

A47 North Tuddenham to Easton Dualling

Scheme Number: TR010038

Volume 6

6.1 Environmental Statement

Chapter 12 – Population and human health

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 North Tuddenham to Easton
Development Consent Order 202[x]

**ENVIRONMENTAL STATEMENT CHAPTER 12
POPULATION AND HUMAN HEALTH**

Regulation Number:	5(2)(a)
Planning Inspectorate Scheme Reference	TR010038
Application Document Reference	TR010038/APP/6.1
BIM Document Reference	HE551489-GTY-EPC-000-RP-LX-30006
Author:	A47 North Tuddenham to Easton Dualling Project Team, Highways England

Version	Date	Status of Version
Rev 0	March 2021	Application Issue

Table of contents

12.	Population and human health	1
12.1	Introduction	1
12.2	Competent expert evidence	2
12.3	Legislation and policy framework	2
12.4	Assessment methodology	4
12.5	Assessment assumptions and limitations	15
12.6	Study area	16
12.7	Baseline conditions	17
12.8	Potential impacts	34
12.9	Design, mitigation and enhancement measures	37
12.10	Assessment of likely significant effects	39
12.11	Monitoring	67
12.12	Summary	68
12.13	References	69
12.14	Glossary	71

Figures

- Figure 12.1: Population and human health constraints
 Figure 12.2: Agricultural Impact Assessment
 Figure 12.3: Design, mitigation and enhancement measures

Tables

Table 12.1:	Sensitivity of receptors	9
Table 12.2:	Magnitude of impact and typical descriptions	12
Table 12.3:	Human health outcome categories	15
Table 12.4:	Agricultural land holdings within the study area.....	20
Table 12.5:	WCH facilities in the study area.....	22
Table 12.6:	Sensitivity of WCH routes to changes in journey length	25
Table 12.7:	Bus stop locations and services	29
Table 12.8:	Health Profiles for Upper Wensum, Mattishall, Great Witchingham and Easton	31
Table 12.9:	Health Determinants for Upper Wensum, Mattishall, Great Witchingham and Easton	32
Table 12.10:	Information collated from stakeholder consultation (2017)	34
Table 12.11:	Private property and housing residual construction effects	43
Table 12.12:	Community land and assets residual construction effects	45
Table 12.13:	Development land and business residual construction effects	47
Table 12.14:	Agricultural land holdings residual construction effects	51
Table 12.15:	Summary of permanent effects on agricultural holdings.....	55
Table 12.16:	Residual effects on WCH during construction	58
Table 12.17:	Residual construction effects on human health	59

Table 12.18: Human health questionnaire responses incorporated into Proposed Scheme design.....	61
Table 12.19: Residual effects on human health	65

12. Population and human health

12.1 Introduction

- 12.1.1 Highways England (the Applicant) has submitted an application for an order to grant a development consent order (DCO) for the North Tuddenham to Easton Dualling Scheme (hereafter referred to as ‘the Proposed Scheme’). The Proposed Scheme comprises the dualling of a section of the A47 between North Tuddenham and Easton, including the creation of two grade separated junctions (Wood Lane junction and Norwich Road junction), associated side road alterations and walking, cycling and horse-riding connections. 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. This section of the A47 also has a poor safety record. The Proposed Scheme aims to reduce congestion related delay, improve safety, 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 (The Proposed Scheme) (**TR010038/APP/6.1**).
- 12.1.2 Under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the Proposed Scheme is an Environmental Impact Assessment development and as such requires submission of an Environmental Statement presenting the likely significant environmental effects of the Proposed Scheme.
- 12.1.3 As part of the Environmental Impact Assessment (EIA) process, this Environmental Statement (ES) chapter reports the potential effects for population and human health as a result of the Proposed Scheme. This assessment includes a review of the existing baseline conditions, consideration of the potential impacts and identification of proportionate mitigation and enhancement opportunities.
- 12.1.4 The requirement to carry out an assessment of potential impacts on population and human health is set out in EIA Directive (2014/52/EU), which is implemented through The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- 12.1.5 The approach to this assessment has been updated since the Scoping Report (September 2019) (**TR010038/APP/6.5**) and subsequent agreed Scoping Opinion (November 2019) (**TR010038/APP/6.6**). This ensures accordance with the most up to date standard in the Design Manual for Roads and Bridges (DMRB), LA 112 Population and human health (Revision 1).

- 12.1.6 Key guidance on health effects identifies that any assessment should aim to predict the health and wellbeing outcomes of the policy or project being assessed. This includes the Institute for Environmental Management & Assessment (IEMA) Health in Environmental Impact Assessment - A Primer for a Proportionate Approach 2017.
- 12.1.7 This chapter considers the effects on private property, community land and assets, future development, local businesses, agricultural land and walkers, cyclists and horse-riders (WCH). An assessment of the impact of the Proposed Scheme on the health of local populations has also been undertaken, using information from other chapters where relevant.

12.2 Competent expert evidence

- 12.2.1 The competent expert for the preparation of this chapter is a Chartered Environmentalist with 17 years' relevant experience of similar projects and impact assessments. They have a Bsc (Hons) in Environmental Management and are a Full Member of the Institute of Environmental Management and Assessment (IEMA) and trained in air quality and odour assessments. They have used their EIA knowledge, experience with DMRB and road infrastructure projects and professional judgement in identifying the likely impacts and significant effects associated with the Proposed Scheme and providing technical guidance through the assessment process.

12.3 Legislation and policy framework

- 12.3.1 The following legislation and policies have been considered as part of this assessment:
- The Countryside and Rights of Way Act (2000) (CRoW Act). The CRoW Act regulates public rights of way (PRoW) and open access land and ensures access to them.
 - The Infrastructure Planning (Environmental Impact Assessment) Regulations (2017) requires the assessment of population and human health as part of this ES.
 - National Policy Statement for National Networks (NPS NN, 2014): The NPS NN sets out the need for and the Government's policies to deliver development of Nationally Significant Infrastructure Projects on the national road network in England and also sets out the primary basis for making decisions of development consent for nationally significant infrastructure projects in England. The Government recognises in the appraisal of sustainability accompanying the NPS NN that some developments will have some adverse local impacts on noise, air quality emissions, landscape and visual amenity. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locational specific level of the

NPS NN. Therefore, whilst applicants should deliver developments in accordance with government policy and in an environmentally sensitive way, including considering opportunities to deliver environmental benefits, some adverse local effects of development may remain.

- Health and Social Care Act (2012): The Act was introduced following the Health and Social Care Bill 2011 and outlines the Secretary of State's duty to promote and improve the National Health Service (NHS), in pursuit of a number of key aims, which include:
 - an improvement in the quality of services
 - a reduction in health inequalities
 - the promotion of autonomy for General Practitioners and health centres
 - improvements to the treatments and services offered to patients
- Public Health England's Public Health Outcomes Framework (2019): This framework sets out a vision for public health, desired outcomes and the indicators that will help us understand how well public health is being improved and protected. The framework concentrates on two high-level outcomes (healthy life expectancy, and the differences in life expectancy and healthy life expectancy between communities) to be achieved across the public health system, and groups further indicators into four 'domains' that cover the full spectrum of public health. The outcomes reflect a focus not only on how long people live, but on how well they live at all stages of life.
- Norfolk County Council's Public Health Strategy 2016-2020: This strategy aims to prioritise public health actions which will promote healthy living and healthy places; protect communities and individuals from harm; provide services that meet community needs and work in partnerships to deliver better services. The guiding principles set out in the document include increasing active travel, making streets safer and improving air quality.
- Broadland District Council Development DPD (2015): Policy ENV4 states that 'Development proposals will be expected to include an assessment of the extent of potential pollution. Where pollution may be an issue, adequate mitigation measures will be required. Development will only be permitted where there will be no significant adverse impact upon amenity, human health or the environment'.
- Breckland Council Local Development Framework (LDF): Policy CP 9 states that 'Development should minimise any unavoidable polluting effects, development will be required to avoid or minimise the pollution of the environment and to prevent any direct contamination caused by the construction process or resultant operations'.
- South Norfolk Health and Wellbeing Strategy 2018 - 2021 (2018): The strategy provides a vision and policy framework to improve the overall health and wellbeing of South Norfolk residents. This includes improving the quality of life of communities and enhancing the built and natural environment, working with developers to design properties and communities that encourage healthy living and support older and vulnerable residents to live independently.

12.4 Assessment methodology

12.4.1 The following standards and guidance have been used to inform the assessment:

- DMRB LA 112 Population and human health (Revision 1)
- IEMA Health in EIA: A Primer for a Proportionate Approach
- Health Impact Assessment Tools (Department of Health, 2010)

12.4.2 In line with DMRB LA 112, this assessment considers the impacts of the Proposed Scheme on the following:

- **Land use and accessibility, including:**
 - private property and housing
 - community land and assets
 - development land and businesses
 - agricultural land holdings
 - walkers, cyclists and horse-riders (WCH)
- **Human health, including:**
 - health profiles of affected communities
 - health determinants, comprising the following:
 - access to healthcare facilities
 - access to community, recreation and education facilities
 - access to green and open space
 - existing and predicted levels of air and noise pollution
 - landscape amenity
 - sources and pathways of potential pollution (for example land and water contamination)
 - safety
 - likely health outcomes

12.4.3 Baseline information has been gathered using desktop sources and information collected for the other topic assessments in this ES. The WCH assessment has also incorporated survey results, from surveys undertaken in 2020. The following desktop sources have been used:

- Ordnance Survey mapping
- OS Address Point Data
- Google street view

- Multi-Agency Geographic Information for the Countryside (MAGIC) mapping
- Breckland Council Adopted Local Plan
- Broadland District Council Local Plan
- South Norfolk Council Adopted Local Plan
- Norfolk County Council PRoW mapping tool
- Public Health England, Local Health Profile (Fingertips)
- Office for National Statistics data
- Census data

Update to standards and scope of assessment

- 12.4.4 Following a review of the updates to DMRB LA 112 Population and human health published in 2019, the original scope as set out in the 2019 Scoping Report has changed (**TR010038/APP/6.5**).
- 12.4.5 In the previous DMRB standard, 'population and human health' topic was referred to as 'People and Communities' and often assessed under two separate chapters: 'Community and private assets' and 'Effects on all travellers'. Driver stress, view from the road and WCH¹ amenity are no longer included within the scope of this chapter due to the changes to standards.
- 12.4.6 Severance is now assessed in terms of separation of communities from assets and areas of community land, alterations to private properties (including their access) and severance of WCH routes.
- 12.4.7 An assessment of the local economy is available in section 5 of the Case for the Scheme (**TR010038/APP/7.1**).
- 12.4.8 Human health is now recognised as a key consideration in decision-making of development projects, including highways. As such, it is a new topic within DMRB LA 112 and has therefore been included within the scope of this assessment.
- 12.4.9 The study areas have also been updated in line with the latest DMRB standards, as explained in Section 12.6.

Surveys

- 12.4.10 To provide an indication of current usage of the PRoW and permissive routes directly affected by the Proposed Scheme and for key locations where WCH

¹ The term Non-Motorised User (NMU) which was used in the previous DMRB standard has now been replaced with walkers, cyclists and horse-riders (WCH) and this term has been used for the remainder of the population and human health assessment

activity could occur on the local highways, WCH surveys were undertaken at nine locations on and in the vicinity of the existing alignment of the A47, as shown in Figure 12.1 (**TR010038/APP/6.2**) and listed below.

- Site 1 – Low Road / A47 / The Street
- Site 2 – Mattishall Lane / A47 / The Street
- Site 3 – A47 / PRow Hockering Footpath FP7
- Site 4 – Church Lane / A47 / Sandy Lane
- Site 5 – Berrys Lane / A47 / Wood Lane
- Site 6 – A47 / PRow Honningham RB1
- Site 7a – A47 / St Andrew's Church
- Site 7b – Taverham Road / A47 / Blind Lane
- Site 8 – A47 / Church Lane / Footpath
- Site 9 – A47 / Ringland Lane / Dog Lane

12.4.11 The surveys were carried out between 7am and 7pm for 14 consecutive days between Monday 13 July and Sunday 26 July 2020 using CCTV video cameras. It should be noted that at Site 6 there was a camera failure, so the survey was extended at this site for an additional day to provide a full 14 day survey. In the main, the weather during the surveys was dry and bright. As such, we would expect that the usage information collected is representative of the average use and sufficient to inform this assessment.

12.4.12 A human health questionnaire was provided during the statutory consultation event in March 2020. The purpose of the questionnaire was to establish the local health profile including the extent to which existing local facilities and amenities meet the needs of the local community; and to identify where improvements could be made which would contribute to better health and wellbeing of the local community. A copy of the questionnaire is provided in Appendix 12.1 (**TR010038/APP/6.3**).

Consultation

12.4.13 Updates to DMRB standards have resulted in changes to the scope of this chapter. The changes have been confirmed to the key consultees (Broadland District Council, Breckland Council, South Norfolk Council, Norfolk and Waveney NHS Clinical Commissioning Group, and the Planning Inspectorate). The key consultees have been identified through the UK Government guidance² on health in planning which outlines that the NHS clinical commissioning group and

² <https://www.gov.uk/guidance/health-and-wellbeing>

public health at the local authority should be included in matters regarding health in planning.

12.4.14 Consultation emails have been issued to the key consultees to agree the scope of the human health assessment and a follow up call was made. A response was received from Breckland Council to confirm that the proposed approach to the methodology was acceptable. A response was received from Broadland District Council with the following comments:

- The village of Honingham should be included in the assessment
- Weston Longville should be included in the assessment
- To be more precise regarding location of Upper Wensum valley, as this extends to Fakenham

12.4.15 The village of Honingham has been included and Weston Longville has been included under Great Witchingham ward. The Upper Wensum valley is a ward crossing the Proposed Scheme, therefore has been included as DMRB LA 112 requires the assessment to be carried out at ward level.

12.4.16 No response has been received from the remaining key consultees. Calls have been attempted and a follow up email sent to these consultees with no response received. However, as the scope of the chapter follows DMRB LA 112, the assessment has been proceeded on that basis.

12.4.17 Non statutory route options public consultation was undertaken from 13 March to 21 April 2017. On conclusion of the route options consultation, a consultation report was completed and can be accessed on the Highways England website³. Statutory public consultation was undertaken from 26 February to 30 April 2020 and included public exhibition events.

12.4.18 A consultation meeting was held with PRow Officers and the Active Travel Officer from Norfolk County Council (NCC) on 25 August 2020 via video conferencing to present the emerging WCH strategy for the Proposed Scheme. A summary of the key points from the meeting is presented below.

12.4.19 It was identified that three PRow would be affected by the Proposed Scheme which are:

- Hockering FP12
- Hockering FP7
- Honingham RB1

³ https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-dualling/results/a47-tuddenham-cons-report_final_080817.pdf

- 12.4.20 Hockering FP12 would be closed as part of the Proposed Scheme. This was accepted by NCC officers as this section of footpath is very short and does not provide a connection to other routes in the area.
- 12.4.21 Concern was expressed with regard to Hockering FP7 which is to be severed as part of the Proposed Scheme. NCC officers stated that severing the route would likely result in the need for some users to walk an increased distance (estimated to be 1km). NCC officers further stated that the reason for closure should not be solely dependent on low usage as this is not a valid justification for closure. However, NCC officers did acknowledge that the proposed footway/cycleway to be provided on Mattishall Lane Link Road as part of the Proposed Scheme would still allow access to the PRow on the southern side of the A47 on both sides of the River Tud.
- 12.4.22 With regard to Honingham RB1, the proposed diversion route was generally accepted, although NCC officers stated that the preference would be retention of the section of the PRow between the existing A47 alignment and Dereham Road through the field, as this is not affected by the Proposed Scheme. Also, the width of the diverted PRow, including the section beneath the proposed Hall Farm underpass, should be suitable for use by a horse and carriage. It was highlighted that as part of the proposed Norwich Western Link scheme, an all user route is being promoted that would provide a more direct route into Honingham from the diverted PRow at the Hall Farm underpass past Honingham Village Hall.
- 12.4.23 With regard to the proposed footway/cycleway along the existing A47 at Honingham that would be downgraded to a local road as part of the Proposed Scheme, NCC officers expressed the view that this was a missed opportunity to provide a traffic free section of infrastructure along this route.
- 12.4.24 Overall, NCC officers were generally supportive of the proposed WCH strategy with the exception of the PRow concerns highlighted above.
- 12.4.25 Feedback was received from the Norwich Cycle Campaign with regards to the emerging WCH strategy that was taken to public consultation. It should be noted that the version of the Proposed Scheme on which they provided comments has now evolved but many of the concerns and comments made remain relevant and have been taken into consideration in the proposed WCH strategy.
- 12.4.26 The main concerns of Norwich Cycle Campaign in relation to the layout that went to public consultation appeared to be the severance effect of the new A47 alignment, with a number of existing roads and crossings to be closed as part of the Proposed Scheme. Where routes and crossings for cyclists were to be provided, the view was expressed that these were convoluted when compared to

the existing road alignments. Concern was also expressed regarding the interaction of the Proposed Scheme with the proposed Norwich Western Link scheme and how cyclists would be catered for at this location.

12.4.27 Issues raised during these consultations have been taken into account to develop the design through design interventions, as described in section 12.10 Design, mitigation and enhancement measures.

Assessment criteria

12.4.28 DMRB LA 112 sets out the requirements for assessing and reporting the environmental effects on population and human health from construction, operation and maintenance of highway projects. This has been used for the assessments within this chapter, as explained below.

Land use and accessibility *Sensitivity of receptors*

12.4.29 The sensitivity of land use and accessibility receptors has been determined using the criteria presented in Table 12.1. These criteria are derived from Table 3.11 of DMRB LA 112.

