

A47 Blofield to North Burlingham Dualling

Scheme Number: TR010040

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

July 2021

Deadline 1

Infrastructure Planning

Planning Act 2008

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

A47 Blofield to North Burlingham
Development Consent Order 202[x]

**CHAPTER 12
POPULATION AND HUMAN HEALTH**

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010040
Application Document Reference	6.1
Author:	A47 Blofield to North Burlingham Dualling Project Team, Highways England

Version	Date	Status of Version
Rev 0	December 2020	Application Issue
Rev 1	July 2021	Deadline 1

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12. Population and Human Health

12.1 Introduction

- 12.1.1 As part of the Environmental Impact Assessment (EIA) process, this Environmental Statement (ES) chapter reports the potential significant 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.
- 12.1.2 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 Infrastructure Planning (EIA) Regulations 2017.
- 12.1.3 The approach to this assessment has been updated since the Scoping Report (February 2018) and subsequent agreed Scoping Opinion (March 2018). This ensures accordance with the most up to date guidance in the Design Manual for Roads and Bridges (DMRB), LA 112 Population and human health.
- 12.1.4 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.
- 12.1.5 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.

12.1 Competent expert evidence

- 12.1.1 The technical lead for the preparation of this chapter is a suitably qualified Chartered Environmentalist with 17 years' relevant experience of similar projects and impact assessments. The technical lead has a Bsc (Hons) in Environmental Management and is a Full Member of the Institute of Environmental Management and Assessment (IEMA). The technical lead has used their EIA knowledge and professional judgement in identifying the likely significant impacts associated with the Proposed Scheme and providing technical guidance through the assessment process.

12.2 Legislation and policy framework

12.2.1 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 Networks National Policy Statement (NNNPS, 2014): The NNNPS 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 NNNPS 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 NNNPS. 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 Plan Document (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'.

12.3 Assessment methodology

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

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

12.3.2 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 (eg land and water contamination)
 - safety
 - likely health outcomes

12.3.3 Baseline information has been gathered using desktop sources and information collected for the other topic assessments in this Environmental Statement. The WCH assessment has also incorporated survey results, from surveys undertaken in 2018. 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) mapping¹
- Broadland District Council Local Plan, including Broadland District Council Site Allocations DPD document²
- Norfolk County Council Public Rights of Way mapping tool³
- Public Health England, Local Health Profile (Fingertips)⁴
- Office for National Statistics data⁵
- Census data

Update to guidance and scope of assessment

12.3.4 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 2018 Scoping Report has changed.

12.3.5 In the previous DMRB guidance, '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 WCH⁶ amenity are no longer included within the scope of this chapter due to the changes to guidance.

12.3.6 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.

¹ Defra (2020) MAGIC Map. Accessed: <https://magic.defra.gov.uk/>

² 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

³ Norfolk County Council (2020) Public Right of Way Mapping Tool. Accessed: <https://maps.norfolk.gov.uk/highways/>

⁴ Public Health England (2020) Local Health Profiles. Accessed: <https://fingertips.phe.org.uk/profile/health-profiles>

⁵ Office for National Statistics (2020). <https://www.ons.gov.uk/>

⁶ The term Non-Motorised User (NMU) which was used in the previous DMRB guidance 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

- 12.3.7 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.
- 12.3.8 The study areas have also been updated in line with the latest DMRB guidance, as explained in Section 12.6.

Surveys

- 12.3.9 WCH surveys were undertaken at the following locations, also indicated by a blue 'X' on Figure 12.1 (**TR010040/APP/6.3**):
- the junctions of the A47 with:
 - Burlingham Footpath 3 (FP3)
 - Lingwood Lane
 - B1140 and South Walsham Road
 - The field access (south of 16 Main Road)
 - the junction of Main Road with Burlingham FP1
- 12.3.10 The surveys were carried out between 7am and 7pm for nine consecutive days, outside of school holidays between Saturday 26 May and Sunday 3 June 2018 using CCTV video cameras. The weather during the surveys was dry and bright. As such, we would expect that the usage information collected is representative and sufficient to inform this assessment.
- 12.3.11 The surveys were undertaken in line with the Walking, Cycling and Horse-riding Assessment and Review (WCHAR) process.

Consultation

- 12.3.12 Updates to DMRB guidance have resulted in changes to the scope of this chapter. The changes have been confirmed to the key consultees (Broadland District Council, Planning Inspectorate).
- 12.3.13 Non statutory consultation was undertaken from 13 March to 21 April 2017 and included public exhibition events. On conclusion of the consultation a consultation report was completed and can be accessed on the Highways England website⁷.
- 12.3.14 Statutory consultation was carried out from 10 September 2018 to 19 October 2018. Feedback was received from Norfolk County Council and the parish councils and other key stakeholders including local landowners, interest groups and the local communities. This feedback provided insight into the key issues in the area for walking and cycling connectivity and numerous suggestions for

⁷ https://highwaysengland.citizenspace.com/he/a47-blofield-to-north-burlingham-dualling/results/a47-blofield-cons-report_final_080817.pdf

improvement. Cognisance has been taken of this feedback and of that received separately from Lingwood and Burlingham Parish Council. The key themes from the statutory consultation regarding population and human health are set out below:

- Concerns regarding noise, vibration, air pollution and light pollution on local residents during the construction period.
- Benefits associated with reduced accidents and driver-related stress.
- Improved journey times would benefit connection between Blofield and Burlingham and access to local businesses.
- Some concerns raised regarding the splitting of communities north and south of the A47.
- Requests for grade separated crossing facilities for pedestrians, cyclists and equestrians in the vicinity of North Burlingham to remove the severance effect of the existing A47 and improve connectivity between the villages of Lingwood and North Burlingham.
- Requests for pedestrian and cyclist facilities running parallel to the existing A47 to fill the gaps in existing provision and improve connectivity between Brundall and Acle.
- The need for pedestrian and cyclist facilities at the proposed B1140 junction, located to the east of North Burlingham.

12.3.15 A consultation meeting was held with key officers of Norfolk County Council on 19 December 2019 to discuss the Proposed Scheme emerging walking, cycling and horse-riding strategy. The feedback from the statutory consultation was also discussed, particularly that received from Lingwood and Burlingham Parish Council. A further consultation meeting was held with officers on 16 January 2020 to discuss the council's aspirations for the de-trunked section of the existing A47. These relate to the walking and cycling proposals, namely the potential for narrowing the carriageway of the existing A47 to facilitate implementation of the combined footway/cycleway without impacting the existing trees and reducing the speed limit of the road.

12.3.16 Consultation emails have been issued to Norfolk County Council and the public health contact for the NHS to agree the scope of the human health assessment. A follow up call was made. No response was received.

12.3.17 Issues raised during these consultations have been taken into account to develop the design through design interventions, as described in section 12.9 Design, mitigation and enhancement measures.

Assessment criteria

12.3.18 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

12.3.19 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> <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

Receptor value (sensitivity)	Description
	<p>2) existing housing and land allocated for housing (eg strategic housing sites) covering >1-5ha and / or >30-150 houses.</p> <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. 2) Agricultural land holdings: 3) areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 4) 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> <ol style="list-style-type: none"> 1) existing employment sites (excluding agriculture) and land allocated for employment (eg strategic employment sites) covering <1ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). <p>Walkers, cyclists, horse-riders (WCH):</p> <ol style="list-style-type: none"> 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

Receptor value (sensitivity)	Description
	<p>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> <p>Agricultural land holdings:</p> <p>1) areas of land which are infrequently used on a non-commercial basis.</p> <p>Walkers, cyclists, horse-riders (WCH):</p> <p>1) N/A.</p>

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

Magnitude of impact

12.3.20 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	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	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	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.
Negligible	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	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

Human health

- 12.3.21 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.
- 12.3.22 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.
- 12.3.23 DMRB LA 112 sets out the following data requirements that should be used to determine the health profiles (which are set out in Table 12-7). 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
- 12.3.24 The purpose of health profiling is to establish the potential sensitivity to change of relevant community groups who may be affected by the Proposed Scheme. Data has been collated for the following communities: Blofield with South Walsham, Burlingham and Acle.
- 12.3.25 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
- sources and pathways of potential pollution (eg land/water contamination)
- stress and anxiety
- safety

12.3.26 The health determinants have been derived to identify health outcomes within affected communities.

Sensitivity

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

- low
- medium
- high

Health Outcomes

12.3.28 Potential health outcomes during construction and operation have been categorised based on the categories provided in DMRB LA 112 Table 3.32, as shown in Table 12-3.

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

Significance of effect

12.3.29 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 ES Chapter 4 Environmental Assessment Methodology **(TR010040/AP/6.1)**.

12.3.30 Effects which have been evaluated as being of moderate or major significance (beneficial or adverse) are considered to be significant.

- 12.3.31 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.
- 12.3.32 Where impacts are referenced, these should be considered adverse, unless otherwise stated. Impacts of moderate significance or above are considered to be a significant effect.

12.4 Assessment assumptions and limitations

- 12.4.1 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.
- 12.4.2 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 9.5km away.
- 12.4.3 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 of 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.
- 12.4.4 Agricultural questionnaires have been sent out to four landowners and one tenant to facilitate the assessment of the impact on agricultural holdings. Follow up calls were made to the land holdings. At the time of the assessment, only two questionnaires were received. As a result, questionnaires have been used to assess holdings 3 and 7. A high level assessment of the remaining nine agricultural holdings has been undertaken. This was achieved using Scheme Overview drawings 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. One of the holdings submitting a response to an agricultural impact questionnaire, is subject to a Farm Business Tenancy with Norfolk County Council. This will end in October 2022 when the current tenant retires. Whilst questionnaires were submitted to Norfolk County Council in relation to the wider area of land in their ownership, no responses were received at the time of the assessment, so it is not known what the intention of the Council is in terms of re-letting of the holding. As a result, the agricultural impact assessment has been made on the assumption it would be intended to continue as a holding.

12.5 Study area

Land use and accessibility

12.5.1 The study area for the assessment of impacts on land use and accessibility extends 500m from the red line 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 (TR010040/APP/6.3).

