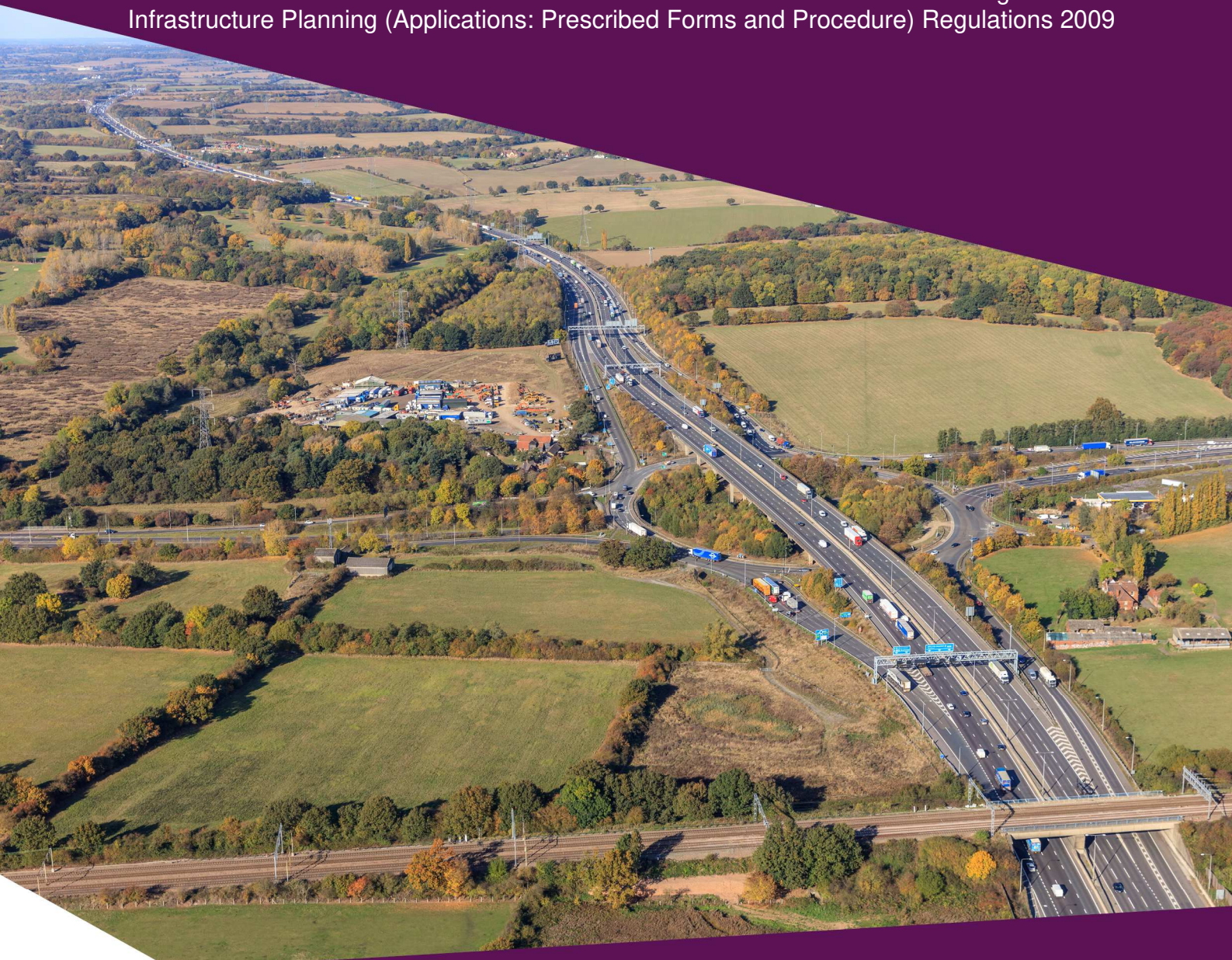


M25 junction 28 improvement scheme TR010029

6.1 Environmental Statement Chapter 13: People and communities

APFP Regulation 5(2)(a)
Planning Act 2008

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



Infrastructure Planning

Planning Act 2008

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

M25 junction 28 scheme Development Consent Order 202[x]

6.1 ENVIRONMENTAL STATEMENT CHAPTER 13: PEOPLE AND COMMUNITIES

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Executive summary

This chapter details the construction and operational effects upon people and communities which are anticipated as part of the Scheme. The potential growth of the area from development will bring more traffic, so without the Scheme to address this, the road network could become more congested. Road schemes can have wide ranging and varied effects on local communities and road users. This chapter has aimed to assess these effects and a number of assessments have been undertaken including impacts upon private dwellings, community assets, local businesses, agricultural land, development land and non-motorised users.

The private dwellings assessment identified a major adverse effect to Grove Farm during both the construction and operational phases of the Scheme. This is due to the temporary and permanent land take required as well as the impact on amenity at this location. A major adverse effect is also anticipated at Maylands Cottages as a result of the impact to amenity caused by the construction of the new loop road. This reduces to a slight adverse (not significant) effect during the operation of the Scheme once the mitigation through vegetation planting establishes.

The community assets assessment considered the impacts upon public spaces and community facilities. A significant adverse effect is anticipated at Maylands Golf Club during the construction stage as a result of the amenity impacts. This is expected to reduce to a slight adverse effect, and therefore not significant by the operational stage. It has also been identified that remodelling of holes 1, 2 and 3 of the golf course is to be provided to mitigate the effect of the proposed land take. This golf hole is expected to be of at least equal quality to the existing course and given that it is anticipated that the new hole can be constructed while the existing hole remains open, the overall effect is considered to be neutral.

The assessment has looked at the land take and amenity impacts from the Scheme on the Gardens of Peace, formerly known as Land at Oak Farm development. While there is expected to be some disruption during the construction phase of the Scheme, related in particular to the proposed diversion of an existing underground Cadent high pressure (33 bar) gas pipeline, it is considered that Gardens of Peace development will continue to be able to operate during construction. These construction impacts will be temporary in nature and are not expected to be significant. The permanent effect on the Gardens of Peace is considered to be neutral given there is an existing easement currently in place.

The rural enterprises assessment considered the impacts upon farms and agricultural land. Given the low-grade agricultural land in place at present, no significant effects are expected as a result of the Scheme.

Sites allocated for development, or sites with extant permissions were assessed in relation to the Scheme. The assessment has identified that there is not expected to be any significant impacts on development land as a result of the Scheme.

The assessment of NMUs considers that there would be no significant effects on NMUs arising from the Scheme. While it is not considered a significant change, there is expected to be a small improvement to existing NMU routes through the provision of a wider footpath within the new A12 off-slip as compared to the footpath within the existing A12 off-slip.

The vehicle traveller's assessment considered impacts upon views from the road and driver stress, which found that there would be moderate beneficial impacts at the operational phase given the Scheme would result in an improvement to traffic flows around the junction.

The assessment of effects of the Scheme on human health identifies that no significant effects are expected.

13. People and communities

13.1 Introduction

13.1.1 This chapter describes the anticipated construction and operational effects of the Scheme on people and communities within the Scheme Development Consent Order (DCO) boundary and study area. The assessment has been undertaken for the following sub-topic areas which provide the framework throughout the chapter:

- Private dwellings and property
- Community assets
- Rural enterprises
- Development land
- Non-motorised users (NMU) - pedestrians, cyclists and equestrians
- Vehicle travellers (VT) - drivers and passengers of both public and private vehicles
- Human health

13.1.2 An assessment of the local economy has been scoped out of the requirements of this chapter as agreed with the Planning Inspectorate and it is therefore not included.

13.1.3 Existing conditions have been reviewed to establish the baseline against which the likely effects from the construction and operation of the Scheme have been assessed.

