • Alluvium • Grantham Formation 	<p>Slight adverse</p> <p>A non-significant cumulative effect is anticipated on the River Nene due to impacts from geology and soils and Road Drainage. This is not anticipated to be significant due to mitigation which has been proposed to ensure the effects are minimal.</p> <p>Neutral</p> <p>No further significant cumulative effects on single receptors within the water environment group during operation are expected as a result of the Proposed Scheme.</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
									<ul style="list-style-type: none"> Designated sites Downgradient unlicensed abstractions 	
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.	<p>Impacts on landscape character are expected at the following landscape and visual receptors during the opening year:</p> <p>Moderate adverse:</p> <ul style="list-style-type: none"> Nassaburgh Limestone Plateau Nene Valley <p>And during Year 15 of operation</p> <p>Slight adverse:</p> <ul style="list-style-type: none"> Nassaburgh Limestone Plateau Nene Valley <p>Slight beneficial effects are expected on the following viewpoints during Year 15 of operation:</p> <ul style="list-style-type: none"> Sutton Riverside open space Sutton Crossways Track Lower Lodge Farm 	Not included in scope of geology and soils assessment.	Not included in scope of materials assessment.	Not included in scope of population and human health assessment.	Not included in scope of noise and vibration assessment.		<p>Neutral</p> <p>No significant cumulative effects on single receptors within the landscape and visual receptors group during operation are expected as a result of the Proposed Scheme.</p>
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 visual assessment.	<p>Neutral effects are anticipated on the following:</p> <ul style="list-style-type: none"> Future users of the Proposed Scheme 	No significant effects anticipated.	Not included in scope of population and human health assessment. Potential pollution pathways already	Not included in scope of noise and vibration assessment.	Not included in scope of RDWE assessment.	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the geology and soils</p>

Receptor	Air quality	Biodiversity	Cultural Heritage	Landscape and visual	Geology and soils	Material assets and waste	Population and human health	Noise and vibration ²	Road drainage and the water environment	Significance of combined effects on single receptors
					<ul style="list-style-type: none"> Offsite receptors Agricultural soils 		cumulatively assessed under human health.			receptors group during operation are expected as a result of the Proposed Scheme.
Heritage assets	Not included in scope of air quality assessment.	Not included in scope of biodiversity assessment	<p>Moderate adverse</p> <p>1006796 / Cropmark site of a barrow cemetery. Physical removal of 6m by 9m triangle (approx. 27m²) of land from the south-eastern corner. No known significant remains will be removed but there is potential for small or ephemeral remains, masked by geological anomalies.</p> <p>Moderate adverse</p> <p>1331283 / Model Farmhouse Setting may be severely damaged if the associated wall (1127438) is damaged.</p> <p>Moderate adverse</p> <p>MPB2229 / Upton Causeway Enclosure Construction activities are likely to remove any remains present in this area.</p>	Not included in scope of landscape and visual assessment.	Not included in scope of geology and soils assessment.	Not included in scope of materials assessment.	Not included in scope of population and human health assessment.	No significant effects identified	Not included in scope of road drainage and the water environment assessment.	<p>Neutral</p> <p>No significant cumulative effects on single receptors within the heritage assets receptors group during operation are expected as a result of the Proposed Scheme.</p>
Overall single project effect for the Proposed Scheme during operation									Neutral	

Summary of single project effects

Construction

- 15.4.2. A significant construction cumulative effect is anticipated on Old Station House. This is due to the multiple effects on cultural heritage through loss of a designated asset and impacts to setting, and effects on population and human health due to the demolition of private property. Individually, the effects are classified as **Moderate adverse**. The cumulative effect on Old Station House has been classified as **Moderate adverse** as the property is derelict and the impact on population and human health would not impact current residents, therefore the effect has not been increased.
- 15.4.3. A cumulative construction effect on the River Nene has been identified, due to the multiple effects identified within the ES Chapter 9 Geology and soils (**TR010039/APP/6.1**), and ES Chapter 13 Road Drainage and the Water Environment (RDWE) (**TR010039/APP/6.1**). Individually, the effects are classified as **Slight adverse**. The cumulative effect on the River Nene has been classified as **Slight adverse** as the mitigation in place for Geology and soils and RDWE would reduce the effect.
- 15.4.4. No further additive or synergistic cumulative effects are expected as a result of construction of the Proposed Scheme.

Operation

- 15.4.5. During operation, neither additive or synergistic cumulative effects are expected as a result of the Proposed Scheme. One receptor, the River Nene, is identified to have more than one effect identified on the receptor during operation. However, the effect identified within ES Chapter 9 Geology and Soils (**TR010039/APP/6.1**) is classified as Neutral, therefore would not be anticipated to cause additive cumulative effects with the Slight adverse effect identified within ES Chapter 13 Road Drainage and the Water Environment (**TR010039/APP/6.1**). Therefore, it is not anticipated that there would be significant cumulative effects as a result of the Proposed Scheme during operation.
- 15.4.6. Mitigation measures to reduce significant effects during construction and operation are outlined in Table 15-7.