Human health

12.5.2 The study area for human health includes the following communities which are located within the Broadland district, adjacent to the Proposed Scheme: Blofield with South Walsham, North Burlingham and Acle. 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. The study area extends beyond these communities where relevant, for example for the noise and air quality assessments.

12.6 Baseline conditions

Land use and accessibility

Private property and housing

- 12.6.1 The sensitivity of the key areas of housing at Blofield, Burlingham and Acle 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). Where only access to these areas of housing is altered, their sensitivity are considered **medium**.
- 12.6.2 There are approximately 650 residential properties within the study area, concentrated in the villages of Blofield, North Burlingham, Lingwood and Acle. There are also scattered properties along the existing A47, some of which have direct access onto the existing A47, as shown on Figure 12.1 (Population and human health). In general, properties in Blofield and Lingwood are accessed via the local highway network south of the existing A47, and North Burlingham to the north, whereas properties in Acle are accessed via the local road network both north and south via existing overbridge and underpass.
- 12.6.3 No other land, buildings or infrastructure used for residential housing have been identified within the study area.
- 12.6.4 The following Broadland planning applications for residential developments are located within the 500m buffer:
- 20160843

- 20151202
- 20150229
- 20151235
- 20160102
- 20151235
- 20191901

12.6.5 20141044 (GNLP) is a proposed site to be developed with residential housing in the GNLP, however at the time of reporting has no planning status.

Community land and assets

12.6.6 The existing A47 experiences congestion during peak hours, particularly at Yarmouth Road, Lingwood Road, Lingwood Lane and the B1140 junctions, creating a degree of severance and accessibility issues for local communities.

12.6.7 There are four woodland areas within the study area including: Burlingham Woods, Church Plantation, Half Round Plantation and Lingwood Community Woodland (refer to Figure 12.1 (TR010040/APP/6.3)). The sensitivity of these areas of community land is designated as **medium**.

12.6.8 Allotments are located in the eastern extents of Blofield with direct access off Waterlow, approximately 40m south of the existing A47. During the 2017 public consultation, the local community highlighted that the allotment are considered to be a 'valued community asset'. The allotments have been classified as having a **high** sensitivity. The allotments cover an area of approximately 1.2ha (refer to Figure 12.1 (TR010040/APP/6.3)).

12.6.9 Blofield is the main source of community assets within the study area, providing assets such as supermarkets, places of worship, schools and GP surgeries, as shown on Figure 12.1 (TR010040/APP/6.3). There are also some community assets in Acle (such as a train station, schools, shops and GP surgeries) and some assets in Lingwood (such as a train station, schools, shops and places of worship). The sensitivity of community assets in Blofield is classified as **high**.

12.6.10 Community assets in Blofield and Acle are likely used by residents in Blofield, Burlingham and Acle as these are the closest assets available. However, residents of Blofield wishing to access a secondary school would be required to travel to Norwich or Acle.

12.6.11 As indicated above, the village of Lingwood located to the south of the A47 has assets located within the village. Residents of Lingwood travelling from Lingwood Road and Lingwood Lane, accessing community assets in Blofield and Acle, are likely to use the local highway network to the south of the existing A47 and the existing A47 for assets in Acle. These routes are not anticipated to be

significantly impacted by the Proposed Scheme and therefore, this village has not been assessed any further.

12.6.12 Norwich is approximately 8.4km to the west of Blofield, it is therefore likely the communities of Blofield, North Burlingham and Acle travel to Norwich regularly for activities such as work and shopping, as well as to use education facilities.

Development land and business

12.6.13 The development land identified within the study area includes two sites allocated for housing (as shown on Figure 12.1 (TR010040/APP/6.3)):

- BLO3: Land Allocated for housing and open space
- BLO4: Land Allocated for housing, open space and a community facility

12.6.14 These allocations have been developed with housing built on the plots. Therefore, these allocations are considered under private property and housing. BLO4 is fully developed with housing and open space. BLO3 is partially developed, with some allocated land remaining for an area of open space.

12.6.15 The majority of businesses within the study area are located in Blofield, however there are a number located along this section of the existing A47, including (refer to Figure 12.1 (TR010040/APP/6.3)):

- Blofield Fish & Chip Shop
- Progress House meeting rooms
- Macron Store
- Butterflies Coffee Shop
- Blofield Farm Shop
- Blofield pick your own
- Norwich Camping and Leisure
- Atlantic Trading, Atlantic Truck and Van Shop
- Annapurna Accommodation
- Lingwood Hall (Hotel)
- Heating Natures Way
- Anglia Woodburner Centre
- British Wild Flower Plants
- Garden Lodge

12.6.16 The sensitivity of all businesses in the study area are assessed as **medium** as individually, these cover an area less than 1 ha.

12.6.17 There is one planning application (20151745) for four industrial units and vehicular access, which may have the potential to support future jobs. This is located on Main Road.

12.6.18 There are no additional areas subjected to planning applications which are not allocated by local authorities, supporting future jobs within the study area.

Agricultural land holdings

12.6.19 Defra farming statistics for Norwich and South Norfolk indicates that farmland is generally owner occupied with some areas occupied on short term tenancy agreements by neighbouring owner occupiers (Defra, 2020).

12.6.20 A combination of site visits and 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. However, associated accesses, utilities supplies and internal tracks appear to have been influenced by the existing A47's presence, running from or in parallel to the existing road. As a result, any changes to the road layout may have associated impacts on the agricultural holdings.

12.6.21 Agricultural holdings which have been reviewed as part of this assessment are shown in Figure 12.3 (**TR010040/APP/6.3**). The 11 farm businesses identified are subject to temporary or permanent land take as a result of the Proposed Scheme. These appear to be mainly arable units. The tenure of the land is split evenly between owner occupiers and tenants of Norfolk County Council. Table 12-4 considers the sensitivity of the farms along the route using the criteria outlined in Table 12-1. This has been determined using information provided by agricultural questionnaires or a high level assessment. High level assessments were undertaken using Scheme Overview drawings, publicly available information, standard industry figures and professional judgement.

12.6.22 Of the 11 farm businesses, nine farms have been identified as being of medium sensitivity. As previously stated, many of the farmsteads are set back from the road, meaning there are limited direct impacts on key infrastructure from the Proposed Scheme. As the land use for these nine farms is predominantly for arable enterprises, at least monthly access for agricultural operations is required. The other two farms (holding 7 and holding 11) were identified as having a very high sensitivity due to access to both main farm yards requiring daily access.

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	Medium

Farm No.	Land use	Land dependent on spatial relationship to infrastructure	Frequency of access required	Sensitivity
2	Arable	No	At least monthly	Medium
3	Arable	No	At least monthly	Medium
4	Arable	No	At least monthly	Medium
5	Arable	No	At least monthly	Medium
6	Arable	No	At least monthly	Medium
7	Arable	Access to main farm yard would be affected by construction works.	Daily	Very High
8	Arable	No	At least monthly	Medium
9	Arable	No	At least monthly	Medium
10	Arable	No	At least monthly	Medium
11	Arable	Access to main farm yard would be affected by construction works.	Daily	Very High

Walkers, cyclists, horse-riders (WCH)

12.6.23 The WCH routes within the study area are as shown in Figure 12.1 (TR010040/APP/6.3).

12.6.24 Burlingham FP3 runs north to south between the A47 and Church Road at Lingwood.

12.6.25 The Burlingham Woodland Walks network (some of which is permissive footpath⁸ only) falls within the study area. This circular footpath runs in an easterly direction from near the junction of A47 with Burlingham FP3, close to the existing A47 in North Burlingham, then heads south and then west, before heading north, back to the starting point.

12.6.26 A permissive bridleway lies to the south of the A47 and provides a connection between Lingwood Road, Burlingham FP3 and Lingwood Lane.

12.6.27 Burlingham FP1 runs north to south between Main Road in North Burlingham and Burlingham Green. It forms part of the Burlingham Woodland Walks network.

12.6.28 Blofield FP4 and FP4a are at the western end of the scheme. Blofield FP4 is outside the red line boundary and is not affected by the scheme. A small part of Blofield FP4a is within the red line boundary, however no works are proposed to

⁸ A path (which could be for walkers, riders, cyclists, or any combination) whose use is allowed by the landowner permissively, but which is not a public right of way.

be carried out to this footpath and it is not intended to close or divert it permanently or temporarily.

12.6.29 The receptors and their sensitivity are summarised in Table 12-5 below. The assigned sensitivity has been based on Table 13.2 in DMRB LA 112, professional judgement and experience of undertaking similar assessments for similar schemes.

Table 12-5 : Sensitivity of WCH routes to changes in journey length

Receptor	Sensitivity	Reasoning
Burlingham FP1	High	This footpath is a promoted circular walk and is one of the starting points for the Burlingham Woodland Walks which commences at the southern end at the St Andrew and St Peter Church car park. As such, it provides access to a number of local amenities and connectivity to the majority of other walking routes in the area which lie to the north. Recorded usage is frequent on weekdays and at weekends. A maximum two-way flow over the 12 hour survey period of around 70 users was observed on a weekday whereas the maximum flow on a Sunday was around 90 users. Only around 20 users were observed using the route on a Saturday. Very few or indeed none of the users of Burlingham FP1 continue on the footway of Main Road in either direction to access and cross the A47.
Burlingham FP3	Medium	This PRow is a promoted circular walk, (part of the Burlingham Woodland Walks network) with limited potential for substitution. However, it is an un-surfaced field edge footpath which does not provide direct access to community assets. Observed usage is very low and it is used mainly for recreational purposes, i.e. dog walking. A maximum two-way flow over the 12 hour survey period of five users was recorded using the route on a weekday of which only three users crossed the A47. A similar situation was observed during the Saturday survey periods whereas during the Sunday survey periods, a maximum two-way flow of only 10 users was recorded using the route, the majority of which crossed the A47.
Burlingham Woodland Walks circular footpath	Medium	The permissive footpath is a promoted circular walk, (part of the Burlingham Woodland Walks network). It is an un-surfaced field footpath which does not provide direct access to community assets. It is mainly used for recreational purposes, i.e. dog walking. Very low usage was observed during the WCH surveys and no users were observed crossing the A47 between the field access and the permissive footpath on any of the survey days.
Permissive bridleway connecting between Lingwood Road and Lingwood Lane	Medium	The permissive bridleway is a promoted circular walk, (part of the Burlingham Woodland Walks network) mainly used for recreational purposes. It is un-surfaced and generally follows field edge boundaries. A maximum two-way flow over the 12- hour survey period of six users was recorded on each survey day and these users were either lone pedestrians or dog walkers

12.6.30 In addition to the usage information provided in Table 12-5 a maximum two-way flow over the 12 hour survey period of five users was recorded crossing the A47 between Lingwood Lane and the short length of road leading to the centre of North Burlingham. On the weekdays, only pedestrians crossed the existing A47.