Table 12.1: Sensitivity of receptors

Receptor value (sensitivity)	Description
Very High	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (eg strategic housing sites) covering >5ha and / or >150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) complete severance between communities and their land/assets, with little/no accessibility provision; 2) alternatives are only available outside the local planning authority area; 3) the level of use is very frequent (daily); and 4) the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) existing employment sites (excluding agriculture) and land allocated for employment (eg strategic employment sites) covering >5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (daily). <p>Walkers, cyclists, horse-riders (WCH):</p>

Receptor value (sensitivity)	Description
	<ol style="list-style-type: none"> 1) national trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient WCH route. Little / no potential for substitution. 2) routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. 3) rights of way for WCH crossing roads at grade with >16,000 vehicles per day.
High	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (eg strategic housing sites) covering >1-5ha and / or >30-150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) there is substantial severance between community and assets, with limited accessibility provision; 2) alternative facilities are only available in the wider local planning authority area; 3) the level of use is frequent (weekly); and 4) the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) existing employment sites (excluding agriculture) and land allocated for employment (eg strategic employment sites) covering >1 - 5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 2) areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 3) access between land and key agricultural infrastructure is required on a frequent basis (weekly). <p>Walkers, cyclists, horse-riders (WCH):</p> <ol style="list-style-type: none"> 1) regional trails and routes (eg promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or 2) rights of way for WCH crossing roads at grade with >8,000 - 16,000 vehicles per day.
Medium	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6 - 15% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (eg strategic housing sites) covering <1ha and/or <30 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) there is severance between communities and their land/assets but with existing accessibility provision; 2) limited alternative facilities are available at a local level within adjacent communities; 3) the level of use is reasonably frequent (monthly); and 4) the land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p>

Receptor value (sensitivity)	Description
	<p>1) existing employment sites (excluding agriculture) and land allocated for employment (eg strategic employment sites) covering <1ha.</p> <p>Agricultural land holdings:</p> <p>1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and</p> <p>2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).</p> <p>Walkers, cyclists, horse-riders (WCH):</p> <p>1) public rights of way and other routes close to communities which are used for recreational purposes (eg dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys; and/ or</p> <p>2) rights of way for WCH crossing roads at grade with >4000 - 8000 vehicles per day.</p>
Low	<p>Private property and housing:</p> <p>1) proposed development on unallocated sites providing housing with planning permission/in the planning process.</p> <p>Community land and assets where there is a combination of the following:</p> <p>1) limited existing severance between community and assets, with existing full Disability Discrimination Act (DDA) DDA 1995 [Ref 2.N] compliant accessibility provision;</p> <p>2) alternative facilities are available at a local level within the wider community;</p> <p>3) the level of use is infrequent (monthly or less frequent);</p> <p>4) the land and assets are used by the minority (>=50%) of the community.</p> <p>Development land and businesses:</p> <p>1) proposed development on unallocated sites providing employment with planning permission/in the planning process.</p> <p>Agricultural land holdings:</p> <p>1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and</p> <p>2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).</p> <p>Walkers, cyclists, horse-riders (WCH):</p> <p>1) routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes; and/ or</p> <p>2) rights of way for WCH crossing roads at grade with <4000 vehicles per day.</p>
Negligible	<p>Private property and housing:</p> <p>1) N/A.</p> <p>Community land and assets where there is a combination of the following:</p> <p>1) no or limited severance or accessibility issues;</p> <p>2) alternative facilities are available within the same community;</p> <p>3) the level of use is very infrequent (a few occasions yearly); and</p> <p>4) the land and assets are used by the minority (>=50%) of the community.</p> <p>Development land and businesses:</p> <p>1) N/A.</p>

Receptor value (sensitivity)	Description
	Agricultural land holdings: <ol style="list-style-type: none"> 1) areas of land which are infrequently used on a non-commercial basis. Walkers, cyclists, horse-riders (WCH): <ol style="list-style-type: none"> 1) N/A.

Source: Design Manual for Roads and Bridges, LA 112 Population and human health, table 3.11

Magnitude of impact

12.4.30 The magnitude of impact on land use and accessibility has been determined using the criteria presented in Table 12.2. These criteria are derived from Table 3.12 of the DMRB LA 112.

Table 12.2: Magnitude of impact and typical descriptions

Magnitude of impact (change)	Typical description
Major	<ul style="list-style-type: none"> Private property and housing, community land and assets, development land and businesses and agricultural land holdings: <ol style="list-style-type: none"> 1) loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. eg direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and/or 2) introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. Walkers, cyclists, horse-riders (WCH): <ol style="list-style-type: none"> 1) >500m increase (adverse) / decrease (beneficial) in WCH journey length.
Moderate	<ul style="list-style-type: none"> Private property and housing, community land and assets, development land and businesses and agricultural land holdings: <ol style="list-style-type: none"> 1) partial loss of/damage to key characteristics, features or elements, eg partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision. Walkers, cyclists, horse-riders (WCH): <ol style="list-style-type: none"> 1) >250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.
Minor	<ul style="list-style-type: none"> Private property and housing, community land and assets, development land and businesses and agricultural land holdings: <ol style="list-style-type: none"> 1) a discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, eg amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. Walkers, cyclists, horse-riders (WCH): <ol style="list-style-type: none"> 1) >50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.

Magnitude of impact (change)	Typical description
Negligible	<ul style="list-style-type: none"> • Private property and housing, community land and assets, development land and businesses and agricultural land holdings: <ol style="list-style-type: none"> 1) very minor loss or detrimental alteration to one or more characteristics, features or elements. eg acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and/or 2) very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. • Walkers, cyclists, horse-riders (WCH): <ol style="list-style-type: none"> 1) <50m increase (adverse) or decrease (beneficial) in WCH journey length.
No change	<ul style="list-style-type: none"> • No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

Source: Design Manual for Roads and Bridges, LA 112 Population and human health, table 3.12

Significance of effect

12.4.31 The significance of effect for each element of the land use and accessibility sub-topic has been derived by combining the assigned value (sensitivity) of the receptor with the magnitude of the change (impact) arising from the Proposed Scheme. This is in accordance with the significance matrix set out in DMRB LA 104, Table 3.8.1. The significance matrix is also presented in Table 4-1 of this Environmental Statement in Chapter 4 (Environmental Assessment Methodology) (TR010038/APP/6.1).

12.4.32 Effects which have been evaluated as being of moderate, large or very large significance (beneficial or adverse) are considered to be significant.

12.4.33 The matrix has been used to guide the identification and assessment of effects on land use and access. Where professional judgement has resulted in a deviation from the thresholds contained in the matrix these are explained within the relevant sections of the chapter and are supported by appropriate evidence.

Human health

12.4.34 Health is defined by the World Health Organisation (WHO) as ‘a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity’ (WHO, 2019). A qualitative assessment of human health has been undertaken in line with the DMRB LA 112. The assessment considers the change to health determinants as a result of the construction and operation of the Proposed Scheme. Changes to health determinants can affect the health of individuals or communities differently depending on their sensitivity to change.

12.4.35 This chapter provides a systematic approach to assess the health effects of the Proposed Scheme. A qualitative approach has been undertaken as it is not

possible to numerically quantify the severity or extent of the effects which would give rise to health outcomes.

12.4.36 DMRB LA 112 sets out the following data requirements that should be used to determine the health profiles (which are set out in Table 12.6). The data used to establish the health profile of local communities has been taken from Public Health England Local Health profiles (2013 to 2017 and 2017 to 2018) and 2011 Census data (ONS, 2016). This includes:

- Percentage of the community with increased susceptibility to health issues (vulnerable members, eg <16 and >65)
- Percentage of the community with pre-existing health issues (eg respiratory disease/chronic obstructive pulmonary disease (COPD))
- Deaths from respiratory diseases
- Percentage of community with long term illness or disability
- General health
- Life expectancy
- Income deprivation

12.4.37 The purpose of health profiling is to establish the potential sensitivity to change of relevant community groups who may be affected by the Proposed Scheme⁴. Data has been collated for the following communities:

- Broadland District: Great Witchingham
- Breckland District: Upper Wensum and Mattishall
- South Norfolk District: Easton

12.4.38 The next step undertaken was to determine the health determinants which are factors that contribute to the health of communities which may be changed as a result of the Proposed Scheme. DMRB LA 112 sets out the following categories to be used to identify the key health determinants for communities:

- access to healthcare facilities
- access to community, recreation and education facilities
- access to green/open space
- existing and predicted levels of air and noise pollution
- landscape amenity

⁴ Wards have been identified using Ordnance survey Election Maps and have been selected at either district ward or unitary authority ward level dependent on the area. Wards which have potential to be impacted by the Proposed Scheme have been selected for assessment.
<https://www.ordnancesurvey.co.uk/election-maps/gb/?x=438679&y=372520&z=6&bnd1=DIS&labels=on>

- sources and pathways of potential pollution (eg land/water contamination)
- stress and anxiety
- safety

12.4.39 The health determinants have been derived using the categories above to identify health outcomes within affected communities.

Sensitivity

12.4.40 Once the health profiles of local communities are established DMRB LA 112 states the sensitivity of those (in terms of their sensitivity to change) should be identified as:

- low
- medium
- high

Health Outcomes

12.4.41 DMRB LA 112 does not define the significance of human health effects as *'it is not possible to quantify the severity or extent of the effects which give rise to the outcomes'*. Potential health outcomes during construction and operation use a different methodology to the Land use and accessibility topic. The potential health outcomes have been categorised based on the categories provided in DMRB LA 112 Table 3.32, as shown in Table 12.3 below. Professional judgement has been used to determine the final health outcome, drawing on all the information presented on human health within this chapter.

Table 12.3: Human health outcome categories

Health outcome category	Health outcome description
Positive	A beneficial health impact is identified
Neutral	No discernible health impact is identified
Negative	An adverse health impact is identified
Uncertain	Where uncertainty exists as to the overall health impact

Source: Design Manual for Roads and Bridges, LA 112 Population and human health, table 3.2

12.5 Assessment assumptions and limitations

12.5.1 Data from 2011, 2013 to 2017 and 2017 to 2018 has been used to establish the health profiles as this is the most recent data available. Whilst some of this data is more than five years old, this is still considered appropriate for the purposes of

this assessment as it still meets the data collection requirements outlined in DMRB LA 112.

- 12.5.2 It has been assumed that community assets within the vicinity of the Proposed Scheme are used by local residents on a regular basis, as Norwich is located approximately 9km to the east.
- 12.5.3 For the purpose of the agricultural holdings assessment, agricultural holdings have been defined as a single farming unit undertaking agricultural activities under the same management. Agricultural holdings may comprise numerous land parcels, not all of which may be impacted by the Proposed Scheme. An assessment of the effects of the Proposed Scheme on the agricultural holdings has been made, not an assessment of the effects on the individual land parcels.
- 12.5.4 Land may be required for the Proposed Scheme from agricultural holdings temporarily, during the construction period, or permanently. Details of the final temporary and permanent agricultural land-take calculations have been estimated from detailed drawings of the Proposed Scheme and land title summaries.
- 12.5.5 Agricultural questionnaires were sent out to 19 landowners and occupiers to facilitate the assessment of the impact on agricultural holdings. Only seven completed questionnaires were received. As a result, questionnaires have been used to assess holdings 4, 5, 7, 10, 11, 12 and 13. A high level assessment of the remaining 12 agricultural holdings was undertaken. This was achieved using Proposed Scheme Overview drawings and shape files and publicly available information, standard industry figures and professional knowledge. Sources of publicly available information include agri-environment scheme layers on MAGIC, Google Earth, Defra statistics pages and the Defra CAP payments website. Where we were unable to establish the size of the holding, the average holding size for the East of England was used (Defra, 2020).

12.6 Study area

Land use and accessibility

- 12.6.1 The study area for the assessment of impacts on land use and accessibility extends 500m from the DCO boundary (including the construction footprint), in line with DMRB LA 112, paragraph 3.6. This has been selected as significant effects are unlikely to occur outside of the 500m study area as a result of the Proposed Scheme. The study area is shown in Figure 12.1 **(TR010038/APP/6.2)**.

Human health

12.6.2 The study area for human health includes the following communities which are located within the Broadland District: Great Witchingham, Breckland District: Upper Wensum and Mattishall, and the South Norfolk District: Easton. This study area is based on the extent and characteristics of the Proposed Scheme, and the degree to which these communities are likely to be affected by the Proposed Scheme, in line with paragraph 3.23 of DMRB LA 112.

12.7 Baseline conditions

Land use and accessibility

Private property and housing

12.7.1 The sensitivity of the key areas of housing in the Breckland Local Authority area (Upper Wensum and Mattishall) and Broadland Local Authority area (Great Witchingham), are considered **high** as the ONS data was reviewed and the number of households are expected to increase by 16-25% by 2041 (refer to the criteria in DMRB LA 112 table 3.11).

12.7.2 The sensitivity of the key areas of housing in the South Norfolk Local Authority area (Easton) is considered **very high** as the ONS data was reviewed and the number of households are expected to increase by >25% by 2041 (refer to the criteria in DMRB LA 112 table 3.11).

12.7.3 There are a large number of residential properties located in the study area. These are primarily located in the villages of Hockering, Honingham and Easton. There are scattered properties along the A47, some of which have direct access onto the existing A47 such as the residential properties at Oak Farm, as shown on Figure 12.1 (**TR010038/APP/6.2**). Smaller clusters of residential properties are also located on Hall Lane, Mattishall Lane, Church Lane and Taverham Road. There are no residential properties within the DCO boundary.

12.7.4 There is one area of residential development land allocated within the study area:

- LP[044]004B: land to the east of Heath Road

12.7.5 This area has been allocated for 25 dwellings, and development is due to start from 2026 onwards.

12.7.6 The following areas are proposed to be included in the Greater Norwich Local Plan, however at the time of reporting this Local Plan has not yet been adopted:

- EAS1 and 2014/2611 (located to the very east of the Proposed Scheme, following the southern boundary of Easton): mixed, including a proposed

890 dwellings, new school, new village hall, retail store, areas of public open space, relocation and increased capacity of allotments.

- 12.7.7 No other land, buildings or infrastructure used for residential housing has been identified within the study area.

Community land and assets

- 12.7.8 The existing A47 experiences congestion during peak hours, creating a degree of severance and accessibility issues for local communities.

- 12.7.9 Poppy's Wood is located adjacent to the north of the existing A47, adjacent to western extents of the Proposed Scheme. Hockering playing field is also located to the north of the existing A47, to the north east of Hockering. The sensitivity of Poppy's Wood and Hockering Playing Field have been classified as **medium**, as there are limited alternative facilities available within the vicinity and the level of use is at least reasonably frequent.

- 12.7.10 Community assets are located in the villages of Hockering, Honingham and Easton, shown in Figure 12.1 (**TR010038/APP/6.2**). In Hockering, community assets include St Michael's Church, Hockering Church of England Primary Academy, Hockering Village Hall, Victoria Inn public house, Hockering Nursery and Hockering Post Office and shop. The sensitivity of these community assets has been classified as **high** due to the frequent level of use and the fact that they are used by the majority of the community.

- 12.7.11 In Honingham there is a Village Hall, children's play area, Honingham Buck public house and St Paul's Chapel of Ease. Merrywood House Residential Care for children is located west of Honingham. East of Honingham and north of the A47 is St Andrew's Church. The sensitivity of these community assets has been classified as **high** due to the frequent level of use and the fact that they are used by the majority of the community.

- 12.7.12 In Easton, community assets include St Peter's Church, St Andrew's Church, Diocese of Norwich Church of England, allotment gardens, the village hall and Easton Post Office. The sensitivity of these community assets has been classified as **high**, as there are limited alternative facilities available within the vicinity and the level of use is at least reasonably frequent. St Peter's Church has an area of consecrated land, located adjacent to the east of the church. This area is not currently being used as a burial ground.

Development land and business

- 12.7.13 There are a large number of businesses located within the study area. The majority of the businesses are located in the villages of Hockering, Honingham

and Easton, with a small number of businesses in more isolated locations along the route. The sensitivity of the businesses have been classified as **medium**, as they are unlikely to individually cover an area of more than 1 hectare, as set out in Table 12.1.

- 12.7.14 In Hockering, businesses include Hockering Motor Services, Kerrie Woollen Cakes and Claxtons Home Improvements located to the south east of Hockering.
- 12.7.15 To the south of Hockering, south of the A47 is Mooney Demolition, Reclaimed Building Materials and Plant Hire. Part of the business premises are located within the DCO boundary.
- 12.7.16 Businesses located in Honingham include Hulbert West financial advisors, H Smith and Sons Construction Company, the Honingham Buck restaurant and LS Sewing Services.
- 12.7.17 Easton is the largest village with the most facilities within the Proposed Scheme study area. Businesses include Easton Guesthouse, The Salon hairdressers and Adams Automotive Engineering. Businesses also located in Easton but just outside the study area include TSM Drainage Engineers and Rembrandt restaurant.
- 12.7.18 There is one planning application located within the study area, with potential to affect future jobs:
- 20150167- conversion of an outbuilding to provide 8 rooms for accommodation with associated parking

Agricultural land holdings

- 12.7.19 Department for Environment, Food and Rural Affairs (DEFRA) farming statistics for Norwich and South Norfolk indicate that farmland is generally owner occupied with some areas occupied on short term tenancy agreements by neighbouring owner occupiers (DEFRA, 2020). A map of the agricultural land area reviewed as part of this assessment can be found in Figure 12.2 (TR010038/APP/6.2). A review of the area using Google Earth showed that the farmsteads and major agricultural infrastructure, such as internal tracks and livestock handling facilities, are in most cases set back from the existing A47. The 18 agricultural holdings identified that could potentially be affected by the Proposed Scheme appear to be predominantly arable, with some grassland areas.
- 12.7.20 Based on the criteria derived from Table 3.11 of DMRB LA 112, of the 18 agricultural holdings, four have been identified as having **very high** sensitivity

(holding 5, holding 8, holding 10 and holding 14). Two of the four holdings require access to their main farm yard and grazing livestock areas on a daily basis. The third is a grazing livestock enterprise, which also requires daily access. The final holding identified as having **very high** sensitivity is pasture land. This is likely to be used for grazing livestock and as such access is anticipated to be required daily. A study of the satellite images of this holding revealed stables and a menage in an adjacent but linked parcel. This type of infrastructure is typically associated with the keeping of horses rather than agricultural livestock. The keeping and rearing of horses is not considered agricultural use. However, in the absence of specific data, this holding remains in the assessment.

12.7.21 Agricultural activity on holding 4 is predominantly mowing fields, which would require less than monthly access outside of the hay season. However, sensitivity has been assessed as **high** as weekly access to infrastructure is anticipated to be required to support a non-agricultural enterprise.