13.1.4 By their nature, road schemes can have wide ranging and varied effects on those communities in the vicinity of the Scheme and the various users of the road network. This chapter has aimed to assess these effects and takes into consideration the outcomes of the air quality (Chapter 5), noise and vibration (Chapter 6), and landscape and visual (Chapter 9) assessments also contained within this Environmental Statement (ES).

13.1.5 The assessment sub-topics and methodology followed is in accordance with the guidance provided in the DMRB Volume 11, Section 3, Parts 6, 8 and 9 and Interim Advice Note (IAN) 125/15 Environmental Assessment Update.

13.2 Competent expert evidence

13.2.1 This chapter has been undertaken by the following individuals who have used their knowledge, best practice and professional judgement to undertake this assessment:

- A qualified Senior Town Planner (BSc (Hons), MSc, MRTPI); who is a Chartered member of the Royal Town Planning Institute and has 6 years of knowledge and experience in town planning including experience with the Development Consent Process (DCO) process.
- A qualified Principal Town Planner (BSc (Hons), MA, MRTPI); who is a Chartered member of the Royal Town Planning Institute and has 15 years of knowledge and experience in town planning, with specific experience in NSIP infrastructure projects.

- A qualified Health Impact Assessment specialist (MBChB Medicine, MSc Environmental Epidemiology, PhD Public Health Policy) with 16 years of UK and international Health Impact Assessment experience, member of the International Association for Impact Assessment, an affiliate of the Institute of Environmental Management, an associate of the Faculty of Public Health and a fellow of the Royal Society of Public Health.

13.3 Legislative and policy framework

13.3.1 National, regional and local policy relevant to the scope of potential effects on people and communities is outlined in Table 13.1 below which have been guided by the design of the Scheme.

Table 13.1: Legislation, regulatory and policy framework for people and communities

Scale	Legislation/ regulation	Summary of requirements
National	National Planning Policy Framework (NPPF) 2019 ¹	<p>The NPPF sets out Government's planning policies to achieve sustainable development under three overarching objectives, these are economic, social and environmental objectives.</p> <p>The economic objective aims to support a prosperous rural economy; planning should promote the sustainable growth and expansion of all types of businesses in rural areas, through: conversion of existing buildings and well-designed new buildings; the diversification of agricultural and land-based rural businesses; sustainable rural tourism and leisure developments which respect the character of the countryside; and the retention and development of accessible local services and community facilities such as local shops, meeting places, sports venues, open space, cultural buildings, public houses and places of worship (Paragraph 83).</p> <p>The social objective aims to support strong, vibrant and healthy communities (...) by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.</p> <p>Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, considering both local business needs and wider opportunities for development. (Paragraph 80).</p> <p>Chapter 8 'Promoting Healthy and Safe Communities' communities sets that planning policies and decisions should aim to achieve healthy, inclusive and safe places which: a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other; b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion; and c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs.</p>

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Scale	Legislation/ regulation	Summary of requirements
		<p>Planning should thus promote safe, accessible environments and to enhance the sustainability of communities and residential environments. There should be positive planning for the use of public areas and shared space, and protect valued facilities and services including open space, sports venues, public houses, places of worship and local established shops (Paragraphs 91-93). Existing open space, sports and recreational buildings and land, including playing fields, should not be built on unless for specific conditions (Paragraph 97). Paragraph 98 states policies should protect and enhance public rights of way (PRoW) and access. Local authorities should seek opportunities to provide better facilities for users, for example by adding links to existing rights of way networks including National Trails.</p> <p>The NPPF states that the system needs to be balanced in favour of sustainable transport modes, where significant development should be focused on locations which are, or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. Chapter 9 'Promoting Sustainable Transport' emphasises how transport should be considered early within the context of planning decisions and sustainable development. This policy encourages solutions that seek to reduce congestion, greenhouse gas emissions and serve to facilitate the use of sustainable transport, transport technology options and parking and patterns of movement to be integrated into the design for environmental and social benefits (paragraph 102). Furthermore, local planning authorities (LPAs) are required to identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice and realise opportunities for large scale development.</p> <p>Other sections of the NPPF that influence people and communities, are described below:</p> <ul style="list-style-type: none"> • NPPF11 Making effective use of land: safeguarding and improving the environment and ensuring safe and healthy living conditions; and securing well-designed, attractive and healthy places. • NPPF12 Achieving well-designed places: creating places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience. • NPPF15 Conserving and enhancing the natural environment: ensuring that new development is appropriate for its location taking into account the likely effects of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development; and mitigating and reducing to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life. • NPPF17 Facilitating the sustainable use of minerals: sets out criteria or requirements to ensure that permitted and

Scale	Legislation/ regulation	Summary of requirements
		<p>proposed operations do not have unacceptable adverse impacts on (...) human health.</p>
	<p>National Networks National Policy Statement (NPS NN)²</p>	<p>The Government’s vision and strategic objectives for the national networks include improving overall quality of life, journey quality, reliability and safety and linking up communities. Junction improvement is cited as a measure which will be used to enhance the existing national road network towards this vision (Paragraph 2.23).</p> <p>The NPS NN establishes the expectation that delivery of new schemes will improve quality of life and avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF and the Government’s planning guidance (Paragraph 3.3). Schemes will also be expected to improve accessibility and inclusivity and reduce community severance, to contribute to a network that provides a range of opportunities and choices for people to connect with jobs, services and friends and family (Paragraph 3.19).</p> <p>Although it does not provide specific guidance for people and communities impacts, the NPS NN outlines the approach to land use which is of relevance to this assessment. Applicants should identify existing and proposed land uses, including best and most versatile agricultural land, near the Scheme and the likely effects on these (Paragraphs 5.165 and 5.168).</p> <p>It is acknowledged in the NPS NN that new or enhanced national networks infrastructure can have direct (paragraph 4.79) and indirect (paragraph 4.80) impacts on health, well-being and the quality of life of the population. It further states that (paragraph 4.81) where a proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant adverse health impacts. And that the applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate (paragraph 4.82).</p>
	<p>Countryside and Rights of Way Act 2000³</p>	<p>The Countryside and Rights of Way Act 2000 (CRoW) regulates all Public Rights of Way (PRoW) and ensures access to them. It requires local highway authorities to publish a Rights of Way Improvement Plan (RoWIP), which should be reviewed every 10 years. The Act also obliges the highway authority to recognise the needs of the mobility impaired when undertaking improvements.</p>
<p>Road Investment Strategy (RIS) 2015 – 2020 and Strategic Business Plan 2015⁴</p>	<p>The RIS aims to improve connectivity, safety, air quality and road user satisfaction, boost the economy whilst reducing noise and negative environmental impacts all of which will have an impact on local communities and people.</p> <p>It also recognises the importance of the network accounting for the needs of walkers and cyclists, and not act as a deterrent to active travel options. The network must be easier to get over, under or around to ensure that roads do not divide communities, and that the associated health and wellbeing benefits of walking and cycling are felt as widely as possible.</p>	

² <https://www.gov.uk/government/publications/national-policy-statement-for-national-networks>