12.6.31 Furthermore, very few movements were recorded at the junctions of the existing A47 with the B1140 and South Walsham Road on each of the survey days. The only crossing movements of the A47 to access the side roads were undertaken

by cyclists with a maximum two-way flow over the 12 hour survey period of nine users and this was observed on a Saturday.

12.6.32 In relation to the transport network in the area, a separate table listing bus stops and routes is provided (Table 12-6).

Table 12-6 : Bus stop locations and services⁹

Bus stop location	Bus service	Frequency	Route	Interchange information
Blofield, opposite surgery	15	Hourly	Blofield Heath – Acle – Wymondham via Norwich	Brundall Railway Station
Blofield, opposite surgery	5A	Hourly	Eaton – Blofield Heath	Brundall Railway Station

Human health

Health profiles

- 12.6.33 All three communities (Blofield with South Walsham, Burlingham and Acle) 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.
- 12.6.34 The data used to establish the health profiles of Blofield with South Walsham, Burlingham and Acle is presented in Table 12-7, in comparison to the national average.
- 12.6.35 Across the Broadland district the population is estimated to be 124,646 (Census, 2011). Table 12-7 shows the ward with the highest population in the study area to be Blofield with South Walsham and the lowest to be Burlingham.
- 12.6.36 The census data shows Blofield with South Walsham, Burlingham and Acle 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 Blofield with South Walsham, Burlingham and Acle is higher than the national average. Income-deprived households are lower than the national average in Blofield with South Walsham and Burlingham, and higher than the national average in Acle.

⁹ Bus routes available from First Norfolk and Suffolk [online] available at: <https://www.firstgroup.com/norfolk-suffolk/routes-and-maps/network-norwich/green-line-1415>

- 12.6.37 The data shows Blofield with South Walsham, Burlingham and Acle to have a lower number of emergency hospital admissions for COPD as a percentage of all hospital admissions than the national average. The data shows deaths from respiratory diseases as a percentage of all deaths to be lower in Blofield with South Walsham, Burlingham and Acle than the national average.
- 12.6.38 The data shows life expectancy for males to be higher than the national average in Blofield with South Walsham and lower than the national average in Burlingham and Acle. Life expectancy for females is shown to be higher than the national average in Blofield with South Walsham and Acle, and lower than the national average in Burlingham.
- 12.6.39 This data shows the variation across the three communities in terms of health indicators and suggests that Acle is particularly sensitive to change. All communities however have demonstrated sensitivities 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 three communities are considered to be of high sensitivity.

Table 12-7 : Health Profiles for Blofield with South Walsham, Burlingham, Acle

Local health indicator	Wards (communities within the study area)			National
	Blofield with South Walsham	Burlingham	Acle	England
Source: Census 2011				
Population	5,594	2,643	2,824	53,012,456
Population aged under 16 (%)	16.4%	18.4%	16.1%	18.9%
Population aged over 65 (%)	24.7%	20%	27.6%	16.3%
Income deprivation (people living in income-deprived households as % of population) ¹⁰	49%	52.9%	57.4%	57%
General health - bad or very bad (%)	4.6%	4.8%	4.8%	5.5%
Limiting long term illness or disability (%)	18.6%	18.4%	21.5%	17.6%
Source: Public Health England (various dates)				

¹⁰ Data represents households which are deprived in 1-4 indices of household deprivation

Local health indicator	Wards (communities within the study area)			National
	Blofield with South Walsham	Burlingham	Acle	England
Emergency hospital admissions for COPD Data 2013 to 2014 and 2017 to 2018	53 (1.9% of total admissions for all causes, any age)	25 (2% of total admissions for all causes, any age)	19 (1.7% of total admissions for all causes, any age)	613, 747(2.2% of total admissions for all causes)
Deaths from respiratory diseases, all ages, all persons Data 2013 to 2017	37 (11.6% of total deaths for all causes, any age)	23 (13.5% of total deaths for all causes, any age)	27 (13.6% of total deaths for all causes, any age)	335, 078 (13.8% of total deaths for all causes)
Life expectancy (males) (years) Data 2013 to 2017	85	78.6	79.4	79.5
Life expectancy (females) (years) Data 2013 to 2017	83.8	82	86.5	83.1

Source: 2011 Census (ONS, 2011) and Public Health England Local Health Fingertips Tool

Health determinants

12.6.40 The health determinant categories as set out in DMRB LA 112 have been used to gather information on the communities of Blofield with South Walsham, Burlingham and Acle, as presented in Table 12-8. These determinants reflect the physical and social aspects of the environment in which the three 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.

12.6.41 In relation to the transport network in the area, a separate table listing bus stops and routes is provided (Table 12-6).

Table 12-8 : Health determinants for Blofield with South Walsham, Burlingham, Acle

Health determinant categories	Health determinants (Blofield with South Walsham, Burlingham, Acle)
The location and type of community, recreational and education facilities	Community assets, green/open space and healthcare facilities are identified in Figure 12.1 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	
Outline spatial characteristics of the transport network and	Usage data for the WCH facilities in the vicinity of the Proposed Scheme are provided in Table 12-5

Health determinant categories	Health determinants (Blofield with South Walsham, Burlingham, Acle)
usage in the area including the surrounding road network, PRow, cycle ways, non-designated public routes and public transport routes.	
Air quality management areas and ambient air quality	The Air quality assessment in Chapter 5 air quality concludes that it is unlikely that there are receptors which would experience significant effects as a result of the Proposed Scheme. Therefore, air quality is not considered a health determinant required to be assessed for the Proposed Scheme.
Areas recognised as sensitive to noise, (eg noise important areas, noise management areas and the ambient noise environment)	<p>There are four noise important areas along this section of the existing A47. Two located within or close to Blofield, one to the south of North Burlingham (Lingwood Road) and to the north of Acle (The Windle).</p> <p>The noise environment is generally rural with the predominant noise source in the area traffic from the A47. Sensitive receptors are principally concentrated in the villages of Blofield, Lingwood and North Burlingham as well as dispersed properties and isolated farmsteads.</p>
Sources and pathways of potential pollution (eg land/ water contamination)	Chapter 9 Geology and soils determines that it is unlikely that there are sources and pathways of potential pollution related to the Proposed Scheme that would affect human health. Therefore, this has not been further included in this assessment.
Landscape amenity	<p>Chapter 7 Landscape and visual effects describes the baseline topography and visual landscape associated with the Proposed Scheme.</p> <p>The potential for views of the Proposed Scheme would be from residential properties (including the settlements of Blofield and Lingwood, the smaller grouping of residential properties at North Burlingham and a wider, dispersed pattern of individual properties and small hamlets spread across the study area) and users of the local PRow network (predominately concentrated near Blofield, Lingwood and North Burlingham).</p> <p>Views of the Proposed Scheme would also be experienced by users of St Andrew & St Peter Church in North Burlingham, business users of Burlingham Business Centre and road users of the existing A47, B1140 and various minor roads within the extent of the study area. The main visual receptors with potential to experience views of the Proposed Scheme are:</p> <ul style="list-style-type: none"> • Residential properties on the north-eastern edge of Blofield • Residential properties on the northern edge of Lingwood • Residential properties in North Burlingham • Dispersed residential properties to the north and south of the existing A47 • Users of PRow on the north-eastern edge of Blofield, to the north of Lingfield and forming part of the Burlingham Woodland Walks • St Andrew & St Peter Church, North Burlingham • Users of the allotments on the north-eastern edge of Blofield • Indoor workers at Burlingham Business Centre, North Burlingham • Outdoor workers at Norwich Camping and Leisure, Blofield • Outdoor workers at Atlantic Truck and Van Centre, Blofield • Outdoor workers at Church Farm Units, North Burlingham • Users of the A47 road • Users of the B1140 road

Health determinant categories	Health determinants (Blofield with South Walsham, Burlingham, Acle)
	<ul style="list-style-type: none"> • Users of the various minor roads to the north and south of the existing A47
<p>Safety information associated with the existing affected road network (eg numbers killed and seriously injured)</p>	<p>A total of 42 collisions were recorded in the study area (between February 2014 and November 2018), of which 36 were classified as slight severity and six were classified as serious. No fatalities were recorded. Additionally, no collisions involving walkers, cyclists or horse-riders were recorded.</p> <p>An examination of the location and occurrence of the collisions highlights a number of clusters along the existing A47. These clusters are located at the A47/Lingwood Lane priority junction where six collisions of slight severity were recorded; and at the A47/White House Lane priority junction where five collisions of slight severity and two collisions of serious severity were recorded.</p>
<p>Information collated from stakeholder consultation</p>	<p>Information from the non-statutory 2017 consultation relevant to the health assessment is summarised below as these have been used to inform this assessment:</p> <ul style="list-style-type: none"> • Concerns that the new carriageway may block access to Lingwood Road and Lingwood Lane, or that there would be no easy access from Dell Corner Lane. • Concerns regarding the road coming closer to the allotments, which are valuable to residents and have been established by hard work from community members. • Some respondents commented that this option would make Burlingham more of a single community again, having been separated by the existing A47. • Other respondents say that the Proposed Scheme would improve accessibility between communities and for local businesses. <p>Information from the statutory 2018 consultation relevant to the health assessment is summarised below as these have been used to inform this assessment:</p> <ul style="list-style-type: none"> • Concerns were raised regarding the impact on the allotments, in terms of land-take, their access and losing money invested in the allotments. • Some respondents believe the proposal will have a positive impact on local businesses and local community access. These comments often focus on improved links between villages such as Blofield and North Burlingham as well as better access to local businesses and farms. • Some respondents were concerned that there will be a negative visual impact on the landscape such as views from the east end of Blofield village. • Some respondents raise concerns that the use of the proposed dual carriageway, and raised speed limit, will cause a greater amount of noise pollution, specifically Blofield, Blofield Heath and Brundall. Suggestions were made such as using noise barriers, tree planting and creation of bunds during construction. • A few respondents expressed concern that the proposals to create a link bridge at the western end of the scheme would have a negative impact on the landscape for example, the loss of tree line, roadkill from faster traffic, increased noise and increased air pollution. • A few respondents expressed concern that carbon emissions, noise and pollution from traffic may increase. Suggestions were made, such

Health determinant categories	Health determinants (Blofield with South Walsham, Burlingham, Acle)
	<p>as planting as many trees as possible to reduce the carbon footprint of the Proposed Scheme.</p> <ul style="list-style-type: none"> Several respondents highlight the benefit of these proposals' increased access to local villages for members of the local community. These comments focus on the potential benefit of overcoming the separation of communities either side of the A47, in particular between Strumpshaw, Lingwood, Blofield Heath and Burlingham.