12.7.22 The remaining thirteen holdings have been identified as being of **high** sensitivity due to a predominantly arable land use. This requires at least monthly access for normal agricultural operations; however, access will be required more frequently during peak times including harvest and sowing. No farm infrastructure has been identified on the areas of holdings covered by the Proposed Scheme DCO boundary.

Table 12.4: Agricultural land holdings within the study area

Farm No.	Land use	Land dependent on spatial relationship to infrastructure	Frequency of access required	Sensitivity
1	Arable	No	At least monthly	High
2	Arable	No	At least monthly	High
3	Arable	No	At least monthly	High
4	Grassland	Yes – supports a non-agricultural enterprise.	Weekly	High
5	Arable	Yes – existing access to A47 will be re-routed through Hockering	Daily	Very high
6	Arable	No	At least monthly	High
7	Arable	No	At least monthly	High
8	Grassland	Yes	Daily	Very high
9	Arable	No	At least monthly	High
10	Mixed	Yes	Daily	Very high
11	Arable	No	At least monthly	High
12	Arable	No	At least monthly	High
13	Arable	No	At least monthly	High

Farm No.	Land use	Land dependent on spatial relationship to infrastructure	Frequency of access required	Sensitivity
14	Grassland	Yes	Daily	Very high
15	Arable	No	At least monthly	High
16	Arable	No	At least monthly	High
17	Grassland + Trees	No	Daily	High
18	Arable	No	At least monthly	High

Walkers, cyclists and horse-riders (WCH)

12.7.23 The existing WCH facilities in the study area are summarised in Table 12.5 and shown in Figure 12.1 (**TR010038/APP/6.2**). They comprise PRoW (namely footpaths and restricted byways), permissive routes and footways provided as part of the highway network.

Table 12.5: WCH facilities in the study area

Location Ref (Figure 12.1)	PRoW Reference (NCC)/Location	Description
1	North Tuddenham FP10	The public footpath runs from Main Road east of North Tuddenham in a north-easterly direction connecting to bridleway North Tuddenham BR4. The route runs through a wooded area and fields.
2	Hockering FP12	The public footpath runs in a north – south direction between the A47 and Lyng Road. The route is approximately 20m long and follows a minor access on the A47.
3	Hockering FP10	The public footpath runs along the southern kerb line of The Street from the access junction with A47 west of Hockering for approximately 70m in a westerly direction.
4	Hockering FP2	The public footpath runs from The Street adjacent to St Michael’s Church and Cemetery in a northerly direction toward Lodge Farm adjacent to Hockering Wood. The run routes along an existing track for its length.
5	Hockering FP3	The public footpath begins at St Michael’s Church and Cemetery on The Street and runs in a generally southern direction passing through grounds of the church and the adjoining field before ending at The Street.
6	Hockering FP9	The public footpath runs between Rectory Road and Heath Road, Hockering in a north-westerly direction passing through the village along a track.
7	Hockering FP1	The public footpath runs from Heath Road, Hockering in a north-westerly direction passing through the village towards Hockering Wood. The route runs along a track through the village before running along field boundaries until Hockering Wood.
9	Hockering FP5	The public footpath runs along Park Lane from Hill House Farm adjacent to the A47 in a generally northerly direction before turning in a westerly direction to connect to Hockering FP6. The route runs along an existing track before running through fields and along field boundaries.
10	Hockering FP11	The public footpath runs from The Street to the east of Hockering for approximately 30m in a southerly direction towards the A47. The route runs through a wooded area.
11	Hockering FP8	The public footpath runs from Mattishall Lane in the west to Hockering FP7 in the east. The route generally runs to the north of the River Tud through fields and a wooded area parallel to the river.
12	Hockering FP7	The public footpath runs from A47 immediately south of Hockering in a predominately southern direction connecting to Hockering FP8 and East Tuddenham FP10. The route runs along an existing track past the sewage works before following field boundaries and then crossing the River Tud.
13	East Tuddenham FP9	The public footpath runs between the end of Rotten Row in the east and Mattishall Lane in the west. The route generally runs to the south of the River Tud through fields parallel to the river.
14	East Tuddenham FP10	The public footpath runs in a northerly direction from Hall Lane in the south crossing East Tuddenham FP9 to a point immediately south of a drain for the River Tud where the footpath becomes Hockering FP7.
15	East Tuddenham FP8	The public footpath begins at Hall Lane immediately north of East Tuddenham and runs in a generally northern direction connecting to East Tuddenham FP9. The route predominantly runs through fields and along field boundaries.
16	East Tuddenham FP7	The public footpath runs between The Street, East Tuddenham to the south and Rotten Row to the north. The route runs through fields.

Location Ref (Figure 12.1)	PRoW Reference (NCC)/Location	Description
17	East Tuddenham FP6	The public footpath begins on Church Lane and runs in a westerly direction for approximately 200m and connects with East Tuddenham FP7. The route runs through a field.
18	East Tuddenham FP5	The public footpath runs from Mattishall Road for approximately 800m in a northerly direction connecting with East Tuddenham FP3. The route runs predominantly through fields.
19	East Tuddenham FP4	The public footpath begins at Mattishall Road and runs in northerly direction and connects to East Tuddenham FP3. The route runs predominantly through a wooded area.
20	East Tuddenham FP3	The public footpath begins at Berrys Lane and runs in a predominately westerly direction to Church Lane. The route is approximately 1.1km long and predominately runs through fields plus a small section of wooded area.
21	East Tuddenham FP2	The public footpath runs in an east – west direction between Wood Lane in the east and Sandy Lane in the west. The route runs along field boundaries between the two roads.
22	Honingham FP4	The public footpath begins in Honingham and runs between The Street in the east and Berrys Lane to the west. The route is approximately 730m long. It follows Mill Lane for its length before passing through the centre of a field and then continuing along the field boundary to Berrys Lane.
23	Honingham FP3	The public footpath is located to the east of Honingham and runs between Dereham Road in the east and Berrys Lane to the west. The route is approximately 330m long and follows a field boundary and the northern edge of the Merrywood House Residential Care Home grounds.
24	Hockering	Combined footway/cycleway (2m wide) linking between Main Road and The Street to the west of Hockering. The majority of the route follows the northern frontage of the A47 from its junction with The Street in the east before heading northwest and connecting with Main Road in the west. The route is approximately 720m long.
25	Hockering	Footway on the southern frontage of the A47 between Mattishall Lane and The Street. The footway continues into Mattishall Lane as far as the residential properties. An uncontrolled crossing with pedestrian island is located on the A47 allowing pedestrians to cross on to a footway on the northern frontage of The Street leading into Hockering.
26	Hockering	Footway on both frontages of The Street through Hockering as far as Meadow View to the east of the village. The footway on the northern frontage of The Street then continues past this point on to the A47 as far as Park Lane.
27	Honingham	Footways are present on Dereham Road, The Street and Norwich Road through the village of Honingham.
28	A47 east of Honingham	Footway on the northern frontage of the A47 running between Taverham Road in the east and the Norwich Road roundabout in the west. The footway crossing the roundabout on the western arm of the A47 and continues along Norwich Road for approximately 120m.
29	Easton	Footway on the northern frontage of Dereham Road leading to the A47/Church Lane roundabout from Easton village. The footway crosses the A47 via two uncontrolled crossings on the A47(E) arm of the roundabout and continues as a footpath through a wooded area for approximately 200m further north. Footways are present on both frontages of Dereham Road heading into Easton.

Location Ref (Figure 12.1)	PRoW Reference (NCC)/Location	Description
31	Honingham RB1	The restricted byway runs between Dereham Road immediately west of Honingham to the south and Wood Lane to the north in a generally northern direction. The route runs through a mixture of fields, wooded areas and along an existing track. The A47 severs the route approximately 220m north of Dereham Road. No crossing facilities are provided at the A47.
32	Easton FP1	The public footpath is located in the residential area of Easton to the south of the A47. It commences at Marlingford Road and runs in an easterly direction to Bawburgh Road, partly along the boundary of St Peter's Church of England Primary Academy.
33	Easton	An uncontrolled crossing of the A47 for pedestrians is provided approximately 350m to the east of the A47/Dereham Road/Church Lane roundabout. The crossing point is accessed via steps that lead from Ringland Lane to the south and Dog Lane to the north. The crossing is a staggered facility with gaps provided in the central reserve barriers to allow users to cross.

12.7.24 The receptors and their sensitivity are summarised in Table 12.6 below. The assigned sensitivity has been based on Table 3.11 in DMRB LA 112, and professional judgement and experience of undertaking similar assessments for similar schemes.

Table 12.6: Sensitivity of WCH routes to changes in journey length

Receptor	Sensitivity	Reasoning
North Tuddenham FP10	Medium	This footpath runs through a wooded area and fields and provides a link to the wider footpath network in the area. It is remote from local amenities and as such is used for recreational purposes. No usage surveys were undertaken for this footpath.
Hockering FP12	Low	This short section of footpath follows a minor access off the A47. It does not offer a meaningful route for either utility or recreational purposes since it does not connect to other routes in the area. No usage surveys were undertaken for this footpath.
Hockering FP10	Low	This footpath has fallen into disuse and is not maintained on the ground. As such, it does not offer a meaningful route for either utility or recreational purposes.
Hockering FP2	Medium	This footpath runs along an existing track from The Street adjacent to St. Michael's Church and Hockering Wood where it connects to the wider footpath network. As such, it is used for recreational purposes. No usage surveys were undertaken for this footpath.
Hockering FP3	High	This footpath is likely to be used by visitors to St Michael's Church since it provides a connect between the church and the existing footway on the northern frontage of The Street, which leads into Hockering village. No usage surveys were undertaken for this footpath.
Hockering FP9	Very High	Along with Hockering FP1, this footpath bisects the main residential area of Hockering village. As such, it is likely to be regularly used by children and parents accessing Hockering Church of England Primary School. No usage surveys were undertaken for this footpath.
Hockering FP1	Very High	Along with Hockering FP9, this footpath bisects the main residential area of Hockering village. As such, it is likely to be regularly used by children and parents accessing Hockering Church of England Primary School. The footpath also provides access to Hockering Wood to the west so is likely to be used for recreational purposes. No usage surveys were undertaken for this footpath.
Hockering FP5	Medium	This footpath runs along an existing track before running through fields and along field boundaries and provides a link to the wider footpath network in the area. It is remote from local amenities and as such is used for recreational purposes. No usage surveys were undertaken for this footpath.
Hockering FP11	Low	This footpath has fallen into disuse and is not maintained on the ground. As such, it does not offer a meaningful route for either utility or recreational purposes.
Hockering FP8	Medium	In combination with Hockering FP7 and East Tuddenham FPP9, this footpath forms part of a circular route in the vicinity of the River Tud and is used for recreational purposes. No usage surveys were undertaken for this footpath.
Hockering FP7	Medium	In combination with Hockering FP8 and East Tuddenham FP9, this footpath forms part of a circular route in the vicinity of the River Tud. Observed usage is very low and it is used mainly for recreational purposes, i.e. dog walking. Only 18 movements were recorded over the 14-day survey period and no movements were recorded on the majority of days.

Receptor	Sensitivity	Reasoning
East Tuddenham FP9	Medium	In combination with Hockering FP7 and Hockering FP8, this footpath forms part of a circular route in the vicinity of the River Tud and is used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP10	Medium	This footpath provides a connection between Hall Lane in the south and footpath East Tuddenham FP9 in the north, beyond which the route becomes Hockering FP7. The route follows a field boundary and is used for recreational purposes since it does not provide access to any local amenities. No usage surveys were undertaken for this footpath.
East Tuddenham FP8	Medium	This footpath provides a connection between Hall Lane in the south and footpath East Tuddenham FP9. The route runs through fields and along field boundaries and is likely used for recreation trips between the Riverside Farm Holidays accommodation and East Tuddenham. No usage surveys were undertaken for this footpath.
East Tuddenham FP7	Medium	This footpath provides a connection between The Street in East Tuddenham to the south and Rotten Row in the north. The route runs through fields and is likely used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP6	Medium	This footpath provides a connection between Church Lane in the east and East Tuddenham FP7 in the west. The route runs through a field and is used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP5	Medium	This footpath provides a connection between The Street in East Tuddenham to the south and East Tuddenham FP3 in the north, passing in close proximity to All Saints Church. The route runs predominantly through fields and is used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP4	Medium	This footpath provides a connection between Mattishall Road in the south and East Tuddenham FP3 in the north. The route runs predominantly through a wooded area and is used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP3	Medium	This footpath provides a connection between Berrys Lane in the east and Church Lane in the west. It runs to the south of the River Tud, predominantly through fields and is used for recreational purposes. No usage surveys were undertaken for this footpath.
East Tuddenham FP2	Medium	This footpath provides a connection between Wood Lane in the east and Sandy Lane in the west. The route runs along field boundaries and is remote from local amenities. As such, it is used for recreational purposes. No usage surveys were undertaken for this footpath.
Honingham FP4	Medium	This footpath provides a connection between The Street in Honingham to the east and Berrys Lane to the west. The route follows Mill Lane for part of its length, with the remainder of the route passing through a field and adjacent to a wooded area. It is used for recreational purposes. No usage surveys were undertaken for this footpath.
Honingham FP3	Medium	This footpath provides a connection between Berrys Lane in the west and Dereham Road at Honingham to the east. The route follows a field boundary and is used for recreational purposes. No usage surveys were undertaken for this footpath.
Combined footway/cycleway linking Main Road and The Street at Hockering	High	This shared facility follows the northern frontage of the A47 and is segregated from the carriageway. As such, it provides a good quality route for pedestrians and cyclists with little potential for substitution. No usage surveys were undertaken for this facility.

Receptor	Sensitivity	Reasoning
Footway on southern frontage of A47 near Mattishall Lane, Hockering	High	This section of footway in conjunction with the pedestrian island on the A47 and the footway on the northern frontage of The Street provide a route between the existing residential properties on Mattishall Lane and Hockering village. The surveys of usage recorded 356 movements crossing between Mattishall Lane and The Street (and vice versa) over the survey period of which, 246 movements were pedestrians (lone pedestrians, dog walkers, pedestrian with child and pedestrians with buggies) and 110 movements were by cyclists. On average there were 18 movements per day by pedestrians with a peak of 31 movements on a Saturday. Similarly, there was an average of eight cycle movements per day with a peak of 17 movements on a Sunday. The results suggest that Mattishall Lane is an important crossing point of the A47 for both pedestrians and cyclists and also, that Mattishall Lane is used as a leisure route by cyclists.
Footways on both frontages of The Street in Hockering	High	These footways provide a route into Hockering village from the residential properties on Mattishall Lane. As indicated above, the surveys of usage recorded 246 pedestrian crossing movements between Mattishall Lane and The Street (and vice versa) over the survey period.
Various sections of footway on Dereham Road, The Street and Norwich Road within Honingham village	Very High	These footways provide access between existing residential properties and local amenities within Honingham village. There is no potential for substitution of these facilities. No usage surveys were undertaken for these facilities.
Footway on northern frontage of A47 between Taverham Road and Honingham roundabout.	High	This footway follows the northern frontage of the A47 and provides access to St Andrew's Church. It is segregated from the carriageway and as such, provides a good quality route for pedestrians with little potential for substitution. The surveys of usage recorded only 11 movements over the 14-day survey period (lone pedestrians, dog walkers, pedestrian with child and pedestrians with buggies), with the majority of usage occurring on a Sunday.
Footway on northern frontage of Dereham Road and uncontrolled pedestrian crossings at Easton roundabout	High	This footway provides access between the existing residential properties and local amenities including St Peter's Church. It also provides a connection to a footpath running in a north-easterly direction from the A47/Dereham Road/Church Lane roundabout via two uncontrolled crossings on the A47(E) arm of the roundabout. The surveys of usage recorded 23 pedestrian movements across the A47 during the 14-day survey period, the majority of which were lone pedestrians and dog walkers. Six cyclists were also recorded crossing the A47 at this location.
Honingham RB1	Medium	This restricted byway runs north to south between Dereham Road and Wood Lane. It crosses the A47 via an uncontrolled crossing facility. The surveys of usage recorded only four movements across the A47 during the 14-day survey period, all of which were lone pedestrians.
Easton FP1	Very High	This footpath bisects the main residential area of Easton village and is likely to be regularly used by children and parents accessing St Peter's Church of England Primary Academy. No usage surveys were undertaken for this footpath.
Uncontrolled crossing of the A47 at Easton	High	This uncontrolled crossing of the A47 provides a connection between the residential area of Easton village and Ringland Lane (known as Dog Lane) to the north of the A47. The surveys of usage recorded 56 movements over the 14-day survey period of which 44 were by pedestrians (lone pedestrians, dog walkers and pedestrian with child). The remaining 12 movements were by cycles.

- 12.7.25 In addition to the usage information provided in Table 12.6, the usage surveys recorded 84 movements crossing the A47 between Low Road and The Street, at Hockering, during the 14-day survey period. On average, there were five movements per day by pedestrians (lone pedestrians, dog walkers and pedestrians with buggies) with a peak of eight movements on Tuesday 21 July 2020. Similarly, there were an average of two cycle movements per day with a peak of nine movements on Friday 17 July 2020. No other users were recorded during the survey. The surveys also indicated that there was no marked variation between weekday and weekend usage.
- 12.7.26 Very few movements were recorded at the junction of the A47 with Sandy Lane and Church Lane at Hockering. Only 25 movements were recorded crossing the A47 during the 14-day survey period. Of the movements recorded, the majority were cyclists and only one lone pedestrian movement was recorded. On the majority of days only two to three cycle movements were recorded but there was a peak of four cycle movements on Thursday 23 July 2020.
- 12.7.27 The usage surveys counted the number of movements between Wood Lane to the north of the A47; and Berrys Lane and Dereham Road to the south of the A47. A total of 258 movements were recorded between these roads, of which, 144 movements crossed the A47 to and from Wood Lane with the remaining 114 movements between Berrys Lane and Dereham Road to the south of the A47. The majority of movements across the A47 were by cycles with only one lone pedestrian movement recorded during the survey period. On average there were 10 cycle movements per day with a peak of 40 cycle movements on Sunday 26 July 2020. No other users were recorded during the survey period. The results suggest the Berrys Lane / Wood Lane is a leisure route for cyclists, especially during weekends.
- 12.7.28 With regard to the movements between Berrys Lane and Dereham Road, the recorded movements are split between 64 pedestrians (lone pedestrians, dog walkers and pedestrians with child) and 50 cycles. On average there were four pedestrian movements and three cycle movements per day with a peak of 12 pedestrian movements on Sunday 19 July 2020 and a peak of nine cycle movements on Friday 17 July 2020. No other users were recorded during the survey period.
- 12.7.29 In relation to the transport network in the area, a separate table listing bus stops and routes is provided (Table 12.7).