³ <http://www.legislation.gov.uk/ukpga/2000/37/contents>

⁴ <https://www.gov.uk/government/collections/road-investment-strategy>

Scale	Legislation/ regulation	Summary of requirements
	RIS2 2020 – 2025 ⁵	RIS2 builds on the long term strategic vision set out in previous RIS and details a stronger focus on the differing needs of road users and adoption of new working practices and technologies. It aims to ensure road users experience a smoother, more consistent journeys. By making the most of green infrastructure and good design, seeks to enable people to live alongside the network and experience less noise, light and air pollution. An
	Health and Social Care Act 2012 ⁶	This is a wide-ranging piece of legislation that places a duty of care to protect and improve public health on the Secretary of State for Health as well as other bodies directed by the Secretary of State for Health such as local authorities, including Directors of Public Health, and the NHS (Sections 11, 12, 18, 22, 30, 31 and 60).
	Public Health Outcomes Framework 2016 ⁷	This sets out the national vision and targets for public health and how public health is being improved and protected. Key target indicators include: reducing killed and seriously injured casualties on England's roads; reducing percentage of the population affected by noise; increasing utilisation of outdoor space for exercise/health reasons; increasing proportion of physically active adults; reducing the fraction of mortality attributable to particulate air pollution; reducing mortality rate from causes considered preventable; and reducing numbers of 16-18-year olds not in education, employment or training.
Regional	Essex County Council Public Rights of Way Plan (2009) ⁸	The Rights of Way Improvement Plan (RoWIP) 2009 is the constituent plan for the Countryside and Rights of Way Act 2000. This serves as a means for the local highway authority to identify improvements and management changes to be made to the local rights of way network in order to meet the Government's aim of better provision for walkers, cyclists, equestrians and people with mobility problems.
	Essex County Council Local Transport Plan (2011) ⁹	<p>The Essex Local Transport Plan 2011 sets out the county's vision for transport, the outcomes aimed to achieve over a fifteen-year period, policies for transport and the broad approach to implementing these.</p> <p>The Plan seeks to achieve five broad outcomes, which are of relevance to the considerations for People and Communities:</p> <ul style="list-style-type: none"> • Provide connectivity for Essex communities and international gateways to support sustainable economic growth and regeneration • Reduce carbon dioxide emissions and improve air quality through lifestyle changes, innovation and technology • Improve safety on the transport network and enhance and promote a safe travelling environment • Secure and maintain all transport assets to an appropriate standard and ensure that the network is available for use • Provide sustainable access and travel choice for Essex residents to help create sustainable communities.

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf

⁶ <http://www.legislation.gov.uk/ukpga/2012/7/contents/enacted>

⁷ <https://www.gov.uk/government/publications/public-health-outcomes-framework-2016-to-2019>

⁸ <https://www.essexhighways.org/uploads/files/final-rowip.pdf>

⁹ https://www.essexhighways.org/uploads/docs/essex_ltp.pdf

Scale	Legislation/ regulation	Summary of requirements
	Essex County Council Cycling Strategy (2016) ¹⁰	The purpose of this strategy is to set out the key elements of a long-term plan that will lead to a significant and sustained increase in cycling in Essex, establishing it in the public's mind as a 'normal' mode of travel, especially for short a-to-b trips, and as a major participation activity and sport for all ages.
	Essex Green Infrastructure Strategy (draft March 2019) ¹¹	A Green Infrastructure Strategy is currently being developed for Essex with the aim to unlock green assets to deliver multiple benefits for example to support healthier, more active lifestyles, flood alleviation, mitigate climate change, enhance and protect biodiversity, and contribute to economic growth.
	Greater London Authority (GLA) London Plan (2016) ¹²	<p>The London Plan is the strategic development plan for the Greater London region. The following policies are of relevance to the considerations for people and communities:</p> <ul style="list-style-type: none"> • Policy 1.1 Delivering the Strategic Vision and Objectives for London • Policy 2.1 London in its Global, European and United Kingdom Context • Policy 2.2 London and the Wider Metropolitan Area • Policy 2.6 Outer London: Vision and Strategy • Policy 2.7 Outer London: Economy • Policy 2.8 Outer London: Transport • Policy 2.18 Green Infrastructure: The Multi-Functional Network of Green and Open Spaces • Policy 3.1 Ensuring Equal Life Chances for All • Policy 3.2 Improving Health and Addressing Health Inequalities • Policy 3.4 Optimising Housing Potential • Policy 3.6 Children and Young People's Play and Informal Recreation Facilities • Policy 3.16 Protection and Enhancement of Social Infrastructure • Policy 3.17 Health and Social Care Facilities • Policy 3.19 Sports Facilities • Policy 4.6 Support for and Enhancement of Arts, Culture, Sport and Education • Policy 6.1 Strategic Approach • Policy 6.2 Providing Public Transport Capacity and Safeguarding Land for Transport • Policy 6.11 Smoothing Traffic Flow and Tackling Congestion • Policy 6.12 Road Network Capacity • Policy 7.14 Improving Air Quality • Policy 7.15 Reducing and Managing Noise, Improving and enhancing the Acoustic Environment and Promoting Appropriate Soundscapes

¹⁰ <https://www.essexhighways.org/uploads/docs/ecc-cycling-strategy-novemeber-2016.pdf>

¹¹ https://consultations.essex.gov.uk/rci/green-essex-strategy/supporting_documents/Plain%20Text%20Green%20Essex%20Strategy%20June%202019.pdf

¹² <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan>

Scale	Legislation/ regulation	Summary of requirements
		<ul style="list-style-type: none"> • Policy 7.16 Green Belt • Policy 7.18 Protecting Open Space and Addressing Deficiency • Policy 7.19 Biodiversity and Access to Nature • Policy 7.21 Trees and Woodlands
	Draft London Plan (2019) ¹³	<p>The Draft New London Plan is currently at the examination stage and, once adopted, will replace the London Plan 2016. Those draft policies which are of particular relevance to the considerations for people and communities are:</p> <ul style="list-style-type: none"> • Policy GG1 Building strong and inclusive communities; • Policy GG5 Growing a good economy • Policy SD2 Collaboration in the wider South East • Policy D2 Delivering good design • Policy H1 Increasing housing supply • Policy H16 Gypsy and Traveller accommodation • Policy S5 Sport and recreation facilities • Policy S7 Burial Space • Policy HC3 Strategic and local views • Policy G1 Green infrastructure • Policy G2 London's Green Belt • Policy G7 Trees and woodland • Policy SI1 Improving air quality • Policy T1 Strategic approach to transport • Policy T3 Transport capacity, connectivity and safeguarding • Policy T5 Cycling
Local Planning Authority	Brentwood Borough Council Replacement Local Plan (2005) ¹⁴	<p>The Replacement Local Plan is the adopted development plan for Brentwood Borough. The following policies are of relevance to the considerations for People and Communities:</p> <ul style="list-style-type: none"> • Policy CP1 General Development Criteria • Policy CP3 Transport Assessments • Policy T2 New development and Highway Considerations • Policy T3 Traffic Management • Policy GB1 New Development • Policy GB2 Development Criteria • Policy GB27 Access to the Countryside • Policy LT1 Strategic Public Open Space
	Brentwood Local Plan (Regulation 19) (2019) ¹⁵	<p>The Brentwood Local Plan is the emerging local plan for Brentwood Borough, currently at Pre-Submission stage. The following policies are of relevance to the considerations for People and Communities:</p> <ul style="list-style-type: none"> • Policy BE01: Future Proofing • Policy BE10: Connecting New Developments to Digital Infrastructure