12.7 Potential impacts

- 12.7.1 This section identifies potential impacts of the Proposed Scheme on population and human health, which may result in significant effects. These are summarised below.
- 12.7.2 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.
- 12.7.3 There would be no property demolitions as a result of the Proposed Scheme.
- 12.7.4 The construction process would be undertaken in phases and predominantly offline, details are provided in chapter 2 The Proposed Scheme (TR010040/APP/6.1).

Construction

Land use and accessibility

- 12.7.5 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 when accessing private properties during the gas pipeline diversion
 - 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

12.7.6 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 required to undertake construction activities
- Permanent land-take from the allotments which are required to construct the Proposed Scheme
- Permanent change to access for private properties on Waterlow, High Noon Lane, Lingwood Road, Lingwood Lane, Main Road, South Walsham Road and B1140
- Permanent change to access areas of community land and community assets such as along the existing A47 and Main Road
- Permanent severance of land and buildings which form part of an agricultural holding
- Permanent severance of Burlingham FP3 between Lingwood and North Burlingham and Burlingham Woodland Walks Circular Walk.
- Permanent diversion of a section of the permissive bridleway.

Human Health

12.7.7 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 significant changes to health determinants and hence potentially affect future health outcomes. The consideration of the health outcomes 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.

12.7.8 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
- Reduced accessibility to healthcare, community, recreation and educational facilities, and green and open space
- 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

12.7.9 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

12.7.10 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 what the health outcomes of changes to health determinants would be has also taken account of there being an identifiable pathway between the predicted impact on health determinant(s) and the health outcomes.

12.7.11 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
- Effects on changes to air quality 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
- Stress, anxiety and related wellbeing effects from changes to landscape amenity in proximity to living areas, open spaces, schools, amenities etc.
- 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)

12.8 Design, mitigation and enhancement measures

Construction

Land use and accessibility

- 12.8.1 The Environmental Management Plan (EMP) (**TR010040/APP/7.7**) will detail key construction mitigation which will be in place by the principal contractor during construction of the Proposed Scheme.
- 12.8.2 Traffic management measures will be put in place as part of the Outline Traffic Management Plan (**TR010040/APP/7.8**) to ensure disruption is minimised on those travelling between communities and those travelling to assets and businesses.
- 12.8.3 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.
- 12.8.4 The Highways England 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.
- 12.8.5 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

- 12.8.6 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 (**TR010040/APP/7.7**) and further details can be found in the following ES Chapters: Chapter 5 Air quality, Chapter 7 Landscape and visual and Chapter 11 Noise and vibration (**TR010040/APP/6.1**).
- 12.8.7 At the allotments, the principal contractor will be required to install fencing to prevent any dust or airbourne material from entering the allotments.

Operation

Land use and accessibility

- 12.8.8 The design, mitigation and enhancement measures that will be provided as part of the Proposed Scheme are described below and shown in Figure 12.2 (TR010040/APP/6.3).
- 12.8.9 Where the existing A47 is unaffected by the dualling, it is proposed to be de-trunked and serve as a local access road for residents. This will include a new combined footway/cycleway provided adjacent to the eastbound carriageway connecting Yarmouth Road at Blofield to the existing footway, which commences at the Dell Corner Lane junction via the Blofield Overbridge. A new section of footway is also proposed on Yarmouth Road to connect to the existing footway and allow pedestrians to walk along Yarmouth Road to the allotments. These new sections of infrastructure will provide improved connectivity between Blofield and North Burlingham for WCH.
- 12.8.10 The Proposed Scheme provides a new length of footway and Public Right of Way (PRoW) footpath, to the south of the new A47 mainline, connecting from the Blofield Overbridge to the B1140 junction. This route connects with multiple existing north / south permissive routes and footpath Burlingham FP3.
- 12.8.11 This new PRoW consists of an unbound footpath running east to west, starting on the footway of the Access Road which provides a link to the Blofield Overbridge:
- adjacent to the proposed agricultural access track passing Lingwood Road to FP3
 - adjacent to the agricultural access track and then the maintenance track from FP3 to permissive Burlingham Woodland Walks
 - adjacent to the existing Burlingham Trails Network (bridleway) to Lingwood Lane with a short diversion of approximately 50m round the proposed soakaway
 - a new footpath from Lingwood Lane to the B1140
- 12.8.12 A new combined footway/cycleway would be incorporated into the A47/B1140 grade separated interchange allowing the safe crossing of the new A47 for pedestrians and cyclists between South Walsham Road and the B1140. The new provision would also include a footway/cycleway link into North Burlingham via the existing A47 to be downgraded and Main Road.

12.9 Assessment of likely significant effects

Construction

Land use and accessibility

12.9.1 During construction, some vehicle 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 for short time periods. The traffic management plan 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. Offline working for the construction of the Proposed Scheme would minimise impacts on community access throughout the study area. 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

12.9.2 Temporary land-take would be required from four gardens belonging to properties on Yarmouth Road, south of the existing A47 to construct the western retaining wall. Approximately the total temporary land take required from the curtilage of the properties would be 860m². The sensitivity of the properties is classified as **high**, and the magnitude of impact is classified as **moderate** (even though this loss is for a small part of the curtilage and is not considered to compromise the viability of the property it is deemed that this impact would be significant to the residents of the properties during construction of this section of the Proposed Scheme). Therefore, impacts are classified as temporary **Moderate adverse**.

12.9.3 Residents of Waterlow would experience a 690m journey length reduction for eastbound journeys along the existing A47 when travelling by vehicle due to the Blofield Overbridge. Westbound journeys to the existing A47 would not experience a significant change. The magnitude of impact would be **minor**, due to the reduction in severance with adequate accessibility provision. Therefore, impacts are assessed as permanent **Slight beneficial**.

12.9.4 Construction of the Proposed Scheme would result in a permanent change to access to Sparrow Hall Bungalow, currently accessible from High Noon Lane, from the north, and the existing A47 from the south. Residents of High Noon Lane, such as Sparrow Hall, would experience a journey length change of 800m when travelling by vehicle to Blofield. Previously residents would access Blofield along Yarmouth Road and crossing the existing A47. The Proposed Scheme

would require users to follow the existing A47 eastbound, cross the Blofield Overbridge and connect into Blofield. Due to the de-trunking of the existing A47, the road would be safer due to decreased traffic flows. The sensitivity of the property is classified as **medium**, and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance to the south of High Noon Lane with alternative access provided northbound along High Noon Lane. Therefore, impacts are classified as permanent **Slight adverse**.

- 12.9.5 During the construction of the gas pipeline diversion, there would be temporary severance effects to residents of the private properties (i.e. Poplar Farm) north of the pipeline on Lingwood Road when making journeys by vehicle to and from the south. For these properties, access would be maintained to the north from the existing A47. Disruption to access is expected to be temporary and short-term, access from the south would be retained once the diversion is complete. The sensitivity of the properties is classified as **medium** and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**.
- 12.9.6 Residents of the properties to the south of Lingwood Road (i.e. Church Farm and Whites Place) would not be able to access the existing A47 north along Lingwood Road during the construction of the gas pipeline diversion. When travelling by vehicle residents would be required to follow Heater Lane for journeys to the west, and through Lingwood and Acle Road for journeys to the east. The sensitivity of the properties is classified as **medium** and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**.
- 12.9.7 Residents of private properties on Lingwood Road such as Poplar Farm and The Lindens would experience an increase in severance during the construction of the Proposed Scheme which would ultimately last for the operation of the Proposed Scheme. Lingwood Road currently leads directly onto the existing A47. When travelling by vehicle residents would experience a 2.7km journey length increase to westbound journeys to and from Blofield as a result of the Proposed Scheme. A journey length increase of 2.8km would be experienced for journeys eastbound through Lingwood to access the A47. During operation these increases in journey lengths are expected to result in increases in journey times for vehicle travellers from the properties on Lingwood Road of approximately one to three minutes. The magnitude of impact is classified as **moderate**, due to an introduction of severance with moderate accessibility provision. Therefore, impacts are assessed as permanent **Moderate adverse**.
- 12.9.8 Construction of the Proposed Scheme would take place predominantly offline, therefore the existing A47 would be open for use by vehicle travellers and cyclists

(refer to chapter 2 The Proposed Scheme (**TR010040/APP/6.1**) for more information). Access to private properties would be maintained throughout the whole of construction. However, there may be severance effects when accessing private property during phase 5 of construction.