Table 12.7: Bus stop locations and services

Bus Stop Location	Location	Bus Service	Frequency	Route
Dereham Road, Easton (E/B)	490m east of the junction with the A47	4	Hourly	N & NU Hospital Norwich Bus Station
		52	School Bus, Limited AM and PM Services	Easton College
		X1	Hourly	Norwich Bus Station
Dereham Road, Easton (W/B)	390m east of the junction with the A47	4	Hourly	Honingham East Tuddenham Mattishall Dereham Swanton Morley
		52	School Bus, Limited AM and PM Services	Swaffham
		X1	Hourly	Dereham Swaffham King's Lynn Wisbech Peterborough
		29A	School Bus, Limited AM and PM Services	From Easton College to Fakenham
Mattishall Road, Honingham (E/B)	750m west of the junction with the A47	4	Hourly	Easton N & NU Hospital Norwich Bus Station
Mattishall Road, Honingham (W/B)	750m west of the junction with the A47	4	Hourly	East Tuddenham Mattishall Yaxham Dereham Swanton Morley
The Street, Hockering	350m east of the junction with the A47	X1 (E/B)	Hourly	Easton Norwich Bus Station
Elsing Road (The Lodge), North Tuddenham (E/B)	475m west of the junction with the A47	80	Operates on Fridays Only, Limited AM and PM Services	Sparham Reepham Aylsham
Elsing Road (The Lodge), North Tuddenham (W/B)	475m west of the junction with the A47	80	Operates on Fridays Only, Limited AM and PM Services	Dereham

Human Health

Health Profiles

- 12.7.30 All four communities within the study area (Upper Wensum, Mattishall, Great Witchingham and Easton) are considered to have a **high** sensitivity to change. This approach is in line with DMRB LA 104, which states that environmental assessments should be undertaken using a realistic 'worst case' scenario. Within each community there would be varying levels of sensitivity to change across different individuals, as some would be more vulnerable than others. In the absence of evidence to suggest that the communities are less sensitive to change, we consider this precautionary approach to be most appropriate for the purposes of this assessment.
- 12.7.31 The data used to establish the health profiles of Upper Wensum, Mattishall, Great Witchingham and Easton is presented in Table 12.8, in comparison to the national average.
- 12.7.32 Across the Broadland district the population was estimated to be 129,464 in 2011 (Census, 2011), across Breckland it was estimated to be 130,491 and across South Norfolk it was estimated to be 124,012 (Census, 2011). Table 12.8 shows the ward with the highest population in the study area in 2019 to be Mattishall and the lowest in 2011 to be in Upper Wensum.
- 12.7.33 The census data shows all four wards to have a lower percentage of their populations with general health of bad or very bad than the national average. However, the percentage of the population with limiting long term illnesses or disability for Upper Wensum and Mattishall is higher than the national average. Income-deprived households are lower than the national average in Great Witchingham and Easton, and higher than the national average in Upper Wensum.
- 12.7.34 The data shows Mattishall, Great Witchingham and Easton to have a lower number of emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) as a percentage of all hospital admissions than the national average, whilst admissions in Upper Wensum are higher. The data shows deaths from respiratory diseases as a percentage of all deaths to be lower in Upper Wensum, Mattishall and Great Witchingham than the national average. The data shows life expectancy for males and for females to be higher in all wards than the national life expectancy for males and females. This data shows the variation across the four communities in terms of health indicators which suggests they are all sensitive to change due to the higher population of community with increased susceptibility to health issues (under 16 and over 65) when compared to the national average. Therefore, for the purposes of this assessment, all four communities are considered to be of **high** sensitivity.

Table 12.8: Health Profiles for Upper Wensum, Mattishall, Great Witchingham and Easton

Local Health Indicator	Wards				National
	Upper Wensum	Mattishall	Great Witchingham	Easton	England
Population	2265	5468 ⁵	2511	2717	53,012,456
Population aged under 16 (%)	15.2%	15.3% ⁶	15.8%	18.2%	18.9%
Population aged over 65 (%)	24.3%	29.8%	20.8%	18.0%	16.3%
Income deprivation (people living in income-deprived households as % of population)	24%	N/A*	21%	18%	23.9%
General health - bad or very bad (%)	5.3%	4.6%	3.9%	3.1%	5.5%
Limiting long term illness or disability (%)	20.6%	20.0%	16.5%	14.9	17.6%
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease Standardised Admission Ratio (SAR)	60 (2% of total admissions for all causes, any age)	26 (1% of total admissions for all causes, any age)	13 (1% of total admissions for all causes, any age)	9 (0.8% of total admissions for all causes, any age)	613,747 (2% of total admissions for all causes, any age)
Deaths from respiratory diseases, all ages, all persons Standardised mortality ratio(SMR)	45 (13% of total deaths for all causes, any age)	18 (6% of total deaths for all causes, any age)	7 (9% of total deaths for all causes, any age)	14 (16% of total deaths for all causes, any age)	335,078 (14% of total deaths for all causes, any age)
Life expectancy at birth - males, 2016-18 (years)	82.7	82.1	86.5	82.1	79.5
Life expectancy at birth - females, 2016-18 (years)	84	85.2	87.4	85.9	83.1

⁵ Population mid-year estimates Census 2011:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/>

⁶ Norfolk Insight Population estimates for all persons by broad age group for 2019:

<https://www.norfolkinsight.org.uk/population/report/view/286efa84892b46e1aba60a1cd3853e3d/E05010251>

Source: Public Health England Fingertips tool, Census 2011, Breckland Council and Norfolk Insight

**Information was not available*

Health Determinants

12.7.35 The health determinant categories as set out in DMRB LA 112 have been used to gather information on the communities of Upper Wensum, Mattishall, Great Witchingham and Easton, as presented in Table 12.9. These determinants reflect the physical and social aspects of the environment in which the four communities are situated that contribute towards their health. These health determining factors are therefore used, along with the health profile data, to predict the likely health outcomes of the Proposed Scheme on the communities.

12.7.36 In relation to the transport network in the area, a separate table listing bus stops and routes is provided (Table 12.7).

Table 12.9: Health Determinants for Upper Wensum, Mattishall, Great Witchingham and Easton

Health determinant categories	Health determinants identified
The location and type of community, recreational and education facilities	Community assets and green/ open space are identified in Figure 12.1 (TR010038/APP/6.2) and considered under the land use and accessibility sections within this chapter. These have been taken into account in identifying the likely health outcomes.
The location of green/ open space	
The location of healthcare facilities	Healthcare facilities have been scoped out of the assessment as there are no healthcare facilities within the vicinity of the Proposed Scheme.
Outline spatial characteristics of the transport network and usage in the area including the surrounding road network, Public Rights of Way (PRoW), cycle ways, non-designated public routes and public transport routes)	Usage data for the WCH facilities in the vicinity of the Proposed Scheme are provided in Table 12.5.
Air quality management areas (AQMA) and ambient air quality	There are no AQMA within the proximity of the Proposed Scheme. The nearest AQMA is the Central Norwich AQMA approximately 9km east that covers the entirety of the Norwich City Centre.
Areas recognised as sensitive to noise, (e.g. noise important areas (NIAs), noise management areas and the ambient noise environment)	There are four NIAs within the vicinity of the Proposed Scheme: IA_ID:5200, asset owner HE IA_ID:5201, asset owner HE IA_ID:5202, asset owner HE IA_ID:6287, asset owner HE Sensitive receptors include dwellings, schools, care homes and churches in addition to other community assets. Of particular sensitivity in Honingham are two specialist schools and a care home. Over 800 noise sensitive receptors have been identified within 600m of the Proposed Scheme.
Sources and pathways of potential pollution (e.g. land/ water contamination)	Potential risks to road construction and maintenance workers are considered to be moderate/ low due to the higher likelihood of workers coming into contact with potential localised contamination sources

Health determinant categories	Health determinants identified
	<p>during in-ground works. However, the adoption of site health and safety measures may reduce this risk further.</p>
<p>Landscape amenity</p>	<p>Residential receptors generally comprise isolated farmsteads or small clusters of properties throughout the areas. There are three villages in proximity to the Proposed Scheme: Hockering, Honingham and Easton.</p> <p>Views out from the villages are generally screened by surrounding tree cover, subtle landform undulations and tree cover on their edged limit views out. At most, glimpsed views are likely from some upper storey windows. This is particularly evident in Easton, where a strongly defined line of mature trees defines the northern edge of the village and screens views of the immediately adjacent A47 corridor.</p> <p>Various PRoW footpaths and bridleways coincide with the extent of the study area, which are shown on Figure 7.4 (TR010038/APP/6.2). Many footpaths are enclosed by landform undulations and tree cover, particularly including paths at lower levels in proximity to the River Tud. However, the following routes afford views in the direction of the site:</p> <ul style="list-style-type: none"> • Paths on higher ground leading north from Hockering in the direction of Hockering Wood, looking south back towards the site • Paths leading south from the River Tud onto higher ground, in the vicinity of East Tuddenham and Honingham • Paths on higher ground in the vicinity of Wood Lane, to the north of the Proposed Scheme • Paths on higher ground in the vicinity of Taverham Road, to the north of the Proposed Scheme
<p>Safety information associated with the existing affected road network (e.g. numbers killed and seriously injured)</p>	<p>Records of collisions over the length of the existing A47 comprising the Proposed Scheme, namely between grid reference 605633, 313670 and grid reference 613527, 311025, for the 5-year period between 3 January 2014 and 12 December 2018 have been reviewed to identify any notable trends or marked road safety issues.</p> <p>A total of 63 collisions were recorded in the study area, of which 54 were classified as being of 'slight' severity and nine were classified as 'serious'. No fatalities were recorded during the period reviewed. Additionally, no collisions involving pedestrians, cyclists or horses were recorded during this review period.</p> <p>An examination of the location and occurrence of the collisions highlights clusters along the A47. These clusters are located at the A47 / Wood Lane / Berrys Lane crossroads where 4 collisions of slight severity were recorded; at the A47 / Taverham Road / Blind Lane crossroads where 5 collisions of slight severity and a single collision of serious severity was recorded; and on the A47 close to its roundabout junction with Church Lane and Dereham Road where 5 collisions of slight severity and a single collision of serious severity were recorded.</p>

Stakeholder consultation

12.7.37 Table 12.10 identifies the key feedback received from the public during the 2017 stakeholder consultation for the Proposed Scheme. Consultation also took place in 2020 which included the completion of a human health questionnaire. The human health questionnaire and the responses to the questionnaire received are

included in Appendix 12.1 (**TR010038/APP/6.3**). This feedback has been taken into account and incorporated into the assessment where appropriate.

Table 12.10: Information collated from stakeholder consultation (2017)

Information collated from stakeholder consultation (2017)
<ul style="list-style-type: none">• Many respondents believe improvements will mean local villages, such as Mattishall, East Tuddenham, Colton, Easton, Marlingford, Hockering and Bawburgh, will no longer be used as 'rat-runs'. They welcome the perceived environmental benefits this would bring to local communities, improving air quality and reducing noise pollution.• Some respondents requested the implementation of natural earth mounds, trees and quiet tarmac to minimise the level of noise pollution that dualling the road may bring about.• Several respondents believe that improvements to the A47 between North Tuddenham to Easton will lead to economic benefits for local businesses.• A couple of respondents and stakeholders, including Easton Parish Council, were worried about access to a new industrial estate planned between Easton roundabout and Honingham roundabout.

12.8 Potential impacts

12.8.1 This section identifies potential impacts of the Proposed Scheme on land use and accessibility, which may result in significant effects. Although human health does not report significant effects, the potential impacts section highlights any impacts which would result in positive, negative or neutral health outcomes. These are summarised below.

12.8.2 For readability, this section provides an overview of the construction and operational impacts and has not been sub-divided into the separate headers under land use and accessibility and human health.

12.8.3 There would be no property demolitions as a result of the Proposed Scheme.

12.8.4 The construction process would be undertaken in phases and predominantly offline, details are provided in Chapter 2 (The Proposed Scheme) (**TR010038/APP/6.1**).

Construction

Land use and accessibility

12.8.5 Potential temporary construction impacts on land use and accessibility during the construction phase of the Proposed Scheme include the following:

- Temporary land-take from private properties, community land, development land, agricultural land and community assets required to undertake construction activities
- Temporary changes to severance and accessibility to private properties, community land, community assets and businesses during construction of the Proposed Scheme

- Temporary diversions or stopping up of WCH routes
- Increased construction traffic on the existing A47 and local roads leading to a temporary disruption to access private properties, community assets and businesses as a result of road closures and traffic management

12.8.6 Potential permanent construction impacts during the construction phase of the Proposed Scheme include the following:

- Permanent land-take from private properties, community land, development land, agricultural land and community assets.
- Permanent severance of land and buildings which form part of an agricultural holding.
- Permanent change to access for private properties on Low Road, Mattishall Lane, Church Lane (East Tuddenham), Berrys Lane, Blind Lane, Dereham Road (Honingham) and Church Lane (Easton).
- Permanent change to access areas of community land and community assets such as along the existing A47.
- Permanent severance of Low Road, Church Lane (East Tuddenham), Hockering FP7, Mattishall Lane, Mill Lane, Gypsy Lane, Hall Farm access track, Berrys Lane and Blind Lane.
- Permanent stopping up of PRow Hockering FP12 and the permanent stopping up and diversion of a short section of Hockering FP8.

Human Health

12.8.7 Potential health impacts have been considered in relation to the aspects of the Proposed Scheme's construction, permanent development and operation that could give rise to changes to health determinants and hence potentially affect future health outcomes. The consideration of the potential for effects has taken account of the range of potential sensitivities of the communities affected along the Proposed Scheme corridor, including key aspects of their health profiles and with a judgement about the impact likelihood and pathways. Road users have also been briefly considered.

12.8.8 Potential impacts to human health which could occur during construction of the Proposed Scheme include:

- Visual effects of new infrastructure on sensitive visual receptors
- Effects of noise and vibration from construction plant and vehicles on communities and residential receptors
- Effects on changes in local air quality (including dust dispersal and deposition and odour) from construction vehicles and activities

- Stress, anxiety and related wellbeing effects from exposure to (or concern about) sustained construction activity (or construction sites) in proximity to living areas, open spaces, schools, amenities etc.
- Stress, anxiety and related wellbeing effects from exposure to (or concern about) construction traffic on local roads close to communities, including for users of roads affected by increased levels of traffic for construction

Operation

Land use and accessibility

12.8.9 Potential impacts during operation of the Proposed Scheme on land use and accessibility include the following:

- Permanent changes to severance for private properties, community assets, agricultural land holdings and businesses
- Permanent changes to severance for WCH

Human Health

12.8.10 This section presents the potential impacts of the proposals on health determinants and considers their potential to give rise to health effects with a negative, positive or neutral health outcome, as required in DMRB LA 112 table 3.32. The nature and scale of predicted impacts has been considered in combination with the sensitivity of the baseline to inform consideration of the potential for effects. The judgement on health effects has also taken account of there being an identifiable pathway between the predicted impact on health determinant(s) and any effect on health outcomes.

12.8.11 Potential impacts to human health which could occur during the operation of the Proposed Scheme include:

- Effects on changes in traffic noise and vibration on communities and residential receptors
- Changes in access (by foot, cycle or car) to public transport
- Changes in access (by foot, cycle or car) to other community assets
- Changes in access (by foot, cycle or car) to green space, parks and countryside
- Changes in community severance
- Perception of the proposed development, including psychosocial effects from concerns about changes in the environment
- Secondary impacts from consequential developments
- Reduced accident rates and severity on the Proposed Scheme

- Increased accessibility (reduced car journey times using new road) to key employment locations, with potential for improved employment opportunities
- Increased accessibility (reduced walking and cycling journey times between communities using the shared use path)

12.9 Design, mitigation and enhancement measures

Construction

Land use and accessibility

12.9.1 The Environmental Management Plan 1st iteration (EMP) (**TR010038/APP/7.4**) will be updated as a 2nd iteration, prior to the construction phase, to detail key construction mitigation which will be in place by the Principal Contractor during construction of the Proposed Scheme. Based upon this assessment the following measures are recommended to be included in the EMP:

- Traffic management measures will be put in place as part of the construction stage Traffic Management Plan (**TR010038/APP/7.5**) to ensure disruption is minimised on those travelling between communities and those travelling to facilities and businesses.
- Communication with local residents will take place during construction to highlight potential periods of disruption. This will be via newsletters, radio announcements, the Highways England scheme web-page, and an appointed Community Liaison Officer.
- The Applicant's Customer Contact Centre will be available to deal with queries and complaints from the public. An information line will be staffed and a complaint management system in place, used on other major infrastructure projects, to ensure complaints are investigated, action is taken and the complainant receives a response.
- Where a closure of a WCH route is required, safe and appropriate alternative routes would be provided to ensure access is maintained during construction. The Principal Contractor would agree all temporary diversion routes with the local authority. Appropriate signage for all closures or diversions would be used to provide sufficient notice of such closures or diversions.

Human health

12.9.2 The Principal Contractor will be required to put in place measures to minimise noise, dust and visual effects. These mitigation measures are set out in the EMP (**TR010038/APP/7.4**) and detailed in the respective chapters in this ES. Further details can be found in the following chapters: Chapter 5 (Air quality), Chapter 7 (Landscape and visual effects) and Chapter 11 (Noise and vibration) (**TR010038/APP/6.1**).