Table 15-7: Residual effects, mitigation and enhancement measures

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
Human receptors residents, including community and private assets, sensitive receptors	During construction, significant effects are expected due to the demolition of Old Station House and a journey length increase between accessing	During operation, no significant effects are anticipated.	There is no suitable mitigation available to reduce this effect due to the permanent nature of the significant effects.

Receptor group and vulnerable groups	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
<p>Human- all travellers (vehicle, walkers, cyclists and horse riders)</p>	<p>Lower Lodge Farm and the A47.</p> <p>During construction, significant effects are expected due to the permanent removal of the cycle facilities at A47/ A1 roundabouts and the diversion of Wansford Hereward Way Permissive 3 and Wansford Hereward Way Permissive 2 along the new access road for Sacrewell Farm. There are also significant effects anticipated due to the removal of the A47/Upton Road / Peterborough Road roundabout (cycle movements between Ailsworth and Upton, and between Southorpe and Ailsworth via Upton).</p>	<p>During operation, no significant effects are anticipated.</p>	<p>The following mitigation has been detailed with ES Chapter 12 (Population and human health) (TR010039/APP/6.1). This will include:</p> <ul style="list-style-type: none"> • New footway / cycleway, all-user and bridleway routes to be provided, including a new underpass • Crossings for cyclists • Signage for cyclists <p>These mitigation measures are set out in the Environmental Management Plan (EMP) (TR010039/APP/7.5) and detailed in the respective chapters in this ES.</p>
<p>Ecological receptors (designated sites, protected species and existing habitats)</p>	<p>During construction, significant cumulative impacts on ecological receptors are expected due to the permanent loss of hedgerows and deciduous woodland.</p> <p>Significant cumulative effects are anticipated at Wittering Brook during construction.</p>	<p>Significant effects are anticipated on Wittering Brook during operation.</p>	<p>The following mitigation has been detailed within Chapter 8 Biodiversity (TR010039/APP/6.1). To mitigate the loss of hedgerows and deciduous woodland, compensatory species-rich hedgerow and native woodland planting is to be undertaken which matures slowly. The time lag would take years to reach its full former maturity causing residual effects.</p> <p>Construction (Wittering Brook):</p> <p>Construction of minor watercourse realignment, Mill Stream re-meandering and drainage ditch interception off-line.</p> <p>Monitoring plan to include water quality sampling prior to, during and after construction (to be agreed with the Environment Agency).</p> <p>Land Drainage Act consent for work on or adjacent to an ordinary watercourse.</p> <p>Environment Agency Flood Risk Activity Permit for works on, over or within 8m of a main river.</p> <p>In-river sediment controls (for example, straw matting) shall be used and it shall be undertaken during low flows to minimise sediment transport.</p>

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
			<p>Adhere to CIRIA guidelines on control of water pollution on linear construction sites (C648) and environmental best practice on-site (C741). Adherence to C786 – Culvert, Screen and Outfall Manual guidelines.</p> <p>Operation (Wittering Brook):</p> <p>Wittering Brook culvert designed to peak flood level for 1 in 100-year plus 65% climate change allowance plus 0.6m freeboard. The culvert design mitigates the volume lost and removes the requirement for floodplain compensation.</p> <p>These mitigation measures are set out in the Environmental Management Plan (EMP) (TR010039/APP/7.5) and detailed in the respective chapters in this ES.</p>
The water environment	During construction, no significant effects are anticipated.	During operation, no significant effects are anticipated.	<p>Mitigation measures to be utilised during construction are detailed in the EMP (TR010037/APP/7.5) and have been set out within ES Chapter 13 Road Drainage and the Water Environment (TR010039/APP/6.1). Mitigation during construction includes:</p> <ul style="list-style-type: none"> • Appropriate storage of construction materials, including bunding of storage tanks, use of silt fencing and covering stockpiles. • Spill kits should be located on sites near to ordinary watercourses and within the works compounds and staff should be trained in their use. • Emergency response procedures included in the EMP to handle any leakages or spillages of potentially contaminating substances. • Existing road drainage soakaways no longer required as part of the proposed drainage design must also be backfilled.
Landscape and visual	Significant visual construction impacts are expected at private properties, community/ commercial facilities and public right of ways.	Significant visual operational impacts are expected at private properties, community/ commercial facilities and public right of ways.	<p>Mitigation is detailed within the Environmental Masterplan (TR010039/APP/6.8) and has been set out within ES Chapter 7 Landscape and Visual Effects (TR010039/APP/6.1).</p> <p>Mitigation during construction would comprise:</p> <ul style="list-style-type: none"> • Keeping a tidy and organised site.