- 12.9.9 Access to private properties on High Noon Lane, Waterlow and the B1140 may not be possible at certain times from the existing A47 due to weekend and overnight closures. However, disruption to access from the existing A47 is expected to be temporary and is expected to resume at the B1140 after phase 5. During phase 6 of construction, temporary diversion routes may be required to access private properties on High Noon Lane and South Walsham Road. However, full details of the length and recommended diversion would be confirmed by the contractor. For properties on High Noon Lane, access would be possible from the north, for properties on Waterlow access would be possible via the south and for properties on the B1140 access would be possible from the south during phase 5. The sensitivity of the properties is classified as **medium** and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**.
- 12.9.10 There are 20 private properties located on Main Road that would experience a change in severance when travelling by vehicle, as the eastern Main Road/ A47 junction which was previously a one-way system, would become a two-way access, onto the Proposed Scheme. With the Proposed Scheme in place, residents could access Main Road using the two-way access at the eastern end of the road, resulting in a journey length reduction of 0.1km for properties in the centre of the road and 0.24km for properties located at the eastern end of the road accessing the A47. The magnitude of impact is classified as minor, due to a removal of severance with adequate accessibility provision. Therefore, impacts are assessed as permanent **Slight beneficial**.
- 12.9.11 The permanent closure of the north of Lingwood Lane during construction would alter access to residential properties along the lane. Therefore, residents wishing to make journeys to the A47 by vehicle would be required to undertake a journey length increase of 1km along Acle Road and through the B1140 or Yarmouth Road junctions. Journeys southbound would be unaffected. The magnitude of impact would be classified as **moderate**, due to an introduction of severance with some accessibility provision. Therefore, impacts are assessed as permanent **Moderate adverse**.
- 12.9.12 Residents along the B1140, in particular the residents of The Coach House, Beighton House and The White House, would experience a change in access to the existing A47 due to the new junction layout. Residents would be required to undertake a journey length increase of 450m through the B1140 junction when travelling by vehicle. However, it is considered that there would be an

improvement in safety as users would no longer be required to cross the existing A47. The magnitude of impact would be classified as **minor**, as accessibility is maintained. Therefore, the impacts are assessed as permanent **Slight adverse**.

12.9.13 Access to additional areas with proposed areas of residential development is not anticipated to be affected by the Proposed Scheme.

12.9.14 Residual effects on private property and housing during operation are set out in Table 12-9.

Table 12-9 : Residual effects on private property and housing

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Temporary land take would be required from residential gardens on Yarmouth Road, south of the A47 to construct the western retaining wall.	High	Moderate	Moderate adverse	Moderate adverse
Change in access for residents along Waterlow	Medium	Minor	Slight beneficial	Slight beneficial
Change in access for residents along High Noon Lane	Medium	Minor	Slight adverse	Slight adverse
Temporary disruption accessing private property on Waterlow during construction phase 5	Medium	Minor	Slight adverse	Slight adverse
Temporary change to severance for private properties on Lingwood Road and south of Lingwood Road due to temporary land take required at land south of Poplar Farm during construction of the gas pipeline diversion	Medium	Minor	Slight adverse	Slight adverse
Change in access for residents along Lingwood Road	Medium	Moderate	Moderate adverse	Moderate adverse
Change in access for residents along Main Road	Medium	Minor	Slight beneficial	Slight beneficial
Change in access for residents along Lingwood Lane	Medium	Moderate	Moderate adverse	Moderate adverse
Change in access for residents along the B1140	Medium	Minor	Slight adverse	Slight adverse

Community land and assets

12.9.15 During construction there would be permanent land-take (up to 0.1ha) from the allotments at Blofield to accommodate the Proposed Scheme. The land-take is a minimal section along the northern edge but does impact the existing access and car park facilities. The allotments are assessed as having high sensitivity (as they were highlighted by the local community as a valued asset). A replacement car park, which would be created during construction, is proposed which would lose some of the allotments. There is likely to be temporary disruption to users of the allotments during the construction of the Proposed Scheme, however these are considered to be temporary in nature. Access will be maintained throughout

construction. Mitigation would aim to minimise impacts on users of the allotments through measures outlined in the EMP (TR010040/APP/7.7). The magnitude of impact is classified as **minor**, as the land-take would not compromise the overall viability of the community facility. Therefore, impacts are classified as permanent **Moderate adverse**. Impacts have been classified as Moderate as opposed to Slight because the allotments were identified as a valued community asset during the public consultation.

- 12.9.16 During construction, there would be permanent land-take (0.3ha, 7.5%) from the north of Lingwood Community Wood. Lingwood Community Wood is assessed as **medium** due to alternative facilities within adjacent communities. The magnitude is classified as **moderate** as there is a partial loss of the woodland. Therefore, impacts are assessed as permanent **Moderate adverse**. During construction, there would be temporary land take due to the construction of the Proposed Scheme and the gas pipeline diversion. Temporary land-take from Lingwood Community Wood would be 0.61ha (17%). The magnitude is classified as **moderate** as there is a partial loss of the woodland. Therefore, impacts are assessed as temporary **Moderate adverse**.
- 12.9.17 During phase 5 of construction, there may be severance effects to community assets in the village of Blofield when accessing from the direction of Acle (to the east) by vehicle, due to potential weekend and overnight closures to complete the A47 tie-ins. Access would need to be gained via local roads to the south of the existing A47. The sensitivity of community assets in Blofield is classified as **high** and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**. Impacts have been classified as Slight as opposed to Moderate as whilst accessibility is reduced, they are accessible via local roads and for majority of construction, the existing A47 is open for use.
- 12.9.18 During construction of the gas pipeline diversion, there may be severance effects when accessing Lingwood Community Woodland by vehicle, from the south. Access would be maintained to the north, from the existing A47. Disruption to access is expected to be temporary and access from the south is expected to be maintained once the diversion is complete. The sensitivity of Lingwood Community Woodland is classified as **high** and the magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**. Impacts have been classified as Slight as opposed to Moderate as the woodland would still be accessible from the north and the reduced accessibility is temporary.
- 12.9.19 It is expected that during the construction of the Proposed Scheme there would be increased severance when accessing the section of Lingwood Community

Woodland adjacent to Lingwood Road from the existing A47. This severance would remain during the operation of the Proposed Scheme. The construction of the Proposed Scheme would permanently stop up Lingwood Road to the north. With the Proposed Scheme in place, users of Lingwood Community Woodland would experience a 2.7km journey length increase when travelling by vehicle for westbound journeys to and from Blofield. A journey length increase of 2.8km would be experienced for journeys eastbound through Lingwood to access the A47. The sensitivity of community land is designated as **medium**, due to severance with existing accessibility provision. The magnitude is classified as **minor**, due to the introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as temporary **Moderate adverse**.

12.9.20 During construction access to Burlingham Woods, Church Plantation and Half Round Plantation located off Main Road would permanently change as a result of the Proposed Scheme. Access from the west would be unaffected and once constructed, access from the east would be improved due to the road becoming two-way. The sensitivity of community land is designated as **medium**, due to severance with existing accessibility provision. The magnitude of community land is designated as **minor**, due to the removal of severance with adequate accessibility provision. Therefore, impacts are assessed as permanent **Slight beneficial**.

12.9.21 It is expected that there would be increased severance when accessing Lingwood Hall, due to the permanent stopping up of Lingwood Lane. Users accessing the hall from the existing A47 would be required to undertake a journey length increase of 1km through the B1140 junction and along Acle Road and White House Lane when travelling by vehicle. Journeys southbound would be unaffected. The sensitivity of Lingwood Hall is classified as **medium** due to severance with existing accessibility provision. The magnitude of impact on Lingwood Hall has been classified as **minor**, due to the minor introduction of severance with adequate accessibility provision. Therefore, impacts are assessed as permanent **Slight adverse**.

Table 12-10 : Residual effects on commercial land and assets during construction

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Community land and assets				
Permanent land-take from the Blofield allotment	High ¹¹	Minor	Moderate Adverse	Moderate Adverse
Permanent and temporary land-take from Lingwood Community Woodland	Medium	Moderate	Moderate Adverse	Moderate Adverse

¹¹ The sensitivity of the allotment gardens has been increased to High value due to its importance to the local community, as raised during the 2017 non-statutory consultations.

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Access to Burlingham Woods, Church Plantation and Half Round Wood off Main Road	Medium	Minor	Slight beneficial	Slight beneficial
Temporary change in severance when accessing community assets in Blofield	High	Minor	Slight adverse	Slight adverse
Temporary change in severance when accessing Lingwood Community woodland due to the gas pipeline diversion	High	Minor	Slight adverse	Slight adverse
Access to Lingwood Community Woodland south of the existing A47	Medium	Minor	Moderate adverse	Moderate adverse
Access to Lingwood Hall	Medium	Minor	Slight adverse	Slight adverse

Development land and businesses

- 12.9.22 It is expected that there would be changes in severance when accessing some businesses within the study area. The sensitivity of all businesses in the study area are assessed as **medium** as individually, these cover an area less than 1 ha.
- 12.9.23 During phase 5 of construction, there may be severance effects to businesses in the village of Blofield, when accessing from the direction of Acle, due to potential weekend and overnight closures to complete the A47 tie-ins. Access would need to be gained via local roads to the south of the existing A47 or at the Cucumber Lane Roundabout west of Blofield. The sensitivity of businesses in Blofield is classified as **medium**. The magnitude of impact is classified as **minor**, due to a temporary introduction of severance with alternative accessibility provision. Therefore, impacts are classified as temporary **Slight adverse**.
- 12.9.24 Access to businesses on Main Road would be maintained from the west during construction. Journeys from the east would be temporarily stopped up during the construction of the Proposed Scheme. The sensitivity of businesses is classified as **medium**. The magnitude of impact is classified as **minor** due to alternative access provided. Therefore, impacts are classified as temporary **Slight adverse**.
- 12.9.25 There is one business located on Lingwood Road, Annapurna Accommodation, which would no longer be accessible by travelling south on Lingwood Road from the existing A47. The Proposed Scheme would permanently stop up Lingwood Road to the north during construction. With the Proposed Scheme in place, users of Lingwood Community Woodland would experience a 2.7km journey length increase when travelling by vehicle for westbound journeys to and from Blofield. A journey length increase of 2.8km would be experienced for journeys eastbound through Lingwood to access the A47. The magnitude of impact on Annapurna Accommodation has been classified as **minor** due to an introduction of severance with adequate accessibility provision. Whilst Lingwood Road would be

stopped up, clients and customers would take access via the Proposed Scheme and grade separated junctions. Therefore, impacts are assessed as permanent **Slight adverse**.