Operation

Land use and accessibility

- 12.9.3 The design, mitigation and enhancement measures that will be provided as part of the Proposed Scheme are described below and shown in Figure 12.3 (TR010038/APP/6.2).
- 12.9.4 A combined footway/cycleway will be provided adjacent to the new side road alignment between Main Road and the existing A47 alignment west of Hockering including suitable crossing facilities at the new priority junction that forms the northbound section of Main Road. This facility is a direct replacement for the existing infrastructure that currently links Main Road with The Street west of Hockering, albeit running adjacent to the new side road alignment.
- 12.9.5 A combined footway/cycleway will be provided along the new Mattishall Lane Link Road that will pass under the new A47 alignment. In addition, a new section of footway/cycleway will be provided on the southern frontage of the existing A47 as far as its junction with the existing Mattishall Lane. This new infrastructure will provide a safe route for pedestrians and cyclists between Mattishall Lane Link Road and Hockering. It will also facilitate a connection to Hockering FP 8 at Whitford Bridge, on Mattishall Lane.
- 12.9.6 A new combined footway/cycleway will be provided along the new side road between the existing A47 east of Hockering and the Wood Lane junction northern roundabout to provide a connection between the B1535 Wood Lane and Hockering. This facility will also cross the stub to be provided for the future connection of the Norwich Western Link Road at Wood Lane junction northern roundabout and connect to a further combined footway/cycleway to be provided to the east of the junction.
- 12.9.7 Honingham RB1, located to the east of Wood Lane, will be diverted along an existing track to connect with a new combined footway/cycleway that starts at the B1535 Wood Lane. The PRoW route then follows a proposed new combined footway/cycleway which runs parallel to the eastbound on slip and then under the new A47 alignment via the proposed Hall Farm underpass. The PRoW then continues along the existing A47 alignment, that will be downgraded, before re-joining its original alignment through the field for an onward connection to Dereham Road.
- 12.9.8 The status of PRoW Hockering FP3 will be upgraded from a footpath to a bridleway, with suitable surfacing to allow cyclists as well as pedestrians to connect between Berrys Lane and Dereham Road. This will enable cyclists to follow the alternative routeing via the realigned Dereham Road, the downgraded existing A47 alignment and the proposed Hall Farm underpass to access Wood Lane to the north. The design requirements of the cycle track means the alignment will be adjacent to the existing PRoW, but to the north away from the

designated alignment of the PRow. Consequently, the official route of PRow Hockering FP3 will need to be diverted onto the new cycle track requiring an approximate 30m journey length increase along Dereham Road to the new access point off Dereham Road. Access via Berrys Lane would be adjacent to the existing PRow.

- 12.9.9 As indicated, the existing A47 at Honingham will be downgraded and a new combined footway/cycleway will be provided on its northern frontage between the realigned Dereham Road in the west and Honingham roundabout in the east. The combined footway/cycleway will also continue on the new alignment of Dereham Road to provide a connection to the proposed upgraded Hockering FP3.
- 12.9.10 A new combined footway/cycleway will be provided to the east of Honingham to provide a link between the sections of the existing A47 alignment to be severed. The new facility will commence from the proposed combined footway/cycleway to be provided on the existing A47 alignment at Honingham roundabout and pass beneath the new A47 alignment before re-joining the existing A47 alignment close to St Andrew's Church.
- 12.9.11 An improved footway/cycleway will be provided on the existing alignment of the A47 between St Andrew's Church and Taverham Road. Crossing facilities will also be provided at Taverham Road to facilitate a connection to infrastructure to be provided to the east of Taverham Road.
- 12.9.12 A new combined footway/cycleway will be provided to the north of the new A47 alignment between Taverham Road and Ringland Road to provide a continuous link between Honingham and Easton and then onwards to Hockering. This new combined facility will connect to a new Easton footbridge linking Dereham Road and Church Lane at Easton. The footbridge will be suitable for pedestrians and cyclists and will replace the uncontrolled crossings at the existing Dereham Road / Church Lane / A47 roundabout which is to be removed. The footbridge will also replace the existing crossing between Ringland Lane south of the A47 and Ringland Lane north of the A47 (known as Dog Lane).

12.10 Assessment of likely significant effects

- 12.10.1 The significance of identified effects after mitigation are outlined below. Impacts of moderate significance or above are considered to be a significant effect.

Construction

Land use and accessibility

- 12.10.2 During construction, some journeys may be temporarily longer or would experience an increase in congestion due to construction traffic and traffic

management measures, especially during peak periods. However, these effects are anticipated to be minimal and only for short time periods.

- 12.10.3 The traffic management plan (**TR010038/APP/7.5**) defines the measures used to reduce the impacts from construction traffic, including measures to reduce worker vehicle movements and to reduce HGV movements, particularly at peak periods with an overall aim to keep traffic moving.
- 12.10.4 Offline working for the construction of the Proposed Scheme would minimise impacts on community access throughout the study area.
- 12.10.5 Sections of the existing A47 would remain open for use, therefore disruptions should be minimised and traffic flows on the existing A47 and other local roads would be maintained, whilst allowing safe working at the interface between the existing road network and the Proposed Scheme.

Private property and housing

- 12.10.6 Construction of the Proposed Scheme would result in permanent effects due to the severance of Low Road. Residents of private properties on Low Road and Oak Farm would experience a change in journey length accessing the existing A47 when travelling by vehicle. They would be required to either travel west on Low Road and north on Fox Lane or travel south east, connecting into Mattishall Lane Link Road. For properties on Low Road closest to Fox Lane, there would be no change in access to the existing A47 along Fox Lane. For properties on Oak Farm closest to the existing A47, the journey length to access the existing A47 would increase by 1.7km for journeys to and from the west and increase by 1.3km for journeys to and from the east. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight adverse**.
- 12.10.7 During construction, the main construction compound will be located to the west of Low Road, using Low Road for access. Residents of Low Road may experience an increase in construction traffic due to deliveries and site worker journeys. However, this will be temporary, and the road will remain accessible to residents.
- 12.10.8 Construction of the Proposed Scheme would result in a permanent change to access due to the stopping up of Mattishall Lane on the current alignment. Properties to the south of the Proposed Scheme on Mattishall Lane would be required to use the Mattishall Lane Link Road underpass to access the existing A47. This includes access for the travellers site located on Mattishall Lane, north of the River Tud. For the two properties located south of the new A47 on Mattishall Lane and the travellers site, this would result in a journey length increase of 0.2km. For the residents to the north of the new A47 on Mattishall Lane, there would be no change in journey length for journeys to the existing

A47, but journeys to the south would be diverted via the Mattishall Lane Link Road. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight adverse**.

- 12.10.9 Construction would permanently stop up the northern end of Church Lane, East Tuddenham. Residents of properties located on Church Lane, Trap's Lane and Rotten Row would experience an increase in journey length. Users would be required to travel south on Church Lane, east on Mattishall Road, north along Colton Road, north west along The Street and west along Dereham Road. Both the existing and proposed A47 locations can be accessed via the proposed link road connecting Dereham Road, Honingham, to the south roundabout of the proposed Wood Lane junction. For the property located furthest north on Church Lane this would result in a journey length increase of 4km. For properties located on Rotten Row, an increase of 3.5km is predicted for the property located furthest to the west. The magnitude is classified as **moderate** due to the introduction of severance with moderate accessibility provision. Therefore, impacts are assessed as **Moderate adverse**.
- 12.10.10 The property of Hillcrest Cottage currently has a private access to the existing A47. The construction of the Proposed Scheme would permanently stop up the existing access and provide a new access connecting into Church Lane. A journey length increase of 4.5km would be required for journeys to the existing A47 heading west. The magnitude is classified as **moderate** due to the introduction of severance with moderate accessibility provision. Therefore, impacts are assessed as **Moderate adverse**.
- 12.10.11 Construction of the Proposed Scheme would result in a permanent change to access to Hall Farm, currently accessible from the existing A47. The Proposed Scheme would provide an alternative access via an underpass of the Proposed Scheme connecting to the existing A47. For the residents at Hall Farm there would be a 0.29km journey length increase for journeys to the A47. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight adverse**.
- 12.10.12 Residents of the private property located by St Andrew's Church, Honingham would experience an increase in journey length when accessing the A47 to travel west. This is due to the permanent stopping up of the existing A47 to the west of the church by the Proposed Scheme. To travel to Honingham roundabout located on the existing A47, they would be required to travel east on the existing A47 and access the proposed Norwich Road junction, to travel west on the Proposed Scheme. This journey would include a journey length increase of 1.2km. A WCH link is being provided to the north of the Honingham roundabout to maintain accessibility by walkers and cyclists, as well as

headroom for dismounted horse riders. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight adverse**.

- 12.10.13 Construction of the Proposed Scheme would result in a permanent increase in journey length for residents of Berry Hall Cottages and the adjacent residential properties when accessing the A47. Those accessing the A47 would be required to travel south on Berrys Lane, east on Mattishall Road, north on Colton Road and The Street to access the Proposed Wood Lane junction. When travelling west on the A47, there would be a journey length increase of 3.5km and when travelling east on the A47, there would be a journey length increase of 3.35km. The magnitude of impact is classified as **moderate**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Moderate adverse**.
- 12.10.14 There will be a satellite compound located to the west of the proposed Wood Lane junction. Access may be required from the A47 for deliveries of large construction plant and from the east, therefore residents may experience an increase in construction traffic when in use.
- 12.10.15 Private properties located on Taverham Road would not experience a change in journey length, as they would be able to access the Proposed Scheme at the same location as the existing A47, however they would be able to access the wider strategic road network via the Norwich Road junction.
- 12.10.16 As the Proposed Scheme is removing the existing A47/ Church Lane roundabout at Easton, private properties located on Ringland Road and Ringland Lane north of the A47 (known as Dog Lane) would experience an increase in journey length when accessing the A47. They would be required to travel north on Ringland Road, west on Weston Road and south on Taverham Road to join the Proposed Scheme at the Norwich Road junction. For the private property located on Dog Lane, this would require a journey length increase of 3.2km. For private properties on Church Lane east of Ringland Road there would be an increase in journey length of 3.3km, for properties towards the south of Ringland Road there would be an increase of 3km, for properties in the middle of Ringland Road there would be an increase of 2.6km and towards the north end of Ringland Road there would be an increase of 2.4km. However, a WCH overbridge (Easton footbridge) is being provided at the location of Easton roundabout providing direct and safer walking and cycling opportunities to these properties. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Moderate adverse**. The effect has been assessed as Moderate instead of Large as whilst there has been a reduction in accessibility for vehicle users, removing the roundabout has created provision for a safer segregated WCH crossing and vehicle journeys can still be taken using the Norwich Road junction.

- 12.10.17 One of the compounds will be located to the west of Honingham roundabout, west of St Andrew’s Church. The private property located at the church may experience an increase in traffic in the area due to increased construction traffic for deliveries of large construction plant and site worker journeys.
- 12.10.18 Whilst the section of the existing A47 between Blind Lane and Easton would be severed as part of the Proposed Scheme, private properties located in Easton would be able to access the Proposed Scheme from Dereham Road due to a tie-in to the proposed Norwich Road junction being located here, using the existing A47.
- 12.10.19 A compound will be located to the north of the Easton roundabout, north of St Peter’s Church. Private properties located south of the roundabout on Dereham Road may experience an increase in traffic in the area due to increased construction traffic for deliveries of large construction plant and site worker journeys.
- 12.10.20 Table 12.11 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.11: Private property and housing residual construction effects

Description of impact	Sensitivity	Magnitude of impact	Residual effect
Increase in journey length for residents of private property on Low Road.	High	Minor	Slight adverse
Increase in journey length for residents of private property at Oak Farm.	High	Minor	Slight adverse
Increase in journey length for residents of private property on Mattishall Lane to the south of the Proposed Scheme.	High	Minor	Slight adverse
Increase in journey length for residents of private property on Church Lane, Trap’s Lane and Rotten Row.	High	Moderate	Moderate adverse
Increase in journey length for residents of Hillcrest Cottage.	High	Moderate	Moderate adverse
Increase in journey length for residents of Berrys Lane (Berry Hall Cottages).	High	Moderate	Moderate adverse
Increase in journey length for residents of Hall Farm.	High	Minor	Slight adverse
Increase in journey length to access the private property located at St Andrew’s Church, Honingham.	High	Minor	Slight adverse
Increase in journey length for the private properties located on Ringland Road, Church Lane and Ringland Lane (known as Dog Lane).	Very High	Minor	Moderate adverse

Community land and assets

- 12.10.21 During construction, access to Poppy's Wood area of community land would be altered by the Proposed Scheme providing direct access to the east of Poppy's Wood from the new side road to the Proposed Scheme. Restrictions on access Poppy's Wood may be required for short durations of tying into the access to the woodland. However, it is recognised that access will be retained to the woodland during construction. Access to the existing A47 would not be altered and would still be obtained from Poppy's Wood by travelling west and using Fox Lane junction. The magnitude of impact has been classified as **minor**, due to the reduction of severance with adequate accessibility provision. Therefore, temporary construction impacts are assessed as **Slight adverse**.
- 12.10.22 Temporary land-take would be required from the southern boundary of Poppy's Wood to enable construction works in this location. The removal of the existing overhead utility asset would require 0.14ha of temporary land-take from Poppy's Wood. Temporary construction access would require 0.22ha of temporary land-take. A combination of the above activities would require a total temporary land-take of 0.22ha from the southern boundary of Poppy's Wood. The magnitude of impact is classified as minor due to the temporary nature of land-take required and that the remainder of the community land will be accessible and utilised during construction. Therefore, the temporary construction impacts are assessed as **Slight adverse**.
- 12.10.23 During construction, access to St Andrew's Church would be permanently altered when accessing to or from the west, resulting in an increase in journey length. To travel to Honingham roundabout on the existing A47, travellers would be required to travel east on the existing A47 and access the Norwich Road junction to travel west on a new side road provided by the Proposed Scheme. This journey would include a journey length increase of 1.2km. A WCH link is being provided to the north of the Honingham roundabout to maintain accessibility for walkers and cyclists. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate access. Therefore, impacts are assessed as **Slight adverse**.
- 12.10.24 During construction, access to Merrywood House would be permanently altered by the Proposed Scheme. Those accessing the A47 would be required to travel south on Berrys Lane, east on Mattishall Road, north on Colton Road and The Street to access the proposed Wood Lane junction. To travel west on the A47 there would be a journey length increase of 3.17km and to travel east there would be an increase of 3.16km. A WCH path is provided along the north of Merrywood House connecting Berrys Lane to Dereham Road. This path would maintain direct walking and cycling connectivity for residents on Berrys Lane and Dereham Road. The magnitude of impact is classified as **moderate**, due to the

journey length increase with access retained from the south and via the WCH path. Therefore, impacts are assessed as **Moderate adverse**.

12.10.25 There will be a satellite compound located to the west of the proposed Wood Lane junction. Access may be required from the A47 for deliveries of large construction plant and from the east, therefore community facilities on Berrys Lane such as Merrywood House may experience an increase in construction traffic when in use.

12.10.26 The Proposed Scheme route requires temporary land-take of 0.11ha and permanent land-take of 0.03ha from an area of consecrated land owned by St Peter's Church, located adjacent to the east of the church. The magnitude of impact has been identified as **moderate**, as whilst the field has been consecrated, it is not yet in use as a burial ground. Discussions are ongoing with the diocese to purchase the area of permanently affected land needed prior to any burials occurring. However, as a worst case scenario, should the field be used as a burial ground before the Proposed Scheme is constructed, the magnitude of impact will increase to **major**, as construction of the Proposed Scheme will result in loss of land with severe damage to key characteristics, for the direct development of land to accommodate highways assets. When considering a worst case scenario that the land is used for burials, there would be a **Large adverse** significance of effect. Should agreement be reached with the diocese to not bury on this land, a **Moderate adverse** significance of effect has been identified.

12.10.27 Whilst the section of the existing A47 between Blind Lane and Easton would be severed as part of the Proposed Scheme, the following businesses located in Easton would be able to access the Proposed Scheme from Dereham Road due to a new side road connection to the proposed Norwich Road junction using the existing A47: Easton Guesthouse, Adams Automotive Engineering, Rembrandt, System Driving School.

12.10.28 Table 12.12 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.12: Community land and assets residual construction effects

Description of impact	Sensitivity	Magnitude of impact	Residual effect
Access to Poppy's Wood would be altered during construction	Medium	Minor	Slight adverse
Temporary land-take required from Poppy's Wood for construction activities	Medium	Minor	Slight adverse
Increase in journey length to access St Andrew's Church, Honingham.	Medium	Minor	Slight adverse

Description of impact	Sensitivity	Magnitude of impact	Residual effect
Increase in journey length to access Merrywood House on Berrys Lane	Medium	Moderate	Moderate adverse
Permanent land-take from area of consecrated ground owned by St Peter's Church	High	Moderate	Moderate adverse

Development land and businesses

- 12.10.29 Due to the severance of Low Road, businesses on Low Road would experience a change in journey length accessing the A47 when travelling by vehicle. This includes Rectory Cottage, Animal Warden Services, Kimblewick Riding Centre, and Two Acre Boarding Kennels. They will be required to travel west on Low Road and north on Fox Lane before travelling east on the A47. Journey length increases are assessed under private property and housing. The magnitude of impact is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight adverse**.
- 12.10.30 During construction, access to Riverside Farm Holidays apartment rental would be permanently altered by the Proposed Scheme, due to the stopping up of Church Lane access to the existing A47. Access would be required to be obtained by travelling south on Church Lane from Rotten Row, travelling east on Mattishall Road, and east to Dereham Road, where the existing and proposed A47 locations can be accessed via the proposed link road to the existing A47 and to the south roundabout of the proposed Wood Lane junction. The increase in journey length is assessed under private property and housing. The magnitude is classified as **moderate** due to the introduction of severance with moderate accessibility provision. Therefore, impacts are assessed as **Moderate adverse**.
- 12.10.31 During construction, the journey length to access GRRRoomers and City Stove Installs Wood Burners Norwich would be reduced by the Proposed Scheme by 0.35km. They can be accessed via a slip road from the Proposed Scheme and connect to the existing A47 via the proposed Norwich Road underbridge. The magnitude is classified as **minor** due to the reduction of severance with adequate accessibility provision. Therefore, impacts are assessed as **Slight beneficial**.
- 12.10.32 Whilst the section of the existing A47 between Blind Lane and Easton will be severed as part of the Proposed Scheme, the following businesses located in Easton will be able to access the Proposed Scheme from Dereham Road due to a a new side road connection to the proposed Norwich Road junction using the existing A47: Easton Guesthouse, Adams Automotive Engineering, Rembrandt, System Driving School.