¹³ <https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan>

¹⁴ <https://www.brentwood.gov.uk/pdf/30102013165238u.pdf>

¹⁵ <https://www.brentwood.gov.uk/pdf/31012019170028000000.pdf>

Scale	Legislation/ regulation	Summary of requirements
		<ul style="list-style-type: none"> • Policy BE11: Strategic Transport Infrastructure • Policy BE13: Sustainable Means of Travel and Walkable Streets • Policy BE14: Sustainable Passenger Transport • Policy BE16: Mitigating the Transport Impacts of Development • Policy BE18: Green and Blue Infrastructure • Policy BE19: Access to Nature • Policy BE22: Open Space in New Development • Policy HP12: Planning for Inclusive Communities • Policy HP13: Creating Successful Places • Policy HP14: Responding to Context • Policy HP15: Permeable and Legible Layout • Policy HP18: Designing Landscape and the Public Realm • Policy PC01: Cultivating a Strong and Competitive Economy • Policy PC02: Job Growth and Employment Land • Policy PC06: Supporting the Rural Economy • Policy PC14: Protecting and Enhancing Community Assets • Policy NE01: Protecting and Enhancing the Natural Environment • Policy NE09: Green Belt • Policy NE11: Established Areas of Development and Structures in the Green Belt
	<p>Havering Core Strategy and Development Control Policies Development Plan Document (2008)¹⁶</p>	<p>The Core Strategy and Development Control Policies Document is the adopted development plan for the London Borough of Havering. The following policies are of relevance to the considerations for People and Communities:</p> <ul style="list-style-type: none"> • CP1-CP2 Places to Live • CP3 Places to Work • CP8 Community Needs • CP9-CP10 Transport • CP14 Green Belt • CP15-CP16 Environmental Management • CP17 Design • DC1-DC8 Places to Live • DC9-DC14 Places to Work • DC26-DC31 Community Needs • DC32-DC39 Transport • DC45-DC47 Green Belt • DC48-DC60 Environmental Management • DC61-DC66 Design
	<p>Havering Local Plan 2016-31 (2018)¹⁷</p>	<p>The Havering Local Plan is the emerging local plan for the London Borough of Havering, currently at Submission stage.</p>

¹⁶ <https://www3.havering.gov.uk/Documents/Planning/LDF/Core-Strategy-Development-Control.pdf>

¹⁷ https://www.havering.gov.uk/downloads/download/641/havering_local_plan

Scale	Legislation/ regulation	Summary of requirements
		The following policies are of relevance to the considerations for People and Communities: <ul style="list-style-type: none"> • Policy 7 Residential design and amenity • Policy 11 Gypsy and Traveller accommodation • Policy 12 Healthy communities • Policy 16 Social infrastructure • Policy 18 Open space, sports and recreation • Policy 19 Business growth • Policy 23 Transport connections • Policy 26 Urban design • Policy 27 Landscaping • Policy 29 Green infrastructure • Policy 36 Low carbon design, decentralised energy and renewable energy

Table Source: Various Local, Regional and National Planning Guidance documents

13.4 Study area

13.4.1 In the absence of prescriptive guidance in DMRB Volume 11 and IAN 125/25 on the recommended study area for people and communities, the study area has been set based on professional judgement, knowledge and best practice.

13.4.2 The following study areas identified in Table 13.2 have been applied to the people and communities assessment and are considered appropriate and likely to capture all relevant effects resulting from the Scheme. The study areas have been discussed through the scoping stage with the local planning authorities and have taken on comments received on the Scoping Opinion (case reference: TR10029, December 2017).

Table 13.2: Study areas by receptor

Receptor	Study area
Private dwellings and property	Extent of Scheme DCO boundary plus a 500 m buffer.
Community land and facilities	Extent of DCO boundary plus a 500 m buffer plus the settlements within the wards of Harold Wood and South Weald.
Rural enterprises	Agricultural land whose land is required either temporarily or permanently by the Scheme or whose accesses may be affected within the DCO boundary plus a 250m buffer.
Development land	Extent of DCO boundary plus a 500 m buffer.
NMUs – pedestrians, cyclists and equestrians	Extent of DCO boundary plus a 500 m buffer.
Vehicle Travellers – drivers and passengers of both public and private vehicles	Extent of DCO boundary plus a 500 m buffer. Driver Stress will also consider the Affected Road Network as described in the Air Quality chapter (Chapter 5 of the ES).
Human health	Extent of DCO boundary plus 1 km buffer that extends along the main transport routes around the Scheme. Specifically, health effects are considered, 250 m from the Scheme boundary - the core health study area, 250 m to 1 km from the Scheme boundary

Receptor	Study area
	- the intermediate health study area, and, where appropriate, over 1 km from the Scheme boundary - the wider health study area).

Table Source: Atkins own methodology 2018

13.5 Assessment methodology

13.5.1 The people and communities assessment reviews a range of potential effects. The method of assessment for these potential effects varies according to the nature of each impact and receptor type. The assessment is focused on the sensitivity of each receptor and the magnitude of impact upon that receptor. Assessment criteria is presented below for the assessment of the following topic areas:

- Private dwellings and property:
 - Land Take and changes in access
 - Amenity
- Community assets:
 - Land Take and severance
 - Amenity
- Rural enterprises:
 - Effect of the Scheme on operation of rural enterprises
- Development land:
 - Effect of the Scheme on the ability of land to come forward for development
- Non-motorised users (NMU):
 - Severance
 - Changes in amenity
- Vehicle travellers (VT):
 - Views from the road
 - Driver Stress
- Human health:
 - Health outcomes: communicable disease, non-communicable disease, physical injury, mental health and wellbeing and nutritional disorders.
 - Health determinants (factors that the Scheme can influence which can lead to beneficial and adverse health effects): population change, housing, learning and education, transport and connectivity, crime and safety, health and social care and public services, shops and retail amenities; and leisure and recreation.

13.5.2 In each case, the assessment methodology accords with of guidance provided in DMRB Volume 11 where applicable.

Sensitivity of receptors

- 13.5.3 The sensitivity of receptors is determined by their vulnerability to change and their capacity to cope with changes. Determination of sensitivity for receptors for the people and communities' assessment accords with DMRB guidance (Volume 11 Section 2 Part 5) and best practice.
- 13.5.4 Guidance on assessing impacts from the demolition of private property and associated land-take is provided in DMRB Volume 11, Section 3, Part 6 Land Use, however this does not include sufficient detail upon which to base assessment criteria beyond reporting the approximate number of units that may be lost. Professional judgement is therefore applied in order to set out criteria against which magnitude and significance shall be assessed and presented in Table 13.3 below.

Table 13.3: Description of sensitivity of receptors

Sensitivity	Criteria
Negligible	Receptor/ resource is very low in importance and rarity
Low	Receptor/ resource has low vulnerability to change. Can easily absorb changes due to the following (or similar) reasons: <ul style="list-style-type: none"> Resource is infrequently used Reasonable alternative facilities, access routes or opportunities available
Medium	Receptor has a limited ability to absorb change for the following (or similar) reasons: <ul style="list-style-type: none"> Resource is semi-frequently used Limited range of reasonable alternative facilities, access routes, or opportunities available
High	Receptor is vulnerable to change. Little ability to absorb change for the following (or similar) reasons: <ul style="list-style-type: none"> Resource is frequently used No reasonable alternative facilities, access routes or opportunities available

Table Source: Based on DMRB HA 205/08 Table 2.1

- 13.5.5 Based on the sensitivity criteria set out above, Table 13.4 sets out the sensitivity of receptors within this assessment:

Table 13.4: Sensitivity of assessment receptors

Topic	Receptor	Indicative sensitivity
Private dwellings and property	Residential property	High
	Commercial property	Medium
Community land and facilities	Designated local green space / valued community facility at a national level	High
	Community facility of medium or high importance on a regional scale	Medium
	Undesignated local green space / non-essential community facility.	Low
	Essential services/ facilities for local community (required).	High