12.9.26 Access to Main Road would be improved by the Proposed Scheme due to a two-way access being constructed. Therefore, if the proposed development for planning application 20151745 is constructed, this would improve access for the proposed development.

12.9.27 Residual effects on businesses in the study area during construction are provided in Table 12-11.

Table 12-11 : Development land and business residual construction effects

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Development land and businesses				
Changes in severance to accessing businesses in Blofield	Medium	Minor	Slight adverse	Slight adverse
Changes in severance to access businesses on Main Road	Medium	Minor	Slight adverse	Slight adverse
Access to businesses located on Lingwood Road	Medium	Minor	Slight adverse	Slight adverse

Agricultural land holdings

12.9.28 The assessment on land holdings has been undertaken in accordance with the criteria outlined in Table 12-2. Potential effects on individual land holdings during the construction of the Proposed Scheme is outlined below and summarised in Table 12-12. The area of agricultural land which could be returned to the holding following construction is also presented.

12.9.29 During construction the Proposed Scheme would result in a total land take of 21ha for holding 7. The main farm yard is encircled by the red line boundary. There is potential disruption to access the land and key infrastructure of the agricultural holding due to the construction of the Proposed Scheme including the gas pipeline. A Countryside Stewardship Higher Level agreement¹² exists on the land, which is due to conclude in September 2021. 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 would be impacted as are fixed such as the removal of grass margins, woodland and nectar pollen mix plots. Access from the existing A47 would be severed during the construction of the Proposed Scheme. Therefore, access to the farm yard would be derived from the south via the local road network or along the new agricultural track from the

¹² 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

west. A substantial amendment to access is required to continue to access land which is part of farm business. In addition, an amendment to the existing agri-environment scheme will be required. As holding 7 has been identified as being of **very high** sensitivity, the magnitude of impact will be **moderate** with a temporary **Large adverse** residual effect.

- 12.9.30 Access to the main farm yard and impacted land associated with holding 11 is gained via the farm drive from the existing A47. 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. During construction the total area of land to be taken will be circa 1ha. Holding 11 has been identified as having a **very high** sensitivity, with a **moderate** magnitude of temporary impact, as a result the residual effect is considered to be temporary **Large adverse**.
- 12.9.31 During construction, the Proposed Scheme would result in a total land take of circa 29ha for holding 6. This would adversely impact the turnover and profitability of the farming enterprise during construction works. There is potential for considerable disruption in terms of access to the land and key infrastructure from construction of the new route of the A47 and the gas pipeline. The main farm yard is encircled by the red line boundary. There is potential disruption to access the land and key infrastructure of the agricultural holding due to the construction of the Proposed Scheme including the gas pipeline. Access to the farm yard would be derived from the south via the local road network or along the new agricultural track from the west. The agricultural track would provide access to land to the south of the Proposed Scheme that would be otherwise severed. As holding 6 is identified as being of **high** sensitivity, with a **major** magnitude of temporary impact, the residual effect is considered to be temporary **Large adverse**.
- 12.9.32 The construction of the Proposed Scheme would result in a total area land take of circa 22ha for holding 8. This could potentially have an adverse impact upon the turnover and profitability of the farming enterprise. There does not appear to be key infrastructure within the red line boundary that is associated with the holding. An agricultural questionnaire was sent to Norfolk County Council to request details of the total holding but a response was not received. As the size of the total agricultural holding is unknown 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. As holding 8 is identified as being of **high** sensitivity, with a **minor** magnitude of temporary impact, the residual effect is considered to be temporary **Moderate adverse**.
- 12.9.33 Access to holding 1 would be severed by construction works, however a new access is being provided to the east of the allotments. A total land take area of circa 4ha would be required during construction. As holding 1 is identified as

being of **high** sensitivity, with a **negligible** magnitude of temporary impact, the residual effect is considered to be temporary **Slight adverse**.

- 12.9.34 Land associated with holding 2 is located to the north of the existing A47. A total land take area of less than 1ha would be impacted upon during construction works. Severance of access for holding 2 would be temporary. The Proposed Scheme is unlikely to impact upon the viability of the holding. As holding 2 is identified as being of **high** sensitivity, with a **negligible** magnitude of temporary impact, the residual effect is considered to be temporary **Slight adverse**.
- 12.9.35 Around 8ha of the existing arable block associated with holding 3 would be subject to total land take during the construction period. Access to the block would be severed by the Proposed Scheme, which would also impact on adjoining fields owned separately. New access would be required for land associated with holding 3, which may require the removal of mature hedgerow. In addition, an amendment to the existing agri-environment scheme would be required. As holding 3 is identified as being of **high** sensitivity, with a **minor** magnitude of temporary impact, the residual effect is considered to be temporary **Slight adverse**.
- 12.9.36 An isolated 2.3ha block of arable land associated with holding 5 would be fully subject to temporary and permanent land take before and following construction. The estimated size of the total agricultural holding, including the affected block, is 29ha. At this scale is likely that the impact on the viability of the holding will be minor. As holding 5 is identified as being of **high** sensitivity, with a **minor** magnitude of temporary impact, the residual effect is considered to be temporary **Slight adverse**.
- 12.9.37 An outlying arable block associated with holding 4 would be subject to a total land take of less than 1ha. Access to the field would not be affected. It is unlikely that the land take would impact upon the viability of the business. As holding 4 is identified as being of **high** sensitivity, with a **negligible** magnitude of temporary impact due to a very small land take area, the residual effect is considered to be temporary **Slight adverse**.
- 12.9.38 Circa 4ha associated with holding 9 is required during the construction period. Access to the field would not be affected. Holding 9 may experience some temporary disruption due to temporary traffic management. However, access to this land would still be maintained. As holding 9 is identified as being of **medium** sensitivity, with a **negligible** magnitude of temporary impact due to a small land take area, the residual effect is considered to be temporary **Slight adverse**.
- 12.9.39 Less than 1ha of holding 10 would be taken during construction works for drainage works. Closure of the existing layby would result in severance of one of two accesses to holding 10, shown on Inset H on Sheet 8 of the Rights of Way and Access Plans [APP-007]. Access would remain intact from The Windle..

Holding 10 is identified as being of **high** sensitivity. The magnitude of impact for holding 10 is considered to be **minor**. The residual effect is considered to be temporary **Slight adverse**.

Table 12-12 : Assessment of temporary effects on agricultural holdings

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	3.7	Negligible	Negligible	Slight adverse	2.57
2	High	0.3	Negligible	Negligible	Slight adverse	0.23
3	High	8.25	Minor	Minor	Slight adverse	0.61
4	High	0.36	Negligible	Minor	Slight adverse	0.2
5	High	2.29	Minor	Minor	Slight adverse	0
6	High	29.12	Moderate	Major	Large adverse	19.84
7	Very High	20.76	Moderate	Major	Large adverse	11.25
8	High	22.46	Minor	Moderate	Moderate adverse	11.93
9	High	3.82	Minor	Minor	Slight adverse	2.2288
10	High	0.85	minor	Negligible	Slight adverse	0.85
11	Very High	1.03	Moderate	Moderate	Large adverse	1.03

12.9.40 The permanent effects from the construction of the Proposed Scheme on individual land holdings is outlined below and summarised in Table 12-13. The scale of effect is based on the proportion of land required from the individual holdings.

12.9.41 The Proposed Scheme would result in permanent land take of circa 10ha for holding 7 which may impact the viability of the farm. This includes small areas of land, created by the Proposed Scheme, which would be uneconomical to farm. The total area of the agricultural holding is 52ha. The scale of permanent land take would equate to 20% of the farm so it is possible that this would impact on the long-term viability of the holding. As holding 7 is identified as being of **very high** sensitivity, with a **moderate** magnitude of permanent impact, the residual effect is considered to be permanent **Large adverse**.

12.9.42 Circa 9ha of permanent land take would be required from holding 6 post construction. This includes small areas of land that would be created by the Proposed Scheme, which would be uneconomical to farm. The estimated size of the holding is 41ha. The scale of permanent land take would equate to 23% of the farm so it is likely that this would impact on the long term viability of the holding. As holding 6 is identified as being of **high** sensitivity, with a **moderate**

magnitude of permanent impact, the residual effect is considered to be permanent **Large adverse**.

- 12.9.43 Permanent land take of circa 1ha from holding 1 would be required for new road construction providing access to the existing A47. The Proposed Scheme is unlikely to detrimentally impact on the viability of the holding. As holding 1 is identified as being of **high** sensitivity, with a **minor** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.44 Land associated with holding 2 is located to the north of the existing A47. Less than 1ha will be permanently taken. As a result, the Proposed Scheme is unlikely to impact upon the viability of the holding. As holding 2 is identified as being of **high** sensitivity, with a **negligible** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.45 The Proposed Scheme would require the permanent removal of more than 7ha of land from holding 3. The existing access would also be severed due to the Proposed Scheme. New access would need to be created for remaining parcel area, which may require the removal of mature hedgerow. A Countryside Stewardship Higher Level agreement exists on the land. An amendment to the existing agri-environment scheme would be required as a result of the Proposed Scheme. While a questionnaire was received for this holding, the full holding area was not given. The estimated size of the holding is 253ha. As a result the scale of permanent land take would equate to 3% of the farm so it is unlikely that this would impact on the long term viability of the holding. As holding 3 is identified as being of **high** sensitivity, with a **minor** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.46 An outlying arable block associated with holding 4 will be subject to temporary and permanent land take of less than 1ha. Access to the field will not be affected. It is unlikely that the land take will impact upon the viability of the business. As holding 4 is identified as being of **high** sensitivity, with a **negligible** magnitude of permanent impact due to a very small land take area, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.47 An isolated 2ha block of arable land associated with holding 5 will be fully subject to permanent land take. The size of the holding is estimated to be 29ha. The permanent land take area represents 8% of the holding size so is unlikely to impact on the viability of the holding. As holding 5 is identified as being of **high** sensitivity, with a **minor** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.48 Approximately 10ha would be subject to permanent land take from holding 8 to create the B1140 junction. The remaining field area could be incorporated into neighbouring blocks, which may impact on field boundary hedges. A Countryside Stewardship Mid-Tier agreement exists on the land. It is unclear whether any

options would be impacted upon by the Proposed Scheme, and it may be possible to make a minor adjustment to an agreement. The estimated size of the holding is 123ha. The scale of permanent land take would equate to 8% of the farm so it is unlikely that this would impact on the long term viability of the holding. As holding 8 is identified as being of **high** sensitivity, with a **minor** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.