12.10.33 Table 12.13 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.13: Development land and business residual construction effects

Description of impact	Sensitivity	Magnitude of impact	Residual effect
Increase in journey length for businesses on Low Road.	Medium	Minor	Slight adverse
Increase in journey length to access Riverside Farm Holidays apartment rental.	Medium	Moderate	Moderate adverse
Decrease in journey length to access GRRRoomers and City Stove Installs- Wood Burners Norwich.	Medium	Minor	Slight beneficial

Agricultural land holdings

12.10.34 The assessment on land holdings has been undertaken in accordance with the criteria outlined in Table 12.4. Potential effects on individual land holdings during the construction of the Proposed Scheme is outlined below and summarised in Table 12.14. The area of agricultural land which could be returned to the holding following construction is also presented. The agricultural holdings are shown on Figure 12.4 (TR010038/APP/6.2).

Temporary construction effects

12.10.35 Holding 1 has land impacted by the Proposed Scheme on both the north and south sides of the existing A47. Access to both areas would be maintained throughout construction. Temporary land-take of 20ha would be required, which equates to 4% of the area of the total holding. The impact on holding 1 has been identified as having a **negligible** magnitude of temporary impact, therefore the residual effect is considered to be **Slight adverse**.

12.10.36 Holding 2 would have a temporary land-take of over 12ha. This equates to circa 3% of the total holding. Access to the unaffected areas will not be impacted. A Countryside Stewardship Higher Level agreement exists on the land⁷. Details are not known about the nature of the options in this agreement. Many of the options within the Higher Level agreement are rotational so it is possible they can be moved away from the construction works. However, some options are fixed and may be impacted by the Proposed Scheme. The impact on holding 2 has been identified as having a **negligible** magnitude of temporary impact; as a result, the residual effect is considered to be **Slight adverse**.

12.10.37 The land impacted by the Proposed Scheme, identified as holding 3, forms part of a 25 year Farm Business Tenancy (FBT), which commenced in 2008. The

⁷ Farmers are paid to carry out certain environmental actions on their farmland through the scheme and failure to meet the obligations of the agreement may result in a reduction in the annual payment.

area of land subject to this tenancy is 50ha; however, the total holding size is circa 157ha. Temporary land-take for the holding equates to nearly 17ha, which is 31% of the tenanted area and 11% of the total holding. A Countryside Stewardship Mid-Tier agreement exists on the land. The Proposed Scheme would require removal of mature hedgerows, which are a fixed option under the holding's agreement. Holding 3 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.38 Direct access from the A47 to holding 4 would be severed. However, access has been redesigned to allow entry from Mattishall Lane to infrastructure sited on the land. This is required for a non-agricultural enterprise sited in Drayton. The land forms part of a 8ha small holding, which supports hay making and some game shooting. Construction of the Proposed Scheme would result in a temporary land-take of approximately 2.5ha, which equates to 31% of the total agricultural holding. The impact on holding 4 has been identified as having a **moderate** magnitude of temporary impact, therefore the residual effect is considered to be **Moderate adverse**.

12.10.39 Access to holding 5 from the existing A47 is located 300m from the farm drive. The existing A47 would remain operational for the duration of the construction works; however, temporary traffic management measures are likely to temporarily have an adverse effect on agricultural operations. Temporary land-take of 13.75ha will be required, which is estimated to equate to 11% of the total holding. The impact on holding 5 has been identified as having a **minor** magnitude of temporary impact, the residual effect is considered to be **Moderate adverse**.

12.10.40 Holding 6 would be subject to a temporary land-take of circa 16ha. This equates to circa 3% of the total holding. The land is remote to the main holding and has been traditionally let for specialist cropping. The Proposed Scheme may affect the viability of the affected fields but will have a minor impact on the wider holding. All access points to the remaining field areas are within the DCO boundary. New access will have to be created, which may mean the removal of mature hedgerow or fencing. Holding 6 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.41 Holding 7 would have a total land-take of 62ha during the construction period. This equates to approximately 10% of the total holding. Access to remaining agricultural land can be taken from the north. A Countryside Stewardship Mid-Tier agreement exists on the land, but it is not known whether any fixed options will be affected by the Proposed Scheme. The impact on holding 7 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

- 12.10.42 The land and infrastructure associated with holding 8 will be fully severed by the Proposed Scheme. As both land and infrastructure will be inaccessible, the full land area of 3.54ha will be permanently taken. This is likely to have an adverse impact upon the turnover and profitability of the farming enterprise. As a questionnaire was not received from the landowner or occupier it is unknown how this will impact on the viability of the wider holding. As holding 8 has a **major** magnitude of permanent impact, the residual effect is considered to be **Very Large adverse**.
- 12.10.43 The land impacted by the Proposed Scheme, farmed by holding 9, is part of 72ha area subject to a separate tenancy. This tenanted area is 13 miles from the main holding. The temporary land-take is nearly 55ha, which equates to 76% of the tenanted block and 13% of the total holding area. As a result, the Proposed Scheme will have an adverse impact on the turnover and profitability of the holding and the viability of the tenancy. Holding 9 has been identified as having a **minor** magnitude of temporary impact on the wider agricultural holding. As a result, the residual effect is considered to be **Moderate adverse**.
- 12.10.44 Currently holding 10 can be accessed from the existing A47 and Berrys Lane; however, the farm's infrastructure is sited on the A47 access drive, which would be severed once construction commences. Heavy machinery access is required for delivery of agricultural inputs, contracting services and timber movements. There is also potential that the private reservoir, sited next to the existing A47 would be severed or that the pipeline would need to be diverted. This is fed by a borehole on the holding and is the only source of water for the holding's agricultural livestock buildings. An uninterrupted water source is necessary for ongoing agricultural operations. The construction of the Proposed Scheme would result in a temporary land-take of approximately 12ha, which equates to 27% of the total agricultural holding. This could potentially have an adverse impact upon the turnover and profitability of the farming enterprise. As holding 10 has been identified as having a **moderate** magnitude of temporary impact, the residual effect is considered to be **Large adverse**.
- 12.10.45 The land impacted by the Proposed Scheme, identified as holding 11, forms part of an FBT that commenced in 2010. The duration of the tenancy was not provided by the landowner. Approximately 2.5ha of land used within a standard arable rotation will be taken during the construction phase of the Proposed Scheme. This equates to 9% of the total area included within the FBT. Holding 11 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.
- 12.10.46 A total-land-take of less than 1ha will be required from holding 12 during the construction period. This equates to circa 27% of the total holding. The land is let on an ongoing, informal cropping arrangement to a neighbouring farmer who uses it as part of a standard cereal and legume rotation. Access to the remaining

parcel area is taken from the existing A47. Holding 12 has been identified as having a **moderate** magnitude of temporary impact. As a result, the residual effect is considered to be **Moderate adverse**.

12.10.47 As part of the Proposed Scheme a new access lane is being created for a private property from Fox Lane. This would require a total land-take of circa 1.5ha from holding 13. This equates to less than 1% of the area of the total holding. However, nearly 370m of mature shelter belt may also need to be removed to accommodate the Proposed Scheme. The existing access will be severed; however, a new field mouth has been designed to facilitate access to the remaining field area from Fox Lane. The temporary impact to holding 13 has been identified as having a **minor** magnitude. As a result, the residual effect is considered to be **Slight adverse**.

12.10.48 Direct access to holding 14 would be severed by the Proposed Scheme. Alternative access via single track roads will be possible via Fox Lane. The total land-take required during construction would be less than 1ha; however nearly 290m of mature shelter belt will need to be removed to accommodate the Proposed Scheme. Holding 14 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Moderate adverse**.

12.10.49 There is limited publicly available information on holding 15. As a result, an assessment of the potential impact on viability due to temporary land loss has been made on the basis of the size of an average farm in the area. A total land-take of circa 2.5ha will be required during the construction period. This would be unlikely to impact upon the viability of an average agricultural holding. Holding 15 has been identified as having a **negligible** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.50 There is limited publicly available information on holding 16; however, from land records it appears that it is occupied by the owners of holding 6. As no questionnaire was received, this cannot be confirmed. As a result, an assessment of the potential impact on viability due to temporary land loss has been made on the basis of the size of an average farm in the area. A total land-take of circa 7ha will be required and access will be severed during the construction period. This may potentially have an adverse impact on turnover and profitability. Holding 16 has been identified as having a **minor** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.51 There is limited publicly available information on holding 17. As a result, an assessment of the potential impact on viability due to temporary land loss has been made on the basis of the size of an average farm in the area. A total land-take of approximately 1ha would be required during the construction period. This

would be unlikely to impact upon the viability of an average agricultural holding. Access would continue during construction. Holding 17 has been identified as having a **negligible** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.52 There is limited publicly available information on holding 18. As a result, an assessment of the potential impact on viability due to temporary land loss has been made on the basis of the size of an average farm in the area. A total land-take of approximately 3ha would be required during the construction period and access would be severed to the remaining 2ha of the parcel. This is unlikely to impact upon the viability of an average agricultural holding. Holding 18 has been identified as having a **negligible** magnitude of temporary impact. As a result, the residual effect is considered to be **Slight adverse**.

12.10.53 Table 12.14 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.14: Agricultural land holdings residual construction effects

Holding name	Sensitivity to change	Total area required during construction (ha)	Construction severance	Magnitude of Impact	Residual effects	Area to be restored to agriculture (ha)
1	High	20.37	Minor	Negligible	Slight adverse	1.77
2	High	12.30	Negligible	Negligible	Slight adverse	7.55
3	High	16.96	Negligible	Minor	Slight adverse	7.42
4	High	2.49	Moderate	Moderate	Moderate adverse	0.00
5	Very high	13.76	Moderate	Minor	Moderate adverse	0.59
6	High	16.04	Minor	Negligible	Slight adverse	8.26
7	High	62.63	Minor	Minor	Slight adverse	32.71
8	Very high	3.54	Major	Major	Very large adverse	0.00
9	High	54.99	Medium	Minor	Moderate adverse	21.87
10	Very high	12.17	Major	Moderate	Large adverse	9.33
11	High	2.48	Minor	Minor	Slight adverse	0.67
12	High	0.88	Minor	Moderate	Moderate adverse	0.31
13	High	1.43	Negligible	Minor	Slight adverse	0.50

Holding name	Sensitivity to change	Total area required during construction (ha)	Construction severance	Magnitude of Impact	Residual effects	Area to be restored to agriculture (ha)
14	Very high	0.55	Minor	Minor	Moderate adverse	0.25
15	High	2.58	Negligible	Negligible	Slight adverse	0.99
16	High	7.11	Moderate	Minor	Slight adverse	1.48
17	High	1.32	Negligible	Negligible	Slight adverse	0.00
18	High	3.11	Negligible	Negligible	Slight adverse	0.45

Permanent construction effects

12.10.54 The permanent effects from the construction of the Proposed Scheme on individual land holdings is outlined below and summarised in Table 12.14. The scale of effect is based on the proportion of land required from the individual holdings.

12.10.55 Holding 1 has land impacted on both the north and south sides of the Proposed Scheme with a permanent land-take of nearly 19ha. This equates to 4% of the wider holding. The Proposed Scheme is unlikely to impact on the long-term viability of the holding but may impact on turnover and profitability. As holding 1 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.56 Around 4.7ha of permanent land-take near Easton will be required from holding 2. This equates to less than 1% of the total holding area. The Proposed Scheme is unlikely to impact upon the viability of the holding. As holding 2 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.57 As a result of the Proposed Scheme, 9.5ha of agricultural land will be permanently taken from holding 3. This equates to 19% of the tenanted area and 6% of the total holding. The Proposed Scheme is unlikely to impact on the long-term viability of the holding but may impact on turnover and profitability. As holding 3 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.58 Holding 4 would be subject to a permanent land-take of 2.5ha, which equates to 31% of the total holding size. This is likely to adversely impact on the future viability of the agricultural holding. Access from the existing A47 would be severed and a new one created off Mattishall Lane. This will allow continued access to infrastructure required for a non-agricultural enterprise. As holding 4 is identified as having a **moderate** magnitude of permanent impact, the residual effect is considered to be **Moderate adverse**.

- 12.10.59 Holding 5 will be subject to a permanent land-take of 13ha of agricultural land. This equates to 10% of the total holding area and is likely to adversely impact on the turnover and profitability of the business. Access to the existing A47 will be retained via Hockering junction. The impact to holding 5 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.
- 12.10.60 As a result of the Proposed Scheme, 8ha of agricultural land will be permanently taken from holding 6. This equates to 1% of the total holding area. Holding 6 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.
- 12.10.61 Around 30ha of agricultural land between Honingham and Easton will be permanently taken from holding 7. This equates to 5.5% of the total holding area. Access to remaining land areas should still be achievable from the north. The Proposed Scheme is unlikely to impact on the long-term viability of the holding but may impact on turnover and profitability. As holding 7 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.
- 12.10.62 While the permanent land-take associated with holding 8 is small, the Proposed Scheme will cause permanent severance to key infrastructure. There is limited publicly available information on holding 8 and no questionnaire was received, so it is not clear what the impact of the Proposed Scheme will have on the wider holding. However, no alternative access arrangements are proposed to be made so it is highly likely that the future viability of the holding will be adversely impacted. As the impact to holding 8 is identified as having a **major** magnitude of permanent impact, the residual effect is considered to be **Very Large adverse**.
- 12.10.63 Holding 9 has a 72ha Farm Business Tenancy, of which, 33ha will be permanently taken by the Proposed Scheme. This equates to 46% of the tenancy area or 8% of the wider holding. This will adversely impact on the future viability of the tenancy, particularly due to the distance of the tenanted land to the main holding. As the impact to holding 9 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Moderate adverse**.
- 12.10.64 Around 3ha of mature shelter belt and arable land will be required to be permanently taken from holding 10 to accommodate the Proposed Scheme north of Berrys Lane. This equates to 7% of the total holding area. The Proposed Scheme is unlikely to impact on the long-term viability of the holding but may impact on turnover and profitability; however, some moderation to day to day operations may be required to mitigate for heavy lorry access. The impact to

holding 10 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.65 Approximately 2ha of agricultural land will be permanently taken from holding 11 to accommodate the Proposed Scheme. This equates to 7% of the total holding area. This is unlikely to impact on the long-term viability of the holding. As holding 11 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.66 Only a small area of 0.6ha of agricultural land will be permanently taken from holding 12. However, this equates to 16% of the total agricultural holding. This is unlikely to impact on the long-term viability of the holding. As a result, the impact to holding 12 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.67 Less than 1ha of mature shelter belt and agricultural land will be permanently taken from holding 13 to accommodate the new A47 and an access track for a private property. This equates to less than 1% of the total agricultural holding. As a result, the impact on holding 13 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.68 Following completion of construction there will be a permanent agricultural land-take of less than 1ha from holding 14; however, 290m of mature shelter belt will be removed. As the impact to holding 14 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.69 Approximately 1.6ha of agricultural land and mature hedgerow will be permanently taken from holding 15. This equates to 2% of an average sized farm. This is highly unlikely to adversely impact on the future viability of the holding. As holding 15 is identified as being a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.70 The Proposed Scheme will result in 5.6ha of permanent land-take of arable land. This equates to 5% of an average sized farm. This is unlikely to adversely impact on the future viability of the holding. As a result, the impact on holding 16 is identified as having a **minor** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.71 Around 1ha of agricultural land will be permanently taken from holding 17. This equates to less than 1% of an averaged sized farm. This is highly unlikely to adversely impact on the future viability of the holding. As holding 17 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.72 Around 2.5ha of agricultural land will be permanently taken from holding 18. This equates to circa 2% of an average sized farm so it is unlikely to adversely impact

on the future viability of the holding. As holding 18 is identified as having a **negligible** magnitude of permanent impact, the residual effect is considered to be **Slight adverse**.

12.10.73 Table 12.15 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.15: Summary of permanent effects on agricultural holdings

Holding Name	Sensitivity to Change	Land removed from holding (ha) (and % of total size)	Permanent Severance	Magnitude of Impact	Residual Effect
1	High	18.59 (4)	Negligible	Negligible	Slight adverse
2	High	4.74 (<1)	Negligible	Negligible	Slight adverse
3	High	9.54 (6)	Minor	Minor	Slight adverse
4	High	2.49 (31)	Minor	Moderate	Moderate adverse
5	Very high	13.16 (10)	Minor	Minor	Slight adverse
6	High	7.77 (1)	Negligible	Negligible	Slight adverse
7	High	29.91 (5.5)	Negligible	Negligible	Slight adverse
8	Very high	3.54 (3)	Major	Major	Very large adverse
9	High	33.11 (8)	Minor	Moderate	Moderate adverse
10	Very high	2.83 (7)	Negligible	Minor	Slight adverse
11	High	1.80 (11)	Minor	Minor	Slight adverse
12	High	0.57 (12)	Minor	Minor	Slight adverse
13	High	0.93 (<1)	Negligible	Negligible	Slight adverse
14	Very high	0.30 (<1)	Negligible	Negligible	Slight adverse
15	High	1.58 (2)	Negligible	Negligible	Slight adverse
16	High	5.63 (5)	Negligible	Minor	Slight adverse
17	High	1.31 (<1)	Negligible	Negligible	Slight adverse
18	High	2.65 (<1)	Negligible	Negligible	Slight adverse

Walkers, Cyclists and Horse-riders

12.10.74 The Proposed Scheme would likely result in the diversion or temporary closure of some routes during construction, which would become permanent diversions and closures during operation of the Proposed Scheme.