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
			<ul style="list-style-type: none"> • Materials delivered on an 'as needed' basis to prevent unnecessary stockpiles. • Protection of retained vegetation in accordance with British Standard (BS) 5837:2012 <p>At this more detailed level, mitigation during operation aims to also achieve the following:</p> <ul style="list-style-type: none"> • New hedgerow, tree, and woodland planting to screen the Proposed Scheme. • New hedgerow planting to integrate the Proposed Scheme with the existing field pattern.
Geology and soils	During construction, significant cumulative impacts on geology and soils are expected on Grade 2 agricultural soils and Subgrade 3a agricultural soils.	During operation, no significant effects are anticipated.	<p>Impacts on geology and soil resources during the construction phase shall be managed and minimised through an Environmental Management Plan (EMP) (TR010039/APP/7.5). Measures have been set out within ES Chapter 9 Geology and soils (TR010039/APP/6.1). The EMP sets out controls to ensure identified risks associated with contamination are appropriately managed and minimised. Mitigation measures within the EMP will include best practice environmental management procedures and appropriate waste management, such as, but not limited to:</p> <ul style="list-style-type: none"> • ensuring adequate space for storage of topsoil and subsoil which must be segregated during excavation • protection of watercourses from entry of polluting matter • stripping, storing and reinstating of soils using best practice measures to minimise the risk of degradation to soils • controls for identification of unexpected contamination • suppression of odour and dust and route selection
Heritage assets	During construction, significant cumulative impacts on heritage assets are expected due to the demolition of the locally listed former	During operation, no significant effects are anticipated.	Construction would be carried out using industry best practice and in accordance with the implementation of an Environmental Management Plan (EMP) (TR010037/APP/7.5) to minimise potential adverse effects. Mitigation

Receptor group	Residual effects (construction)	Residual effects (operation)	Design, mitigation and enhancement measures
	Wansford Railway Station (WAN01).		<p>measures have also been set out within ES Chapter 6 Cultural heritage (TR010039/APP/6.1)</p> <p>In addition to the identified Proposed Scheme design mitigation measures, historic building recording of the locally listed former Wansford Railway Station (WAN01) will be carried out to Level 3 according to Historic England’s guidance for investigating and recording historic buildings (Historic England, 2016).</p> <p>Compliance with the EMP (TR010037/APP/7.5) will be secured by a requirement in the DCO.</p>

15.5. Assessment of different project effects

- 15.5.1. Developments within the 2km ZOI have been informed by the ‘Uncertainty Log’ used to produce the Traffic Forecasting Package Report for the Proposed Scheme, and the major developments listed on the National Infrastructure Planning website. The Peterborough City Council Local Plan 2016-2036 (2019) and Huntingdonshire District Council Local Plan to 2036 (2019) were used to identify areas of allocated development within the 2km ZOI. Peterborough City Council and Cambridgeshire County Council were contacted to comment on the long list of developments detailed within Appendix 15.1 (TR010039/APP/6.3). At time of writing, no response has been received.
- 15.5.2. Only those developments that have been included in the shortlist have been brought through to the assessment of different project effects.
- 15.5.3. Appendix 15.1 (TR010039/APP/6.3) details two developments located within the 2km ZOI of the Proposed Scheme, identified within the uncertainty log. These have been classified as Tier 3 developments as neither of the developments have a scoping report available on the planning portal. Within the 2km ZOI surrounding the Proposed Scheme boundary there are no major developments which have a scoping report available on the planning portal, therefore there are no developments which have been deemed to require further assessment. Therefore, there is no potential for different project effects within this ZOI.
- 15.5.4. The National Infrastructure Planning website shows there to be no developments within the 2km ZOI of the Proposed Scheme.
- 15.5.5. The Peterborough City Council Local Plan 2016- 2036 (2019) and the Huntingdonshire District Council Local plan to 2036 (2019) informs the preparation of the Local Plans for these locations and identifies areas that the Council understands to be available for development. Review of these

documents show there to be no land allocated for development within 2km of the Proposed Scheme.

15.6. Conclusion

- 15.6.1. In summary, as a single project, it has been identified that there may be a **Moderate adverse** significant effect on Old Station House during construction due to effects on Cultural heritage and Population and human health as a result of the Proposed Scheme. The cumulative effect on Old Station House is assessed as **Moderate adverse**. The Proposed Scheme is unlikely to result in any other significant cumulative effects during construction or operation.
- 15.6.2. In combination with other developments within the ZOI, no significant cumulative effects are anticipated on receptors identified in this ES.

15.7. References

- 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>
- Huntingdonshire Council's Local Plan to 2036 (2019) Available online at: <https://www.huntingdonshire.gov.uk/media/3872/190516-final-adopted-local-plan-to-2036.pdf>
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online at: <https://www.legislation.gov.uk/ukxi/2017/572/contents/made>
- Peterborough City Council Adopted Local Plan (2019). Available online at: [Adopted Local Plan: development documents - Peterborough City Council](#)
- Peterborough City Council (2010) Peterborough Local Development Framework: Peterborough Site Allocations DPD. Available online at: [Peterborough Site Allocations Preferred Options](#)
- The Highways Agency (2019) Design Manual for Roads and Bridges DMRB LA 104 - Environmental assessment and monitoring. Available online at: <https://www.standardsforhighways.co.uk/dmrb/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>