- 12.9.49 Holding 9 would be subject to 1.6ha of permanent land take to create the B1140 junction. This represents 3% of the total holding size, which is estimated to be 57ha. It is unlikely that the permanent land take would impact upon the viability of the business. Holding 9 is identified as being of **high** sensitivity, with a **negligible** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.50 Following completion of construction one of two existing accesses to holding 10 would be severed due to the Proposed Scheme. As holding 10 is identified as being of **high** sensitivity, with a **minor** magnitude of permanent impact, the residual effect is considered to be permanent **Slight adverse**.
- 12.9.51 Following completion of construction there would be no physical impact upon holding 11. However, there is potential for a residual effect to impact on the business due to operational disruption if access to the main farm yard is impacted upon during construction. It is unlikely that the work would have a long lasting impact on the viability of the holding. As holding 11 is identified as being of **very high** sensitivity, with a **negligible** magnitude of permanent impact. The residual effect is considered to be permanent **Slight adverse**.

Table 12-13 : Assessment 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	1.13 (<1)	Negligible	Minor	Slight adverse
2	High	<0.1 (<1)	Negligible	Negligible	Slight adverse
3	High	7.63 (3)	Minor	Minor	Slight adverse
4	High	0.16 (<1)	Negligible	Negligible	Slight adverse
5	High	2.29 (8)	Negligible	Minor	Slight adverse
6	High	9.28 (23)	Moderate	Moderate	Large adverse
7	Very High	9.51 (20)	Moderate	Moderate	Large adverse
8	High	10.52 (8)	Minor	Minor	Slight adverse
9	High	1.59 (3)	Negligible	Negligible	Slight adverse
10	High	0	Minor	Negligible	Slight adverse
11	Very High	0	Negligible	Negligible	Slight adverse

Walkers, cyclists and horse-riders (WCH)

- 12.9.52 The Proposed Scheme would result in the diversion or temporary closure of some routes during construction, which would become permanent diversions and closures during the operation of the Proposed Scheme.
- 12.9.53 The severance of Burlingham FP3 would have a **major** impact on users during the construction period. In the future, users making a trip between Lingwood and North Burlingham via Burlingham FP3 would be required to divert to the proposed WCH route running west to east parallel to the proposed agricultural access track to connect to the proposed Blofield Overbridge and then continue their journey via the overbridge and the proposed new combined footway/cycleway to be provided on the northern side of the former A47, which would be de-trunked. Although the Blofield Overbridge would facilitate the safe crossing of the new A47 alignment for users, the resulting increase in journey length would be in excess of 500m. The sensitivity of Burlingham FP3 has been classified as **medium** due to observed usage being very low 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 unsurfaced, recreational route which does not provide direct access to community assets.
- 12.9.54 Construction of the Proposed Scheme would permanently remove part of the route of the permissive footpath which runs in an easterly direction, from near the junction of A47 with Burlingham FP3, close to the existing A47 in North Burlingham, then heads south and then west, before heading north, back to the starting point. The part of the permissive footpath running in an easterly direction from near Burlingham FP3 lost to the Proposed Scheme would be diverted to the proposed new PRoW located further to the south to maintain the connections. Although the footpath is a promoted circular walk, its sensitivity has been classified as **medium** due to its very low usage for recreational purposes only. When considering mitigation, the magnitude of the potential impact is **negligible** since the path provision would result in less than a 50m change in journey length. Effects are therefore assessed as permanent **Slight adverse**.
- 12.9.55 The Proposed Scheme will require the permanent diversion of a short length of the permissive bridleway to accommodate drainage works. Although the bridleway is a promoted circular walk, its sensitivity has been classified as **medium** due to its very low usage for recreational purposes only. When considering mitigation, the magnitude of the potential impact is **negligible** since realignment of the bridleway would result in less than a 50m change in journey length. Effects are therefore assessed as permanent **Slight adverse**.

12.9.56 The Proposed Scheme would have no change on Burlingham FP1. As this footpath is identified as being of **high** sensitivity as it is a promoted circular walk and usage is frequent on weekdays and at weekends. The Proposed Scheme would not impact on this footpath so the magnitude is assessed as **no change**, therefore residual effect is considered to be **Neutral**.

Table 12-14 : Residual effects on WCH during construction

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Walkers, cyclists and horse- riders (WCH)				
Severance of Burlingham FP3 during construction	Medium	Major	Moderate adverse	Moderate adverse
Severance and re-alignment of the permissive footpath at North Burlingham	Medium	Negligible	Moderate adverse	Slight adverse
Severance and re-alignment of the permissive bridleway at North Burlingham	Medium	Negligible	Moderate adverse	Slight adverse
Burlingham FP1	High	No change	Neutral	Neutral

Human Health

12.9.57 Effects of construction on human health determinants are described in Table 12-15.

12.9.58 References to significant effects are detailed in the corresponding ES chapter, where Table 12-15 assesses the change to health determinants and resulting health outcome which may occur due to the identification of potential significant effects.

Table 12-15 : 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	Burlingham FP3 and a permissive footpath at North Burlingham would be affected as assessed under WCH, section 12.10 construction impacts (section. 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. Mitigation measures have been proposed to ensure paths are maintained throughout the construction period, by using	Neutral

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
	<p>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 an effect on health determinants as a result of changes to access and local networks, therefore the health outcome is assessed as neutral.</p>	
<p>Access to green and open space</p>	<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).</p> <p>PRoW access would be maintained or where this is not possible, diversions will be put in place to ensure access to green and open space north of the existing A47 (Burlingham Woods) and south of the A47 (Lingwood Community Woodland) is maintained. As access to green and open space would be maintained, the health outcome of construction of the Proposed Scheme on access to green and open space is assessed to be neutral.</p>	<p>Neutral</p>
<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. This includes users of Blofield allotments.</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. Subject to the use of temporary and permanent noise barriers, construction noise monitoring and mitigation measures, no receptors have been identified to be significantly affected by noise from construction and construction traffic.</p> <p>Mitigation measures for the construction of the Proposed Scheme are provided in Chapter 5 Air Quality and in the EMP. 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 Traffic Management Plan 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>Neutral</p>

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
Landscape amenity	<p>During construction of the Proposed Scheme, there is potential for visual receptors to experience significant effects as described in chapter 7 Landscape and visual, therefore potentially resulting in changes to health determinants and health outcomes. Receptors include residents, those using PRoW, those using the allotments, those using Lingwood Community Woodland and the views from the road.</p> <p>Chapter 7 Landscape and visual effects assessment concludes that after mitigation, there are forty-four residential receptors expected to experience large or moderate adverse construction visual effects. These consist of properties on the north-eastern edge of Blofield, in the vicinity of Poplar Farm on Lingwood Road, on the southern edge of North Burlingham; on Lingwood Lane and along the B1140 to the north and south of the existing A47.</p> <p>Two PRoW receptors have been identified which would experience large or moderate adverse construction effects and 6 road receptors would experience large or moderate adverse construction visual effects. This would typically associate with views from the existing A47, Waterlow, Lingwood Lane, Lingwood Road and the B1140 to the north and south of the Proposed Scheme.</p> <p>Significant adverse visual affects during construction as described in Chapter 7: Landscape and visual 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>	Neutral
Stress and Anxiety	<p>During construction of the Proposed Scheme, there is potential for increased stress and anxiety due to journey length delays as a result of construction traffic. Mitigation would be in place to reduce impacts from construction traffic through the Traffic Management Plan (TMP). Highways England Customer Contact Centre will also 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.</p>	Neutral
Safety	<p>The construction of the Proposed Scheme is not considered to have any impact to the safety of communities or individual residents.</p>	Neutral

Operation

Land use and accessibility

Private property and housing

12.9.59 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.

- 12.9.60 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.
- 12.9.61 Impacts on residential receptors during operation of the Scheme are reported in chapter 5 Air Quality, chapter 7 Landscape and Visual and chapter 11 Noise and Vibration (**TR010040/APP/6.1**).

Community land and assets

- 12.9.62 The majority of community assets in the study area are located in Blofield (as identified in Section 12.6), including the allotments.
- 12.9.63 With the Proposed Scheme in place, community assets in Blofield could still be accessed from the north via Plantation Road and from Yarmouth Road Junction, therefore journey length from the Proposed Scheme has no change. However, when travelling from the east such as by residents in Acle, journey time savings may be experienced, of up to approximately four minutes¹³ when travelling by vehicle. The journey length changes and journey time savings outlined in the private property and housing assessment would benefit those travelling from the direction of Acle for accessing healthcare assets, schools and shops.
- 12.9.64 Access to the community facility St Andrew's Church would benefit from Main Road becoming a two-way road. With the Proposed Scheme in place, users of the church could access Main Road using the two-way access at the eastern end of the road, resulting in a journey length reduction of 0.1km when travelling by vehicle. The sensitivity of St Andrew's Church is designated as **medium**, due to severance with existing accessibility provision. The magnitude of change to community land is designated as **minor**, due to the removal of severance with adequate accessibility provision. Therefore, impacts are assessed as permanent **Slight beneficial**.
- 12.9.65 Beneficial impacts are anticipated on those travelling from North Burlingham to the assets at Lingwood due to improved safety crossing the existing A47 via the proposed B1140 grade separated junction.
- 12.9.66 When accessing community assets in Blofield from the direction of Acle, the Proposed Scheme would improve journey times between Blofield and Acle for vehicle drivers as well as removing the need for a right turn across A47 traffic at

¹³ Further information on journey time savings can be found in the A47 Blofield to North Burlingham Transport Forecasting Package Report 2020

Yarmouth Road junction via the Blofield Overbridge, thereby considered to be a safer option.