Topic	Receptor	Indicative sensitivity
Community severance	Non-essential services/ facilities for local community (desirable).	Low
Rural enterprises	Farm types or land-based enterprises in which the operation is dependent on the spatial relationship of land to key infrastructure, and where there is a requirement for frequent and regular access between the two, or dependent on the existence of the infrastructure itself, e.g. dairying; irrigated arable cropping and field scale horticulture; intensive livestock or horticultural production; equestrian centres. ALC Grades 1, 2 and 3a is considered to be of high sensitivity.	High
	Farm types or land-based enterprises in which there is a degree of flexibility in the normal course of operations, e.g. combinable arable crops; grazing livestock farms (other than dairying). Agricultural land in ALC Subgrade 3b is considered to be of medium sensitivity.	Medium
	Farm types and land uses undertaken on a semi-commercial or non-commercial basis such as occasional grazing by horses. Agricultural land in ALC Grades 4 and 5 is considered to be of low sensitivity.	Low
	Agricultural land in a long-term state of disuse and reverting to scrub.	Negligible
Development land	Assigned on a case by case basis.	N/A
Non-motorised users	All NMUs, key sensitive groups include children and young people, older people, women, people with disabilities and people on low incomes (these are often overlapping groups and individuals and groups may be part of more than one of these categories).	High
Vehicular travellers	Public transport, motor vehicle.	Low
Human health	Communities with one or more of the following: existing low levels of physical and/or mental health; high levels of health inequalities or inequities; weak social and economic support networks; high levels of deprivation; high levels of exposure to environmental risk factors; poor availability of or access to health and social services; high proportion of vulnerable sub-groups (e.g. children, elderly, people with disabilities, economically inactive); strong views or high degrees of uncertainty about the project. These communities are judged to have a low coping capacity.	High
	Communities with one or more of the following: existing moderate or average levels of physical and/or mental health; moderate or average levels of health inequalities or inequities; social and economic support networks; moderate or average levels of deprivation; moderate or average levels of exposure to environmental risk factors; moderate availability of or access to health and social services; average proportion of vulnerable sub-groups (e.g. children, elderly, people with disabilities, economically inactive); no	Medium

Topic	Receptor	Indicative sensitivity
	strong views or high degrees of uncertainty about the project. These communities are judged to have a moderate coping capacity.	
	Communities with one or more of the following: good levels of physical and/or mental health; low levels of health inequalities or inequities; good social and economic support networks; low levels of deprivation; low levels of exposure to environmental risk factors; good availability of or access to health and social services; low proportion of vulnerable sub-groups (e.g. children, elderly, people with disabilities, economically inactive); no strong views or high degrees of uncertainty about the project. These communities are judged to have a high coping capacity.	Low

Table Source: Adapted from DMRB HA 205/08 Table 2.1 and part based on professional judgement, knowledge and best practice.

Magnitude of impact

13.5.6 To determine significance of effect, each change has to be assessed on magnitude level. The criteria used to determine the magnitude of any change in baseline conditions is presented in Tables 13.5 to 13.15 below. The magnitude of change is primarily derived from the following:

- Geographical scale of impact
- Duration of impact (temporary, short term, long term)
- Frequency of impact (continuous, intermittent, changeable or constant)
- Whether the impact is reversible or irreversible

13.5.7 This section sets out the criteria for determining the magnitude of impact for each of the identified receptors.

Private dwellings and property

Land take and changes in access

13.5.8 Advice on assessing impacts from the demolition of private property and associated land-take is provided in DMRB Volume 11, Section 3, Part 6 (Land Use), however this does not include sufficient detail to define the assessment criteria beyond reporting the approximate number of units that may be lost. Professional judgement is therefore applied to set out criteria against which magnitude of impact is assessed.

13.5.9 Demolition, loss of land, and alterations to access have been considered as a land take effect. Land take effects may either result in temporary impacts during construction, or permanent impacts occurring following construction including any permanent acquisitions of a right only over the land. In this case, land take would be required from construction stage continuing through to the operational phase. No additional land take is expected following the construction stage. The magnitude of impact has been assessed according to the criteria set out in Table 13.5 and loss of land is considered adverse in all cases. This has been considered against a qualitative assessment, taking into account spatial scales, including the study area (500 m) in which the affected private dwellings and property are located and the wider local authority areas. This will therefore allow

for consideration of existing and future housing stock in a wider spatial area as well as the effect on the study area.

Table 13.5: Assessment criteria for demolition, land take and changes in access to private dwellings and property

Magnitude	Impact description
Major (adverse)	Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements.
Moderate (adverse)	Loss of resource, but not adversely affecting the integrity; partial loss of/ damage to key characteristics, features or elements.
Minor (adverse)	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to one (maybe more) key characteristics, features or elements.
Negligible (adverse)	No loss or detrimental alteration to one or more characteristics, features or elements.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table Source: Atkins 2018, adapted using professional judgement from DMRB Vol 11 Section 3 Part 6 and DMRB Volume 11 Section 2 (Part 5)

Amenity

- 13.5.10 Construction of the Scheme has the potential to adversely affect amenity for residents and occupiers of properties near the Scheme. Amenity effects e.g. air quality, noise or visual impact have been assessed elsewhere in the ES (Chapters 5, 6 and 9 respectively). However, where a property or properties are likely to receive a combination of two or more significant traffic or amenity effects, this chapter has considered the likely impact of these effects on residents and the local community.
- 13.5.11 The magnitude of impact has been assessed according to the criteria set out in Table 13.6. All residential dwellings, including their access and curtilage, are considered to be receptors of high sensitivity. In-combination effects are considered in the Assessment of Cumulative Effects (Chapter 15).

Table 13.6: Assessment criteria for amenity effects on private dwellings and property

Magnitude	Impact description
Major (adverse)	Adverse or beneficial alteration in amenity (including two or more significant amenity effects) for 5+ dwellings.
Minor (adverse)	Adverse or beneficial alteration in amenity (including two or more significant amenity effects) for 1-4 dwellings.
Neutral	No two interacting significant amenity effects on dwellings.

Table Source: Atkins own methodology based on best practice 2018

Community land and facilities

Land take

- 13.5.12 Advice on assessing impacts from the loss of land used by members of the public is included in Section 3 of the ES (Environmental Assessment Techniques), the Geology and Soils chapter (Chapter 10) and Part 6 (Land Use) of the DMRB. This guidance requires assessment of the impact of loss of land

used by the community. It requires the undertaking of sufficient assessment to identify the location, status and importance of facilities and land used by the public. As with land take from private dwellings, land take for community assets is considered adverse.

- 13.5.13 The method for the assessment of magnitude is based on a bespoke set of assessment criteria, which have been developed using professional judgement to assign a level of significance to effects arising from the impacts to community land and facilities. The magnitude of impact has been assessed according to the criteria set out in Table 13.7.

Table 13.7: Assessment criteria for land take on community assets

Magnitude	Criteria
Major (adverse)	Loss of majority of the receptor (>50%), loss cannot be replaced in or near to study area.
Moderate (adverse)	Loss of the receptor (> 25% but <50%) so as to reduce the enjoyment of people using the community facility. Loss of land can be replaced near to the study area.
Minor (adverse)	Small loss of the receptor (<25%) is required which would affect enjoyment of people using the community facility.
Negligible	No loss of receptor with little or no overall impact on the enjoyment of people using the community facility.

Table Source: Atkins own methodology derived in part from the High Speed 2 community impact approach which required 5 or more residential properties to be affected in order for a community effect to be considered likely

Severance

- 13.5.14 Community severance is concerned with the role of roads as a barrier between different parts of the community resulting in changes to journey patterns and the impact of the Scheme on accessibility to and from communities and their facilities.
- 13.5.15 In accordance with DMRB Volume 11, Section 3, Part 8, the magnitude of impact for assessing community severance has been described using a three-point scale, according to the criteria set out in Table 13.8.