- 12.10.75 Construction of the Proposed Scheme would permanently remove the combined footway/cycleway linking between Main Road and The Street to the west of Hockering. This would have a **major** impact on users. However, a replacement facility would be provided adjacent to the new side road alignment between Main Road and the existing A47 alignment at Hockering. This combined footway/cycleway provides a good quality route for pedestrians and cyclists. When considering mitigation, the magnitude of the potential impact is **negligible** since the provision of the new facility would result in less than a 50m change in journey length. Effects are therefore assessed as permanent **Slight adverse**.
- 12.10.76 The Proposed Scheme would have a **major** impact on users of Hockering FP12 since it would permanently remove this facility. Hockering FP12 has been identified as being a very short section of footpath which does not offer a meaningful route for either utility or recreational purposes since it does not connect to other routes in the area. Effects are therefore assessed as permanent **Slight adverse** given that this footpath does not offer a meaningful route for any potential users.
- 12.10.77 The Proposed Scheme would upgrade the existing footway along the southern frontage of the A47 alignment in the vicinity of Mattishall Lane to a combined footway/cycleway following the route of Mattishall Lane Link Road. This footway provides a route between the existing residential properties on Mattishall Lane and Hockering village and is well used. The magnitude of the impact is **no change** as the journey length would be unchanged. Effects are therefore assessed as **Neutral**.
- 12.10.78 The severance of Hockering FP7 would have a **major** impact on users during the construction period. In the future, users making a trip between Hockering and East Tuddenham or following the circular walk along the banks of the River Tud, formed by Hockering FP7, Hockering FP8 and East Tuddenham FP9, would need to access via the proposed new footway/cycleway to be provided on Mattishall Lane Link Road. For some users, the resulting increase in journey length would be in excess of 500m. Hockering FP7 has been observed usage as having a very low usage and the trips being for recreational purposes only. The magnitude of the impact is **major** as severing the route would result in a permanent increase in journey length in excess of 500m for users. Effects are therefore assessed as permanent **Moderate adverse** given the very low usage of this recreational route.
- 12.10.79 A very short section of Hockering FP8, where it connects to Hockering FP7, may need to be permanently stopped up and diverted to accommodate the Proposed Scheme, although, journey length is unlikely to change. Hockering FP8 has been identified as being used for recreational purposes. The magnitude of the impact is **no change** since an increase in journey length is not anticipated. Effects are therefore assessed as **Neutral**.

- 12.10.80 The Proposed Scheme would require the permanent stopping up and diversion of a section of Honingham RB1. With the mitigation in place, users making a trip between Wood Lane and Dereham Road would be diverted along an existing track to connect with a new combined footway/cycleway that starts at the Wood Lane roundabout and then runs parallel to the eastbound on slip road and under the new A47 alignment via the proposed Hall Farm underpass. The route then connects to a combined footway/cycleway to be provided on the existing A47 alignment, which would be downgraded. Users would then make use of this shared facility to re-join the existing alignment of Honingham RB1 for an onward connection to Dereham Road. Although the resulting increase in journey length would be in excess of 500m, the proposed underpass would facilitate the safe crossing of the new A47 alignment for users. Honingham RB1 has been observed as having very low usage levels and the trips being for recreational purposes only. The permanent increase in journey length would be in excess of 500m and this suggests that the magnitude of the impact is **major**. However, taking account of the amenity, reduced severance and potential road safety benefits associated with the provision of the underpass and applying professional judgement, the magnitude of the impact has been reduced to **moderate**. Effects are therefore assessed as permanent **Moderate adverse** given the very low usage of this recreational route.
- 12.10.81 The Proposed Scheme would upgrade the existing footway along the northern frontage of the A47 alignment in the vicinity of St Andrew's Church to a combined footway/cycleway. This footway is segregated from the carriageway and provides access to St Andrew's Church from Honingham via Honingham Church underpass. The magnitude of the impact is **no change** as the journey length would be unchanged. Effects are therefore assessed as **Neutral**.
- 12.10.82 The existing A47/Dereham Road/Church Lane roundabout at Easton and the uncontrolled pedestrian crossings would be permanently removed as part of the Proposed Scheme. However, a new Easton footbridge, suitable for pedestrians and cyclists, would be provided to facilitate the safe crossing of the new A47 for movements between Dereham Road and Church Lane, north of the A47. The uncontrolled pedestrian crossings and the connecting footway on Dereham Road provide access to local amenities and the footpath which commences to the north of the A47. The crossings are also used by pedestrians and cyclists. The permanent increase in journey length would be approximately 120m and this suggests that the magnitude of the impact is **minor**. However, taking account of the amenity, reduced severance and potential road safety benefits associated with the provision of the overbridge and applying professional judgement, the magnitude of the impact has been reduced to **negligible**. Effects are therefore assessed as permanent **Slight adverse**.

12.10.83 The provision of the new Easton footbridge for pedestrians and cyclists at Easton would facilitate the permanent closure of the existing uncontrolled crossing of the A47 between Ringland Lane and Dog Lane. This uncontrolled crossing provides a connection between the residential area of Easton village and Ringland Lane (known as Dog Lane) to the north of the A47 and is used by both pedestrians and cyclists. The permanent increase in journey length for some users would be approximately 420m and this suggests that the magnitude of the impact is **moderate**. However, taking account of the amenity, reduced severance and potential road safety benefits associated with the provision of the overbridge and applying professional judgement, the magnitude of the impact has been reduced to **minor**. Effects are therefore assessed as permanent **Moderate adverse**.

12.10.84 The Proposed Scheme would have **no change** on the other WCH facilities identified in Table 12.6. Effects are therefore assessed as **Neutral**.

12.10.85 Table 12.16 outlines the assessment of significant effects. Those residual effects in bold are considered to be significant (moderate and above).

Table 12.16: Residual effects on WCH during construction

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Permanent removal of the combined footway/cycleway linking between Main Road and The Street, to the west of Hockering	High	Major	Large adverse	Slight adverse
Stopping up of Hockering FP12	Low	Major	Slight adverse	Slight adverse
Upgrade to existing footway on A47 at Mattishall Lane	High	No change	Neutral	Neutral
Severance of Hockering FP7	Medium	Major	Moderate adverse	Moderate adverse
Stopping up of Hockering FP8	Medium	Major	Large adverse	Neutral
Stopping up of Honingham RB1	Medium	Major	Large adverse	Moderate adverse
Upgrade to existing footway on A47 in vicinity of St Andrew's Church	High	No change	Neutral	Neutral
Closure of uncontrolled crossings at Easton roundabout	High	Major	Large adverse	Slight adverse

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Closure of uncontrolled crossing at Ringland Lane/ Dog Lane, Easton	High	Major	Large adverse	Moderate adverse

Human Health

12.10.86 Effects of construction on human health determinants are described in Table 12.17.

Table 12.17: Residual construction effects on human health

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
Access to healthcare facilities	During the construction of the Proposed Scheme, traffic management and the increase in construction traffic to the area would temporarily restrict traffic movements. However, diversions would be provided as part of the mitigation for the Proposed Scheme, therefore access to healthcare facilities would be retained. The temporary change in access is not considered to have a detrimental effect to the human health of the communities and therefore the health outcome is assessed as neutral.	Neutral
Access to community, recreation and education facilities	<p>Hockering FP12, Hockering FP8, Honingham RB1 would be permanently stopped up as a result of the Proposed Scheme as assessed under WCH. Hockering FP8, Honingham RB1 would be diverted as part of the Proposed Scheme. There would be a permanent removal of the combined footway/cycleway between Main Road and The Street. The Proposed Scheme would also result in the permanent severance of FP7 and the closure of uncontrolled crossings at both Easton roundabout and Ringland Lane / Dog Lane.</p> <p>Physical inactivity is a primary contributor to a wide range of chronic diseases including, but not limited to, coronary heart disease, stroke and diabetes. Physical activity is important for the mental health of the population and helps to prevent obesity, therefore any temporary stopping up of paths during construction would potentially have negative impacts to human health.</p> <p>Where possible, mitigation measures have been proposed to ensure paths are maintained throughout the construction period, by using diversion routes. This would be agreed with the local authority and would reduce any adverse effects. It is not predicted that any temporary works would have a significant effect on population and human health as a result of changes to access and local networks, therefore the health outcome is assessed as neutral.</p>	Neutral
Access to green and open space	<p>During construction, access to green and open space would be maintained by the existing A47 and local roads. Mitigation would be in place to reduce impacts from construction traffic through the Traffic Management Plan (TMP) (TR010038/APP/7.5).</p> <p>As access to green and open space would be maintained during the construction of the Proposed Scheme, the health outcome of construction of the Proposed Scheme on access to green and open space is assessed to be neutral.</p>	Neutral

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
<p>Existing and predicted levels of air and noise pollution</p>	<p>There is the potential for residents and members of the communities to be temporarily affected by increases of noise or dust disturbance during the construction period.</p> <p>The noise generating activities associated with construction include vehicle movements such as HGVs and heavy machinery, all of which could increase noise and vibration impacts for residents or members of the community. Temporary noise barriers would help to reduce these impacts, however negative health effects may be experienced by some communities due to the noise created by construction activities.</p> <p>Subject to the use of temporary and permanent noise barriers, construction noise monitoring and mitigation measures, one receptor has been identified to be significantly affected by noise from construction and construction traffic. Acorn Barn, on Lyng Road will be significantly affected. A moderate residual effect is predicted from drainage basin works, predicted to last approximately 2 months for each drainage basin. Details regarding how long each item of plant would be operational is currently unconfirmed. The works would result in predicted significant residual effects where these construction activities take place for 10 or more days or nights in any 15 consecutive days or nights, or for a total number of days exceeding 40 in any 6 consecutive months.</p> <p>Further detailed assessments will be undertaken by the Principal Contractor where there is potential for moderate or major residual impacts at a large number of residential properties during tie-in works which will occur at night and/or weekends.</p> <p>The Principal Contractor is required to submit Section 61 prior consent to the Local Authority due to identified significant effects.</p> <p>Construction vibration is not expected to result in significant effects at any vibration-sensitive receptors.</p> <p>Mitigation measures for the construction of the Proposed Scheme are provided in ES Chapter 5 (Air quality) (TR010038/APP/6.1) and in the EMP (TR010038/APP/7.4). When mitigation measures are implemented during the construction phase of the Proposed Scheme, fugitive emissions of dust from the construction site would be monitored and managed appropriately and as such should not cause significant nuisance at nearby receptors. The conditions would be monitored by checking the weather conditions and identifying those activities where fugitive dust emissions could be generated. Measures to minimise the impacts would be implemented and actioned as appropriate and regularly reviewed. With mitigation measures in place, no receptors have been identified as significantly affected by the Proposed Scheme.</p> <p>The change in HGV traffic would not remain constant for the period of construction and is predicted to vary depending on the construction programme. All traffic associated with construction would be managed via a TMP (TR010038/APP/7.5) which would aim to route traffic away from sensitive receptors (where possible) and schedule deliveries outside of peak times if possible.</p> <p>Therefore the health outcome of changes to air quality and noise disturbance during construction of the Proposed Scheme is assessed to be neutral.</p>	<p>Air quality: Neutral</p> <p>Noise: Negative</p>
<p>Landscape amenity</p>	<p>During construction of the Proposed Scheme, there is potential for visual receptors to experience significant effects as described in ES Chapter 7 (Landscape and visual effects) (TR010038/APP/6.1), therefore potentially resulting in changes to health determinants and health outcomes.</p>	<p>Neutral</p>

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
	<p>Receptors include residents, those using PRoW and the views from the road.</p> <p>ES Chapter 7 (Landscape and visual effects) (TR010038/APP/6.1) assessment concludes that after mitigation, there are twelve residential receptors expected to experience large or moderate adverse construction visual effects. These consist of Oak Farm, Hill View properties, Newgate House, Sycamore Farm Properties, properties beside Sandy Lane, Berry Hall properties, Merrywood House, a property at the western extent of Honingham, Hall Farm, Hall Farm Cottages and properties opposite Church Plantation.</p> <p>PRoW receptors have been identified which would experience large or moderate adverse construction effects and road receptors would experience large or moderate adverse construction visual effects. This would typically associate with views from the existing A47.</p> <p>Significant adverse visual affects during construction as described in ES Chapter 7 (Landscape and visual effects) (TR010038/APP/6.1) would be temporary. Therefore, the health outcome of construction of the Proposed Scheme on landscape amenity as a determinant of human health is assessed to be neutral.</p>	
Sources and pathways of potential pollution (e.g. land/ water contamination)	<p>ES Chapter 9 (Geology and soils) (TR010038/APP/6.1) has identified impacts to health as a result of construction of the Proposed Scheme to be Neutral to Slight Adverse. This includes users and occupiers of the A47 and adjacent land areas (agricultural fields, paths), construction workers and off-site residential receptors. Health concerns consist of direct contact with, inhalation or ingestion of contaminated soils, dusts and inhalation of ground gases/ vapours.</p> <p>Mitigation during the works has been outlined in the EMP (TR010038/APP/7.4) and will ensure the monitoring of ground gases and vapours in confined spaces, and that suitable personal protective equipment (PPE) and hygiene practices for construction and maintenance workers will be provided and upheld throughout the construction period.</p> <p>The health outcome of exposure to sources and pathways of potential pollution as a result of the Proposed Scheme is considered to be neutral.</p>	Neutral
Safety	The construction of the Proposed Scheme is not considered to have any impact to the safety of communities or individual residents.	Neutral

Human health questionnaires

12.1.1. Human health questionnaires were provided during the statutory consultation events to highlight the key points consultees would like to make on the Proposed Scheme, with regards to human health. A summary of the key themes raised is provided in Table 12.18. Appendix 12.1 (TR010038/APP/6.3) provides information on all the responses.

Table 12.18: Human health questionnaire responses incorporated into Proposed Scheme design

Question	Response theme	Incorporation of responses to Proposed Scheme design
1	<ul style="list-style-type: none"> Dangerous crossing the A47 to access Hockering both as a pedestrian and in a vehicle 	<ul style="list-style-type: none"> An underpass will be provided from Mattishall Lane to Hockering which will improve safe access to Hockering

Question	Response theme	Incorporation of responses to Proposed Scheme design
	<ul style="list-style-type: none"> • Pedestrian access to Lower Easton is dangerous • Travelling in direction of Dereham is dangerous • Prevalence of rat-running, especially noted in Lower Easton 	<ul style="list-style-type: none"> • New overbridge for walkers and cyclists to be provided from Church Lane to cross A47 access Easton • New dualled A47 will provide improved access, safer junctions and traffic calming measures <p>The stopping up of various roads to become access only, such as Blind Lane and Church Lane, will help to reduce rat-running in Lower Easton. There will be only two points of access onto the A47 at the proposed Wood Lane junction and proposed Norwich Road junction to aid continuous traffic flow, encouraging the use of the proposed A47.</p>
2	<ul style="list-style-type: none"> • Potential damage to the environment (open space, River Tud) as a result of the Proposed Scheme, especially if Berrys Lane junction remains open • Difficult to access open space as a pedestrian 	<ul style="list-style-type: none"> • Environmental issues and damage to the River Tud mitigated, see ES Chapter 13 (Road drainage and the water environment) (TR010038/APP/6.1). • Berrys Lane junction to be stopped up. • Existing WCH routes to Hockering Wood to be maintained
3	<ul style="list-style-type: none"> • Proposed Scheme would make it difficult to access GP surgery and shops in Mattishall. Road between Hockering and Mattishall should be kept open. Closure of Mattishall Lane could affect traffic on Mill Road. • Closure of Mattishall Lane could result in more traffic onto road west of Hockering leading from current bridge over the A47. • Removal of roundabout at Easton would make it difficult to access GP surgery and shops at Roundwell/ Longwater. 	<ul style="list-style-type: none"> • Mattishall Lane to be stopped up however underpass to existing A47 to be provided to ensure safe access • Access to A47, Church Lane and Dereham Road maintained with proposals to removal the roundabout. Norwich Road junction has been proposed to the west of the current Easton roundabout which will allow access to Dereham Road.
4	<ul style="list-style-type: none"> • Maintain/ improve access to Mattishall and Dereham • Underpass required from Hockering to Mattishall Lane • Maintain footpath access to St Andrew's Church 	<ul style="list-style-type: none"> • New dualled A47 will provide improved access, safer junctions and traffic calming measures • An underpass from Mattishall Lane to Hockering provided as part of the Proposed Scheme
5	<ul style="list-style-type: none"> • Underpass from Lower Easton to Easton Village • Measures to stop speeding • Existing A47 to be maintained for walkers and cyclists • Provision of safe walking and cycling facilities north of Mattishall 	<ul style="list-style-type: none"> • Existing A47 to be maintained, and additional WCH routes provided on Proposed Scheme
6	<p>Noise concerns:</p> <ul style="list-style-type: none"> • Concerns over noise increases in Honingham and East Tuddenham and Lower Easton, Rotten Row and Church Lane 	<ul style="list-style-type: none"> • Noise and visual screening to be provided in Hockering, identified as area of issue in noise assessment (ES Chapter 11(Noise and vibration) (TR010038/APP/6.1))
7	<p>Air quality concerns:</p> <ul style="list-style-type: none"> • Honingham and Lower Easton 	<ul style="list-style-type: none"> • Air quality assessment has not found these areas to result in significant air quality effects from the

Question	Response theme	Incorporation of responses to Proposed Scheme design
	<ul style="list-style-type: none"> Sycamore Farm Church Lane East Tuddenham Rotten Row, Church Lane and Dereham Road 	Proposed Scheme (ES Chapter 5 (Air quality) (TR010038/APP/6.1))
8	<ul style="list-style-type: none"> Increase height of verges and soundproof fencing for air quality and noise issues Tree planting and landscaping to reduce carbon footprint and noise Keep Mattishall Lane open 	<ul style="list-style-type: none"> Noise and visual screening to be provided in Hockering, identified as area of issue in noise assessment Landscaping included as part of Proposed Scheme, see ES Chapter 7 (Landscape and visual effects) (TR010038/APP/6.1) An underpass from Mattishall Lane to Hockering provided as part of the Proposed Scheme
9	<ul style="list-style-type: none"> Light pollution at new junctions 	<ul style="list-style-type: none"> Lighting will be provided at the two proposed grade separated junctions.

Operation

Land use and accessibility

Private property and housing

12.10.87 There would be no permanent property demolition or loss of curtilage of properties as a result of the Proposed Scheme. All private properties would have an access maintained, however there might be a change in journey length for some properties as a result of the Proposed Scheme. The Proposed Scheme would include altered and newly formed accesses to private properties where required. Where the access is altered as a part of the construction, this has been assessed as part of the construction assessment.

12.10.88 Permanent impacts on private property and housing resulting from land-take or a change in access are reported under construction. No further impacts on private property and housing are anticipated during operation of the Proposed Scheme.