12.9.67 Access to community assets further afield (for example Norwich or Great Yarmouth), via the A47 would be improved with better travel times and safer access at the Yarmouth Road junction (improved merge lane) and the B1140 grade separated junction.

12.9.68 Residual effects on community assets during operation, including healthcare assets and green/open space are provided in Table 12-16.

Table 12-16 : Residual effects on community land and assets

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Access to community assets in Blofield (permanent)	Medium	Negligible	Slight beneficial	Slight beneficial
Access to St Andrew's Church	Medium	Minor	Slight beneficial	Slight beneficial
Access to assets in Lingwood	Medium	Negligible	Slight beneficial	Slight beneficial

Development land and businesses

12.9.69 The majority of businesses in the study area are located in Blofield. With the Proposed Scheme in place, businesses in Blofield can still be accessed from the north via Plantation Road and from the Yarmouth Road Junction, therefore journey length from the Proposed Scheme has no change compared to the existing A47 when travelling by vehicle. However, when travelling from the east such as by residents in Acle, journey time savings may be experienced, of up to approximately four minutes¹⁴ due to expected decreased traffic congestion on the Proposed Scheme. The magnitude of impact on businesses in Blofield has been classified as **minor**, due to a removal of severance with adequate accessibility provision. This includes businesses listed in the baseline section 12.6. Therefore, impacts are assessed as permanent **Slight beneficial**.

12.9.70 For businesses located on Main Road, there would be a reduction in severance due to the easternmost section of Main Road becoming a two-way road, as detailed in private property and housing. The magnitude of impact on businesses located on Main Road detailed in the baseline section 12.6 has been classified as permanent **minor beneficial**, due to the increase in accessibility provision with the Proposed Scheme in place. Therefore, impacts are assessed as **Slight beneficial**.

¹⁴ Further information on journey time savings can be found in the A47 Blofield to North Burlingham Transport Forecasting Package Report 2020

12.9.71 Residual effects on businesses during operation are only in relation to changes in some accesses, as shown in Table 12-17. No direct impacts on development land or businesses are anticipated as a result of the Proposed Scheme.

Table 12-17 : Residual effects on development land and business

Description of impact	Sensitivity	Magnitude of impact	Potential impacts (pre-mitigation)	Residual effect
Access to development land and business				
Access to businesses located in Blofield (permanent)	Medium	Minor	Slight Beneficial	Slight Beneficial
Access to businesses located on Main Road	Medium	Minor	Slight Beneficial	Slight Beneficial

Agricultural land holdings

12.9.72 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.

WCH

12.9.73 The carriageway of the de-trunked section of 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 Proposed Scheme provides a new Public Right of Way (PRoW) footpath connecting from the Blofield Overbridge to the B1140 junction. This route connects with multiple existing north / south permissive routes and footpath Burlingham FP3.

Table 12-18 : Residual effects to WCH

Description of impact	Sensitivity	Magnitude of impact	Residual effects
Severance of Burlingham FP3	Medium	Major	Moderate adverse
New combined footway/cycleway along de-trunked A47 connecting realigned Waterlow at Blofield to existing footway at the Dell Corner Lane junction via the Blofield Overbridge.	n/a	n/a	Slight beneficial
New section of footway on Yarmouth Road to improve pedestrian access to Blofield allotment.	n/a	n/a	Slight beneficial
New footpath to the south of the new A47 to improve connectivity between Blofield and North Burlingham. This new infrastructure would provide a connection to the permissive bridleway and Burlingham FP3.	n/a	n/a	Slight beneficial
Combined footway/cycleway would be incorporated into the A47/B1140 grade separated interchange	n/a	n/a	Slight beneficial

Human Health

12.9.74 Residual effects of operation on human health are provided in Table 12-19.

12.9.75 References to significant effects are detailed in the corresponding ES Chapter (TR010040/APP/6.1), where Table 12-19 assesses the change to health determinants and resulting health outcome which may occur due to the identification of potential significant effects.

Table 12-19 : Residual effects on human health

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
Access to healthcare facilities	The improvement of journey times (on average by two minutes ¹⁵) between Blofield and Acle due to the Proposed Scheme would result in reduced severance and improved access to healthcare facilities in these communities. Use of the de-trunked existing A47 would also improve access to local healthcare facilities for local residents due to reduced traffic congestion as a result of the Proposed Scheme. For WCH accessing facilities in Blofield from north of the existing A47, the new footway and combined footway/cycleway and the Blofield Overbridge would facilitate safer access. Improved access to healthcare facilities as a result of the Proposed Scheme is therefore assessed as having a positive health outcome on residents within the wards of Blofield with South Walsham, Burlingham and Acle.	Positive
Access to community, recreation and education facilities	The provision of the footway and combined footway/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. The footway and combined footway/cycleway offers a new option for users of the post office, where previously this facility was only accessible by car.	Positive
Access to green and open space	Access to green and open space north and south of the existing A47 is provided by PRoW located north and south of the existing A47. Access to Burlingham Woods to the north of the A47 is maintained and access to Lingwood Community Woodland would be altered due to the severance of Burlingham FP 3, however re-provision to the south would ensure access is maintained. Access to open spaces from north and south of the existing A47 would be improved by the Blofield Overbridge, enabling safer access. 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. Improved access to green and open space as a result of the Proposed Scheme is therefore assessed as having a positive health outcome.	Positive
Existing and predicted levels of air and noise pollution	The operational effect of the Proposed Scheme on air quality is not anticipated to result in negative health effects on any receptors. The greatest improvement in air quality is expected to occur at two properties located in Blofield.	Air quality: Neutral Noise, residential properties on Strumpshaw Road,

¹⁵ Further information on journey time savings can be found in the A47 Blofield to North Burlingham Transport Forecasting Package Report 2020.

Health Determinant	Predicted impacts on determinants	Residual effect of health outcome
	<p>During operation, there are residential properties within the study area which would potentially experience significant adverse and beneficial residual noise effects.</p> <p>Eighteen residential properties located on Strumpshaw Road (Brundall ward), Wood Lane (Brundall ward) and Stone Road (Brundall ward) are expected to experience short-term significant adverse and long-term minor beneficial residual effects. Long-term minor beneficial effects on these receptors may result in a positive health outcome for residents of these properties.</p> <p>Adverse noise effects off-line on the B1140 and Yarmouth Road may occur due to increases in traffic flows and speeds on other parts of the local road network. Receptors include 37 residential properties located on Yarmouth Road (Blofield with South Walsham Ward), expected to experience short-term significant/moderate and long-term minor/moderate adverse residual effects as a result of the Proposed Scheme. Significant adverse residual effects are likely at residential properties within 80m of Yarmouth Road. Eighteen residential properties on B1140 (Marshes ward) would potentially experience short-term major/moderate and long term moderate/minor adverse residual effects as a result of the Proposed Scheme. The health outcome has therefore been determined as negative.</p>	<p>Wood Lane and Stone Road: Positive</p> <p>37 residential properties on Yarmouth Road, residential properties within 80m of Yarmouth Road, 18 residential properties on B1140: Negative</p>
Landscape amenity	<p>During operation of the Proposed Scheme, moderate or large significant adverse visual effects are expected at 16 residential properties, described in chapter 7 landscape and visual. No other receptors are expected to experience significant residual effects. However, at year 15 of operation, the effects are not expected to be significant. 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.</p>	Neutral
Stress and Anxiety	<p>The implementation of the Proposed Scheme is not anticipated to have an impact on the stress and anxiety of local residents.</p>	Neutral
Safety	<p>The implementation of the proposed Blofield combined footway/cycleway and Blofield Overbridge will facilitate safer access for walkers and cyclists. Due to improved travel options for WCH, the health outcome has been determined as positive.</p>	Positive

12.10 Monitoring

12.10.1 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 ES Chapter 11 Noise and vibration (**TR010040/APP/6.1**).

12.10.2 Monitoring requirements for landscape visual effects will be determined as an outcome of the DCO process. 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.

12.11 Summary

- 12.11.1 Overall, impacts on population and human health are predominantly non-significant once the Proposed Scheme is operational. The exception to this is users of Burlingham FP3 where a **Moderate adverse** effect is anticipated due to journey length and journey time increases. Beneficial effects would be experienced by pedestrians and cyclists travelling along the de-trunked section of A47 due to the new combined footway/cycleway, lower traffic levels and slower speeds.
- 12.11.2 For those travelling by vehicle to access properties, businesses and community assets using the new A47 (the Proposed Scheme) by vehicle, benefits would be experienced in terms of journey time savings and safety for road users. Increase in severance due to increases in journey length would occur to properties on Lingwood Road and Lingwood Lane which would result in a **Moderate adverse** effect. Lingwood Community Woodland would result in a **Moderate adverse** effect due to increases in severance and land-take. Land-take of the Blofield allotments would result in a **Moderate adverse** effect.
- 12.11.3 During construction, there are likely to be some 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 producing an EMP (**TR010040/APP/7.7**) and recruiting a Community Liaison Officer would seek to minimise these effects as far as possible. Temporary land take during construction for four private properties would result in a **Moderate adverse** effect.
- 12.11.4 During operation, it is not expected that there would be any changes in health outcomes, however there may be both positive and negative health outcomes in terms of noise and accessibility for some receptors.
- 12.11.5 There are two agricultural holdings within the high level assessment where the impact of the Proposed Scheme may adversely impact upon the viability of the holdings. This is due to permanent land take of high quality, arable land. Four holdings are particularly sensitive to construction works due to land take and issues of access to key infrastructure.

12.12 References

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