Table 13.8: Assessment criteria for community severance

Magnitude	Criteria
Major	In cases of severe severance, people are likely to be deterred from making trips to an extent sufficient to induce a re-organisation of their habits. This would lead to a change in the location of centres of activity or in some cases to a permanent loss of a particular community. Alternatively, considerable hindrance will be caused to people trying to make their existing journeys. For example, a change in journey length of more than 500 m.
Moderate	In cases of moderate severance some residents, particularly children and elderly people, are likely to be dissuaded from making trips. Other trips will be made longer or less attractive. For example, a change in journey length of between 250 m and 500 m.
Minor	Generally, in cases of slight severance current journey pattern is likely to be maintained, but there will probably be some hindrance to movement. For example, a change in journey length of less than 250 m.

Table Source: DMRB Volume 11, Section 3, Part 8

13.5.16 The impact of severance on changes to NMU routes is reported under the NMU sub-heading.

Amenity

13.5.17 The Scheme may result in changes in amenity experienced at community facilities or land used by the community. Amenity and traffic effects (including air quality, noise, vibration, and visual impact caused either directly by the Scheme itself or by changes in traffic flows brought about by the Scheme) have been considered individually in detail elsewhere in the ES namely the air quality (Chapter 5) and noise assessment (Chapter 6). The people and communities chapter has considered instances where users of a community facility or land used by the community may experience a combination of such effects, leading to a cumulative deterioration in amenity. In-combination effects are also considered in Assessment of Cumulative Effects (Chapter 15).

13.5.18 A qualitative assessment of the potential impact of the Scheme on the amenity of community facilities and land used by the community during construction and operation has been undertaken, drawing upon the conclusions of the traffic, air quality, noise, vibration and visual impact assessments.

13.5.19 The method for the assessment of magnitude of impact is based on a bespoke set of assessment criteria, which have been developed using professional judgement to assign a level of significance to effects arising from the impacts, as set out in Table 13.9.

Table 13.9: Assessment criteria for amenity of community assets

Magnitude	Criteria
Major	Substantial and permanent changes in environmental amenity for a large number of people.
Moderate	A substantial change to a modest number of people’s environmental amenity or a moderate change in many people’s environmental amenity. Impacts can be temporary or permanent but do not significantly affect the overall functioning of the land use in the longer term.
Minor	A detectable but non-material change to environmental amenity for a small or large number of people. Changes might be noticeable, but the beneficial or adverse impacts fall within the range of normal variation.
Neutral	Changes that are unlikely to be noticeable (i.e. well within the scope of natural variation).

Table Source: Atkins own methodology based on best practice 2018

Rural enterprises

13.5.20 The assessment follows the approach of the DMRB Volume 11, Section 3, Part 6 Land Use.

13.5.21 Magnitude of impact (degree of change) of the Scheme on rural enterprises has been assessed on the following scale set out in Table 13.10, based on the likely impact on their viability. The magnitude of impact of permanent land-take is negligible. The potential impact of temporary closure of accesses in the construction phase is major.

Table 13.10: Magnitude of impact to rural enterprises

Magnitude	Criteria
Major	The identified impacts are predicted to result in very large damage to the enterprise.
Moderate	The identified impacts are predicted to result in moderate or large damage to the enterprise.
Minor	The identified impacts are predicted to result in slight or moderate damage to the enterprise.
Negligible	The identified impacts are predicted to result in little or no damage to the enterprise.

Table Source: DMRB Volume 11 Section 3 Part 6 Land Use

Development land

- 13.5.22 Assessment of the effects of the Scheme on development land is based upon guidance set out in DMRB, Volume 11, Section 3, Part 6, Chapter 5: Effects on Development Land. It should be noted that this does not follow the other subtopics with magnitude attributes, but instead effects are assessed by sensitivity and significance.
- 13.5.23 Development land is defined in DMRB as:
- Land that is covered by local planning authorities' future development land use designations as indicated in adopted and emerging development plans.
 - Land upon which planning permission has been granted for developments that have not yet been built, such as for housing development.
- 13.5.24 This guidance suggests that the environmental assessment should take account of, as far as is practicable, future changes in land use due to new development which would be likely to occur in the absence of a scheme. This should be done by considering the impact of a scheme's land-take on any sites covered by local planning authorities' land use planning designations.
- 13.5.25 In addition, future changes in land use, for which planning permission has been granted, may also be relevant to the assessment of a scheme. For example, where a proposed scheme would run close to an area reserved for housing development it should be recognised that more residences would be affected by noise, visual intrusion, etc., than the current assessment suggests. Alternatively, planned development could reduce the landscape quality of an area, for example.
- 13.5.26 In order to assess potential effects of the Scheme on development land, a desk-based review of local planning policy and associated mapping, a search of planning consents has been undertaken to identify potential 'receptors'. The impact of the Scheme has then been assessed using a descriptive approach that considers potential 'land-take' from allocated or consented sites and the effect of the Scheme may have on allocated or consented sites nearby. This assessment has considered the extent to which the Scheme would support, depart from, or hinder planning policy aims. The significance of impact on development land has been assessed using the criteria outlined in Table 13.11 below.

Table 13.11: Magnitude of Impact on development land

Magnitude	Criteria
Significant Beneficial	The Scheme substantially contributes to the achievement of, or is consistent with, the intended use of identified development land.
Beneficial	The Scheme partially contributes to the achievement of, or is consistent with, the intended use of identified development land.
Neutral	The Scheme does not affect the intended use of identified development land or equally benefits and hinders achievement of the intended use.
Adverse	The Scheme partially hinders or is inconsistent with the intended use of identified development land.
Significant Adverse	The Scheme substantially hinders or is inconsistent with the intended use of identified development land.

Table Source: DMRB, Volume 11, Section 3, Part 6, Chapter 5

Non-motorised users (NMU)

Journey length and severance

- 13.5.27 Severance of existing and proposed routes and PRoW used by NMU which may be affected by the Scheme have been identified through a desk-based assessment drawing on the guidance in the Pedestrians, Cyclists and Equestrians component of DMRB Volume 11, Section 3, Part 8. Changes in journey length, journey times and amenity for pedestrians and others may be such that they affect, adversely or beneficially, the degree to which a locality is subject to “community severance”.

Amenity

- 13.5.28 Amenity, for non-motorised users, is defined in Volume 11, Section 3, Part 8, sub-section 4 as “*the relative pleasantness of a journey*”. In assessing amenity for the routes used by pedestrians and others, a descriptive approach has been employed to give an overall indication of the change in amenity and the number of journeys affected, including reasoned judgement. This assessment has verified the earlier assessment undertaken during the option selection stage of changes in amenity, allowing for any subsequent modifications in the Scheme design (for example, to traffic forecasts, or the route alignment or mitigation).
- 13.5.29 Other factors have been considered where applicable, such as footpath width and distance from traffic, barriers between pedestrians and traffic, and the quality of street furniture and planting. For ramblers, changes in the quality of landscape or townscape are also relevant. For cyclists, there may be positive factors, such as the clear signage of alternative routes, subways or cycle crossings, and negative factors such as junctions where cyclists and vehicles are not separated. For equestrians, landscape quality is generally an important factor, and some of the factors affecting cyclists, depending on the existing and proposed provision for riders. Safety for equestrians crossing a route is a particularly important consideration.
- 13.5.30 The NMU assessment focuses on changes in journey lengths and times, the effect on the amenity value of journeys and changes in community severance. The outcomes have been collated into a combined schedule. Table 13.12 sets out the magnitude of impact criteria used for the assessment of NMU.