12.10.89 Private properties in Hockering and residential properties located at the Mooney Demolition site would not experience a change in journey length, as access to the existing A47 will remain the same. This involves accessing via The Street for properties in Hockering and directly onto the existing A47 for properties at the Mooney Demolition site.

12.10.90 Residents of private property on The Street, Hall Drive and Dereham Road, south east of the proposed Wood Lane junction, can still access the existing A47 via Hall Drive therefore there is no alteration in journey length.

Community land and assets

12.10.91 Access to the existing A47 from the following community facilities in Hockering would not change as a result of the Proposed Scheme, due to them still retaining

the same access to the existing A47: Hockering Church of England Primary School, Hockering Village Hall, Victoria Inn Public House, Hockering Nursery, Hockering Post Office and shop. The proposed Mattishall Lane Link Road will ensure continued access to facilities such as Hockering Nursery on the opposite side of the A47 to Hockering Village. The magnitude of the impact is identified as **no change**, therefore the effect is **Neutral**.

12.10.92 Access to the existing A47 from Honingham Village Hall and Honingham St Paul's Chapel will not change as a result of the Proposed Scheme, due to them still retaining the same access to the existing A47 via Hall Drive. The magnitude of the impact is identified as **no change**, therefore the effect is **Neutral**.

12.10.93 Whilst the existing A47 will be severed between Blind Lane and Easton roundabout, access to St Peter's Church, the Diocese of Norwich Church of England, Easton Village Hall, St Peter's Church of England Primary School, and Easton Post Office from the Proposed Scheme will be retained due to the connection from the proposed Norwich Road junction to Dereham Road, Easton. Therefore, the magnitude of the impact is identified as **no change** and the effect is **Neutral**.

Development land and businesses

12.10.94 Whilst the section of the existing A47 between Blind Lane and Easton would be severed as part of the Proposed Scheme, the following businesses located in Easton will be able to access the Proposed Scheme from Dereham Road due to the new side road connection to the proposed Norwich Road junction using the existing A47: Easton Guesthouse, Adams Automotive Engineering, Rembrandt, System Driving School. Therefore, the magnitude of the impact is identified as **no change** and the effect is **Neutral**.

Agricultural land holdings

12.10.95 Permanent effects on agricultural holdings are reported under construction effects. No further effects on agricultural holdings are anticipated during the operation of the Proposed Scheme.

Walkers, Cyclists and Horse-riders

12.10.96 Some sections of the carriageway of the existing A47 would be narrowed and the speed limit of the road would be reduced to reflect the lower levels of traffic that it would carry in the future. The provision of the various sections of new combined footway/cycleway would provide safer and more pleasant journeys for cyclists and pedestrians undertaking east to west trips between Hockering, Honingham and Easton. These new facilities would also facilitate the safe crossing on the new A47 for north to south trips, e.g. for trips between Hockering and Mattishall.

12.10.97 The embedded mitigation measures outlined in Section 12.9 would result in slight beneficial effects. These benefits would be experienced by pedestrians and cyclists travelling along the new footway and cycleways and the provision of safe crossing points at Mattishall Lane Link Road underbridge, Honingham Church underpass and the proposed Easton footbridge.

Human Health

12.10.98 Effects of operation on human health determinants are described in Table 12.19.

Table 12.19: Residual effects on human health

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
<p>Access to community, recreation and education facilitates</p>	<p>The provision of the footway and cycleway encourages the use of active travel which would improve active travel provision along the Proposed Scheme. This is predicted to result in a positive impact on population and human health. The footway and cycleway would provide access to areas of open space and is likely to encourage more people to access the area on foot or by bicycle, which has the potential to result in increased physical activity of the local population, and other users from other communities.</p> <p>The proposed Mattisall Lne Link Road underbridge would provide a safe crossing for WCH and maintain connectivity between the communities.</p> <p>Easton footbridge offers a new safer crossing of the A47 in the vicinity of the Easton roundabout (to be removed) which was previously an unsafe at grade crossing of the dual carriageway, as was the at grade crossing at Ringland Lane / Dog Lane, located further to the east.</p>	<p>Positive</p>
<p>Access to green and open space</p>	<p>Access to green and open space would be retained as a result of the Proposed Scheme with no change to access proposed. Reduced traffic flows on the existing A47 as a result of the Proposed Scheme would result in improved access to green/open space for local residents. As there is no change to access green and open space as a result of the Proposed Scheme the health effect would be neutral.</p>	<p>Positive</p>
<p>Existing and predicted levels of air and noise pollution</p>	<p>The operational effect of the Proposed Scheme on air quality is not anticipated to result in negative health effects on any receptors. The receptors experiencing a beneficial effect is due to a diversion of traffic flows away from receptor locations as a result of the Proposed Scheme in place</p> <p>No exceedances of NO₂ annual mean objective were estimated for the opening year of the Proposed Scheme. The greatest increase is expected at receptor 30 (Dereham Road, East Tuddenham) however the predicted mean NO₂ level is below the AQO of 40 µg/m³. The greatest improvement in annual mean concentrations is expected to occur at receptor 27 located on Meadow View in Hockering.</p> <p>The greatest increase in annual mean NO₂ concentration is expected to occur at receptor 43, located on Carsinal Close, Easton. However, the predicted annual mean concentration is well below the AQO of 40 µg/m³ in both the Do-minimum (DM) and Do-something (DS) scenarios.</p>	<p>Air quality: Neutral</p> <p>Noise: Negative (receptors experiencing significant adverse effects are mitigation)</p> <p>Noise: Neutral (receptors experiencing non-significant noise effects after mitigation)</p> <p>Noise: Beneficial</p>

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
	<p>Overall, 25 of the 49 receptors are expected to show a slight deterioration in air quality, with 24 showing an improvement in air quality with the Proposed Scheme in place. All concentrations are well below the AQO of 40 µg/m³. Therefore, the health outcome on air quality as a result of operation of the Proposed Scheme is assessed to be neutral.</p> <p>Adverse noise effects off-line may occur due to increases in traffic flows and speeds on other parts of the local road network. The following receptors (residential, community facilities and PRoW) Significant adverse noise effects are predicted at:</p> <ul style="list-style-type: none"> • Eighty-three receptors in Lyng or on Lyng Road (north of the A47); • Two receptors on Church Lane; • Six receptors on Mattishall Lane; • Hall Farm and Hall Farm Cottages; • St Andrew's Church, Honingham; • Hockering Nursery and Newgate, Gypsy Lane in Hockering; and • Two PRoWs in Hockering, one PRoW in East Tuddenham FP9, one PRoW in Honingham and three PRoWs in Lyng. <p>Significant adverse effects at 91 of the above receptors are due to traffic re-routing at locations where mitigation is not practical. Significant adverse effects at the remaining 15 receptors are due to the following:</p> <ul style="list-style-type: none"> • More road users choosing to access the improved A47 between North Tuddenham and Easton. • Significant effects remaining at some locations despite mitigation being included (i.e. due to the large increase in road traffic noise associated with the introduction of a high-speed dual carriageway into a rural area). • Some noise barriers are not provided for receptors far from the Proposed Scheme where the marginal benefits provided by a noise barrier does not affect the outcome of the assessment. Further mitigation is not proportionate or would result in adverse landscape and visual impacts. <p>Mitigation consisting of a low noise surface and four noise barriers have been included between these receptors and the Proposed Scheme, however significant adverse effects are still expected. The mitigation will provide a perceptible reduction in noise levels but the noise levels from a high speed dual carriageway in a rural location will be too high to be offset by this.</p> <p>Significant beneficial noise effects are predicted at;</p> <ul style="list-style-type: none"> • Noise Important Area 5200 • Three receptors in Hockering (outside of NIA 5200) • Two receptors on Ringland Road • Two receptors on The Broadway • Three PRoW: Hockering FP3, FP10 and FP11 	<p>(receptors experiencing beneficial effects)</p>

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
	Therefore, there are three health outcomes for the different noise receptors. For receptors experiencing no significant adverse noise effects during operation after mitigation, the outcome is neutral. For those experiencing adverse noise effects after mitigation, the outcome is negative. For noise receptors experiencing beneficial noise effects during operation, the outcome is beneficial.	
Landscape amenity	During operation of the Proposed Scheme, moderate or large significant adverse visual effects are expected as described in ES Chapter 7 (Landscape and visual effects) (TR010038/APP/6.1). No other receptors are expected to experience significant residual effects. However, at year 15 of operation, effects are expected to be significant at five residential properties. Therefore, significant adverse effects experienced during operation of the Proposed Scheme on landscape amenity as a determinant of human health is assessed to be neutral.	Neutral
Sources of pollution	Chapter 9 (Geology and soils) (TR010038/APP/6.1) has identified impacts to health as a result of operation of the Proposed Scheme to be Neutral. This includes users and occupiers of the A47. Health concerns consist of direct contact with, inhalation or ingestion of contaminated soils, dusts and inhalation of ground gases/ vapours. No mitigation measures or monitoring have been recommended during operation of the Proposed Scheme as no significant effects are identified in ES Chapter 9 (Geology and soils) (TR010038/APP/6.1). Therefore, the health outcome of exposure to sources and pathways of potential pollution as a result of the Proposed Scheme is considered to be neutral.	Neutral
Safety	The implementation of the proposed footway / cycleway along the length of the Proposed Scheme, the underbridge of Mattishall Lane, the underbridge at Honingham roundabout and the overbridge at Easton roundabout would facilitate safer access for walkers and cyclists. Due to improved travel options for WCH, the health outcome has been determined as positive.	Positive

12.11 Monitoring

- 12.11.1 Once built and operational the significant effects reported in Section 12.10 would be permanent and unchanging, therefore no monitoring would be required.
- 12.11.2 Monitoring will take place for receptors in which significant effects have been identified due to changes in noise and vibration, during construction and operation of the Proposed Scheme. For further detail please Chapter 11 (Noise and vibration) (TR010038/APP/6.1).
- 12.11.3 The maintenance of mitigation such as planting and seeding will continue for a period of five years before being handed over to the future maintaining authority for on-going highway maintenance.

12.12 Summary

- 12.12.1 Overall, impacts on population and human health are predominantly non-significant once the Proposed Scheme is operational.
- 12.12.2 For those travelling by vehicle to access private properties using the new A47 (the Proposed Scheme) by vehicle, benefits would be experienced in terms of journey time savings and safety for road users. Increases in journey length would occur to properties such as Berry Hall Cottages, and private properties on Church Lane, Rotten Row, Ringland Road and Dog Lane, and Hillcrest Cottage which would result in a **Moderate adverse** significant effect.
- 12.12.3 Permanent land-take from a small area of consecrated land owned by St Peter's Church in Easton would result in a **Moderate adverse** significant effect, due to the permanent loss of land, with limited alternative facilities within the area. If the area is to be used as a burial ground before construction of the Proposed Scheme, the magnitude of impact would increase and result in a **Large adverse** significant effect, due to the loss of land with severe damage to key characteristics, for the direct development of land to accommodate highways assets. Discussions are ongoing with the diocese to purchase the area of land needed prior to any burials occurring.
- 12.12.4 For those travelling by vehicle to access businesses using the new A47 (the Proposed Scheme) by vehicle, benefits would be experienced in terms of journey time savings and safety for road users. An increase in journey length to access Riverside Farm Holidays apartment rental would result in a **Moderate adverse** significant effect.
- 12.12.5 For WCH, there would be **Moderate adverse** significant residual effects anticipated for users of Honingham RB1 due to the stopping up and diversion of a section of the route, leading to an overall journey length increase. The severance of Hockering FP7 would have a major impact on users during the construction period. Once the Proposed Scheme is operational, users would be required to experience a journey length increase resulting in a **Moderate adverse** significant effect. The closure of uncontrolled crossing at Ringland Lane / Dog Lane and associated journey length increase would result in a **Moderate adverse** significant effect.
- 12.12.6 There will be three new sections of footway/ cycleway introduced as part of the Proposed Scheme: adjacent to the new side road alignment between Main Road and the existing A47 alignment at Hockering; along Mattishall Lane Link Road that will pass under the new A47 alignment; along the new side road between Sandy Lane and the Wood Lane junction northern roundabout to provide a connection between Wood Lane and Hockering; on the northern frontage of the

existing A47 between the realigned Dereham Road in the west and the existing Honingham roundabout in the east; on the existing alignment of the A47 between St Andrew's Church and Taverham Road; and to the north of the new A47 alignment between Taverham Road and Ringland Road to provide a continuous link between Honingham and Easton and then onwards to Hockering. Honingham RB1 will be diverted along an existing track to connect with a new footway/ cycleway that starts at the realigned B1535 Wood Land. Hockering FP3 will be upgraded from a footpath to a bridleway.

- 12.12.7 Slight beneficial effects would be experienced by pedestrians and cyclists travelling along the new footway and cycleways, lower traffic levels and slower speeds on the existing A47 and the provision of safe crossing points at Mattishall Lane Link Road (underbridge), to the east of Honingham roundabout (underpass) and the proposed footbridge in the vicinity of the Easton roundabout (which would be removed).
- 12.12.8 There are three agricultural holdings within the high level assessment where the impact of the Proposed Scheme may result in permanent significant adverse effects upon the viability of the holdings. These consist of **Moderate adverse** significant effects on holding 4, **Very large** significant effects on holding 8 and **moderate adverse** significant effects on holding 9. This is due to permanent land-take of high quality, arable land. Seven holdings are particularly sensitive to construction works due to land-take and issues of access to key infrastructure, thereby resulting in significant adverse effects.
- 12.12.9 During construction, there are likely to be some negative effects on local communities and potentially their health in terms of the noise and dust created by construction activities and the visual amenity impact of construction vehicles and compounds. Mitigation measures including an EMP (**TR010038/APP/7.4**) and provision of a Community Liaison Officer will seek to minimise these effects as far as possible.
- 12.12.10 During operation, it is expected that there would be negative health outcomes related to noise for some sensitive receptors, however there will also be some positive health outcomes in terms of noise reduction and accessibility improvements for other receptors.
- 12.12.11 Once built and operational, the significant effects reported in Section 12.10 would be permanent and unchanging, therefore no monitoring would be required.

12.13 References

- Broadland District Council (2016) The current local plan:

Accessed:

https://www.broadland.gov.uk/info/200139/planning_for_future_development/247/the_current_local_plan

Site Allocations DPD. Available online at:

https://www.broadland.gov.uk/downloads/download/162/site_allocations_dpd
(accessed 07/04/2020)

- Breckland Council (2019) Adopted Local Plan. Accessed: <https://www.breckland.gov.uk/adopted-local-plan>
- South Norfolk Council (2011) Adopted Local Plan. Accessed: <https://www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan>
- Department of Environment, Farming and Rural Affairs (Defra) (2020) Defra Statistics: Agricultural Facts – England Regional Profiles. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866807/regionalstatistics_overview_20feb20.pdf (accessed 27/08/2020)
- Highways England (2019) Design Manual for Roads and, LA 112 Population and human health. Available online at: <https://www.standardsforhighways.co.uk/ha/standards/DMRB/vol11/section3/LA%20112%20revision%201%20Population%20and%20human%20health-web.pdf>
- Highways Agency (2001) Design Manual for Roads and Bridges Volume 11, Section 3, Part 6 Land Use. Superseded by LA 112.
- Highways Agency (1993) Design Manual for Roads and Bridges Volume 11, Section 3, Part 8 Pedestrians, Cyclists, Equestrians and Community Effect. Superseded by LA 112.
- Highways Agency (1993) Design Manual for Roads and Bridges Volume 11, Section 3, Part 9 Vehicle Travellers. Superseded by LA 112.
- Highways England (2019) Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Revision 1). Available online at: http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/LA_104.pdf
- Google Streetview photography: Available at: <https://www.google.com/maps>
- IEMA (2017) Health in EIA: A Primer for a Proportionate Approach
- Defra, MAGIC maps. Available online at: <https://magic.defra.gov.uk/MagicMap.aspx>
- Norfolk County Council (n.d.) Map of Burlingham Woodland Walks. Available at: <https://www.norfolk.gov.uk/out-and-about-in-norfolk/norfolk-trails/short-and-circular-walks/burlingham-woodland-walks>
- South Norfolk District Council (2011) Adopted Local Plan. Accessed: <https://www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan>
- Office for National Statistics, (2019). Household projected growth by 2041. Available at:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland>

- Office for National Statistics, (2011), Census 2011 tables Quick Statistics. Available at: https://www.nomisweb.co.uk/census/2011/quick_statistics
- Office for National Statistics (2020). <https://www.ons.gov.uk/>
- Public Health England, Public Health Profile Local Health (Fingertips). Available online at: <https://fingertips.phe.org.uk/profile/local-health>
- World Health Organisation (2019) Constitution/ Available online at: <https://www.who.int/about/who-we-are/constitution>

12.14 Glossary

Term	Definition
Accessibility	The ability of users to access land, property, infrastructure, businesses and community assets.
Access	The means by which to approach or enter land, property and assets.
Agricultural Land Holdings	Land and associated infrastructure for the purpose of agricultural production, e.g. arable farming, dairy farming etc.
Businesses	Land and buildings for the purpose of commercial/industrial enterprise.
Community	A group of people living in the same place or having a particular characteristic in common.
Community land and assets	Land, buildings and infrastructure providing a service/resource to a community, e.g. open spaces, village greens, village halls, healthcare and education facilities etc.
Development land	Land identified in national or local plans, policies or strategies for development (including intensification of existing uses) and land subject to planning permission.
Health Determinants	Personal, social, economic and environmental factors which determine the health status of individuals and communities.
Human Health	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity
Health Outcome	The health status of an individual, group or population, attributable to a planned intervention (e.g. a project).
Health profile	Statistical picture of the baseline health conditions and trends within an area. NOTE: A profile can be built up for a variety of scales (e.g. ward, Local Authority or more strategic levels e.g. Local Enterprise Partnerships).
Journey length	Physical length of a journey.

Land-take	Temporary or permanent use of land for a project which takes it from private or public landholdings.
Population	All individuals located in a particular location (this can be local, regional or at a national scale).
Private property and housing	Land, buildings and infrastructure for the purpose of residential use.
Severance	The extent to which members of communities are able (or not able) to move around their community and access services/facilities.
Strategic housing sites	Large scale sites/land allocated in local planning policy for the provision of residential land use.
Strategic employment sites	Large scale sites/land allocated in local planning policy for the provision of employment land use.