Table 13.12: Assessment criteria for NMU effects

Magnitude	Magnitude of impact criteria
Major Beneficial	Substantial improvement to NMU network through provision of new amenities for pedestrians and cyclists where there is no existing route. NMUs navigate route with a decrease in traffic flows of over 50% Annual Average Daily Traffic (AADT). Decrease in journey length by over 500 m.
Moderate Beneficial	Improvement to existing NMU network through new amenities, where there are none or few existing amenities. NMUs navigate route with decrease in traffic flows of 30% - 50% AADT. Decrease in journey length by 250 – 500 m.
Minor Beneficial	Improvement of existing NMU network through upgrading of existing amenities or provision of new amenities where some already exist. Decrease in journey length by up to 250 m.
Negligible /Neutral	No change to traffic flows or NMU amenity. No provision of new amenities. No substantial change in journey length.
Minor Adverse	Existing facilities worsen. Increase in journey length by up to 250 m.
Moderate Adverse	Existing facilities worsen. NMUs navigate route with increase in traffic flows of 30% - 50% AADT. Increase in journey length by 250 – 500 m.
Major Adverse	Substantial harm to NMU route and degradation of amenities. Closure or removal of existing NMU routes. NMUs required to navigate route with an increase of traffic flows of over 50% AADT. Increase in journey length by over 500 m.

Table Source: Atkins own methodology based on best practice 2018

Vehicle travellers (VT)

Views from the road

13.5.31 The assessment of VT’s views has been based on the guidance in DMRB Volume 11, Section 3, Part 9. ‘View from the road’ is taken to be the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes. Aspects to be considered are:

- The types of scenery or the landscape character
- The quality of the landscape
- Features of particular interest or prominence in the view
- The extent to which travellers may be able to view the scene

13.5.32 The extent to which travellers may be able to view landscape shall be considered according to the following categories in defining sensitivity:

- No View: road in steep cutting or contained by earth bunds, environmental barriers or adjacent structures.
- Restricted View: frequent cuttings or structures blocking the view.

- Intermittent View: road generally at ground level with shallow cuttings or barriers at intervals.
- Open View: view extending over many miles or only restricted by existing landscape features.

13.5.33 The effects of the Scheme on traveller’s views from existing routes and from the carriageway of the Scheme itself has been assessed according to the TAG Social Impact Appraisal guidance¹⁸. The effects on traveller’s views has been categorised in one of the following three ways as set out in Table 13.13.

Table 13.13: Assessment criteria for views from the road for vehicle travellers

Magnitude	Magnitude of impact criteria
Beneficial	Views from the road would be, on balance, a change for the better.
Neutral /Negligible	Little or no effect for most views from the road or improvements on some views are generally balanced by deterioration in others.
Adverse	Views from the road would be, on balance, a change for the worse.

Table Source: DMRB Volume 11 Section 3 Part 9

Driver stress

13.5.34 There are three main components of driver stress: frustration; fear of potential accidents; and uncertainty relating to the route being followed:

- Driver frustration - caused by an inability to drive at a speed consistent with the standard of the road. This increases as speed falls in relation to expectations.
- Driver fear - the main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions.
- Driver uncertainty - caused primarily by signage that is inadequate for the individual’s purposes.

13.5.35 The measurable aspect of driver stress is associated with frustration due to delays. The level of driver stress has been determined through a qualitative assessment of the above factors, under the finely graded three-point descriptive scale, as recommended under DMRB guidance, Low, Moderate or High.

13.5.36 As per the DMRB guidance, the following tables 13.14 to 13.16 have been used to guide the assessment of driver stress in the ES. The modelling of driver stress is for the operational phase only.

Table 13.14: Driver stress - Motorways

Average peak hourly flow per lane, in flow Units/1 hour	Average journey speed km/hr		
	Under 75	75-95	Over 95
Under 1200	High	Moderate	Low
1200-1600	High	Moderate	Moderate

¹⁸ <https://www.gov.uk/government/publications/tag-social-and-distributional-impacts-worksheets>

Average peak hourly flow per lane, in flow Units/1 hour	Average journey speed km/hr		
	Under 75	75-95	Over 95
Over 1600	High	High	High

Table Source: Table 1 DMRB Vol 11 Section 3, Part 9 Vehicle Travellers

Table 13.15: Driver stress - Dual-carriageway roads

Average peak hourly flow per lane, in flow Units/1 hour	Average journey speed km/hr		
	Under 60	60-80	Over 80
Under 1200	High*	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High
* "Moderate in urban areas"			

Table Source: Table 2 DMRB Vol 11 Section 3, Part 9 Vehicle Travellers

Table 13.16: Driver Stress - Single carriageway roads

Average peak hourly flow per lane, in flow Units/1 hour	Average journey speed km/hr		
	Under 50	50-70	Over 70
Under 600	High*	Moderate	Low
600-800	High	Moderate	Moderate
Over 800	High	High	High
* "Moderate in urban areas"			

Table Source: Table 3 DMRB Vol 11 Section 3, Part 9 Vehicle Travellers

Human health

13.5.37 This assessment is based on established good practice guidance on health impact assessment developed by the Department of Health, Public Health, England, the Department for Communities and Local Government, the Devolved Countries in the UK as well as professional associations such as the Faculty of Public Health, the Institute of Environmental Management and Assessment (IEMA) and international agencies and associations such as the International Finance Corporation and the International Association for Impact Assessment.¹⁹
20 21 22 23 24 25 26

13.5.38 The World Health Organisation (WHO) definition of health used by public health professions within the UK, and internationally, are that health is *'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'* and is *"the extent to which an individual or group is able to realise aspirations and satisfy needs, and to change or cope with the*

¹⁹ Health Development Agency. (2002). Introducing health impact assessment (HIA): informing the decision-making process, England.

²⁰ NHS Executive. (2000). Resources for HIA: Volumes 1 & 2. England.

²¹ Welsh Assembly Government and Health Challenge Wales. (2004). Improving Health and Reducing Inequalities: a practical guide to health impact assessment.

²² Public Health Institute of Scotland. (2001). HIA: a guide for local authorities; Scottish HIA network; 2001.

²³ Institute of Public Health in Ireland. (2009). Health impact assessment guidance.

²⁴ IEMA, Faculty of Public Health and Ben Cave Associates, (2017) Health in Environmental Impact Assessment: A Primer for a Proportionate Approach.

²⁵ International Finance Corporation. (2010). Introduction to Health Impact Assessment.

²⁶ International Association for Impact Assessment. (2006). Health Impact Assessment International Best Practice Principles. Special Publication Series No. 5. Fargo, USA.

environment. Health is therefore a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources, as well as physical capacities".²⁷²⁸

- 13.5.39 Human health is underpinned by several determinants which span environmental, social and economic aspects. These include: population change, employment and economy, housing and shelter, transport and connectivity, learning and education, crime and safety, social capital and community cohesion, health and social care and public services, shops and retail amenities, spirituality, faith and traditions; arts and cultural activities; leisure and recreation; lifestyle and daily routines; governance and public policy, energy and waste; and land and spatial.
- 13.5.40 Governance and public policy have been screened out as not relevant to this Scheme as the policy context shows that the Scheme is strongly aligned to existing national and local transport policies and does not have any specific impacts on governance or public policy. Spirituality, faith and traditions has been screened out as no places of worship are affected. The gypsy and traveller site located at Putwell Bridge Caravan Park has been considered under the private dwellings section of this chapter. Arts and cultural activities have been screened out as no arts and cultural venues are affected. Given the nature of the Scheme, lifestyle and daily routines is considered as part of transport and connectivity.
- 13.5.41 No overhead powerlines or substations are being added or moved as part of the Scheme so there is no change in Electro-Magnetic Field (EMF) exposure on communities living around the Scheme. Hence an assessment of EMF impacts was not undertaken as there is no change in EMF exposure expected because of the Scheme.
- 13.5.42 The following assessment methodology and the assigning of sensitivity, magnitude and significance has been developed using the consultants' professional judgement. This professional judgment has been based on knowledge from previous similar schemes, desk-based analysis of baseline public health and socio-economic characteristics of the wider study area, scientific literature on health effects, Scheme consultation and EIA scoping responses, national and local health priorities, national and international regulatory standards, and national and local policies.
- 13.5.43 The assessment methodology used to assess the following human health sub-topics are as follows:
- Health outcomes: communicable disease, non-communicable disease, physical injury, mental health and wellbeing and nutritional disorders.
 - Health determinants: population change, employment and economy, housing and shelter, transport and connectivity, learning and education, crime and safety, health and social care and public services, shops and retail amenities, social capital and community cohesion, spirituality, faith and traditions; arts and cultural activities; leisure and recreation; and lifestyle and daily routines.
- 13.5.44 The assigning of sensitivity, magnitude and significance is based on professional judgment and informed by the findings of the relevant health assessments reported in this ES. Magnitude of impact on health receptors has been classified

²⁷ World Health Organization. (1948). Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference. New York, 19-22 June 1946, and entered into force on 7 April 1948.

²⁸ World Health Organization. (1984). Health Promotion: A Discussion Document on the Concepts and Principles. WHO Regional Office for Europe. Copenhagen.

as Major, Moderate, Low, or Negligible, in line with the definitions provided in Table 13.17.

Table 13.17: Magnitude of impact on human health receptors

Magnitude	Criteria
Major	An impact that is expected to have major adverse or beneficial health effects, typically following one or more of the following: a large change in health risk (increase or decrease), affecting a large number of people, long-term in duration, permanent and irreversible.
Moderate	An impact that is expected to have a moderate adverse or beneficial health effect, typically following one or more of the following: a moderate change in health risk (increase or decrease), affecting a moderate number of people, short-term in duration, intermittent and reversible.
Minor	An impact that is expected to have a minor adverse or beneficial health effect, typically following one or more of the following: a low change in health risk (increase or decrease), affecting a small number of people, temporary or short-term in duration, intermittent and reversible.
Negligible	An impact that is unlikely to have an effect on population or human health.

Table Source: Public Health by Design own methodology based on best practice 2018

Significance of effect

13.5.45 Significance of effect is the product of the sensitivity of receptors and magnitude of impact. The significance of effects within this assessment is identified according to Table 4.1 and Table 4.2 in the Environmental Assessment Methodology chapter (Chapter 4). Of the effects described, moderate, large and very large effects are considered 'significant'.

13.6 Assumptions and limitations

- 13.6.1 This chapter provides an assessment of the effects of the Scheme on people and communities. Certain assumptions have been made to assist in the undertaking of the assessment, for example that the Scheme is considered to achieve an overall improvement in traffic management as per the aims of the Scheme.
- 13.6.2 Information on community facilities has been primarily based on desk-based research.
- 13.6.3 It is assumed all associated engineering works will take place within the DCO boundary and that there will therefore be no additional land take required to that described within the ES.

13.7 Baseline conditions

13.7.1 This section outlines the existing situation regarding the receptors identified for the people and communities chapter. The receptors are also identified on Figure 13.1 (application document TR010029/APP/6.2).

Consultation

13.7.2 In accordance with DMRB Volume 11 Section 3 guidance, consultation has been undertaken with Local Authorities (London Borough of Havering and Brentwood Borough Council) and stakeholders likely to be affected by the Scheme. The

formal public consultations required for the Scheme forms part of this process. The aim of consultation is to:

- Confirm the receptors identified in this chapter within the study area baseline.
- Ascertain their level of usage by members of the community.
- Obtain more information on anticipated impacts of the Scheme.
- Assist in identifying suitable mitigation measures for adverse effects.

Private dwellings and property

13.7.3 Residential and commercial property ‘sites’ (either properties or clusters) have been identified within 500 m of the Scheme as set out in Table 13.18. These have been identified following desk based research and are also shown on Figure 13.1.

Table 13.18: Residential and commercial property receptors

Receptor	Location	Distance from DCO boundary	Local authority
Grove Farm	North west of junction 28 and accessed via the M25 anticlockwise slip road and the east bound slip road off the A12 entering to the roundabout	Within DCO boundary	London Borough of Havering
Maylands Cottage	Off road leading to Maylands Golf Club, to the west of junction 28	Adjacent to the DCO boundary to the west	London Borough of Havering
Dwellings at Harold Park	Located north and south of A12 dual carriageway, to the west of junction 28	300 m to the west of the DCO boundary at the closest point	London Borough of Havering
The Poplars dwelling and farm buildings	South east of junction 28	10 m from DCO boundary	Brentwood
Dwellings fronting Nags Head Lane	South west of junction 28	Adjacent to DCO boundary at closest point	Brentwood
Dwellings and properties at South Weald Service Station	East of junction 28 roundabout	Adjacent to DCO boundary at closest point	Brentwood
Dwellings and properties in Brook Street area	East of junction 28 roundabout	Adjacent to DCO boundary at closest point	Brentwood
Dwellings and properties along Wigley Bush Lane and Weald Park Way	North east of the junction	50 m from DCO boundary	Brentwood
Putwell Bridge Caravan Park	South of the A12 Colchester Road to the west of junction 28	Within the DCO boundary	Brentwood
Dwelling at Boyles Court Farm	South east of junction 28	500 m from the DCO boundary	Brentwood

Receptor	Location	Distance from DCO boundary	Local authority
Dwellings off Warley Road	South of junction 28	100 m from the DCO boundary at closest point	Brentwood

Community land and facilities

- 13.7.4 Community land is defined by DMRB, Volume 11, Section 3, Part 6 as land used by the community and includes common land, town and village greens and public open spaces; community facilities includes places of worship, medical centres and hospitals, schools, and shops. It also includes land designated in Local Plans as Public Open Space.
- 13.7.5 Table 13.19 provides a summary of the community assets within the study area including a 500 m buffer zone which have been considered as part of the assessments and are again shown on Figure 13.1.

Table 13.19: Community receptors

Receptor	Type	Location	Distance from DCO boundary	Local authority
Maylands Golf Club	Private sport/leisure facilities	North west of Junction 28	Partly within the DCO boundary	London Borough of Havering
Henderson Sports and Social Club	Private sport/leisure facilities	West of junction 28	500 m from DCO boundary	London Borough of Havering
Spirit Health Club	Private sport/leisure facilities	East of junction 28	50 m from DCO boundary	Brentwood
Gardens of Peace (formerly known as Land at Oak Farm)	Burial ground	West of Junction 28, south of the A12	Partly within the DCO boundary	London Borough of Havering

- 13.7.6 In addition, there is a cluster of community facilities and services which may be public or private located along Brook Street outside of the study area.
- 13.7.7 The centre of Romford, approximately 4.6 miles to the west of junction 28 along a shared use path (SUP) adjacent to the southern side of the A12, is considered to be within reasonable cycling distance (< 5 miles) of the Scheme. Romford hosts all of the local services and amenities expected within a town centre. The eastern part of the town, Harold Park, extends to approximately 800 m from junction 28 along the A12 and includes shops and services at the junction with Willow Way and along Colchester Road and Harold Court Road.

Rural enterprises

- 13.7.8 The area of land to the north west of the existing junction where the Scheme is proposed is occupied by two agricultural holdings. The first is Grove Farm, occupied by G & R Skips and Recycling. However, as Grove Farm. comprises a

residential dwelling as well as farm buildings and scrap and storage yard, this receptor has been assessed under the private dwellings section of this chapter.

- 13.7.9 The second holding is an area of unmanaged grass land separating Grove Farm from Maylands Golf Club known as the Glebelands Estate. This area is not known to be in any active agricultural use. The land here is Agricultural Land Classification grade 4 as identified within the geology and soils chapter (Chapter 10) of the ES. Grade 4 is poor quality agricultural land.
- 13.7.10 Two other farm buildings have been identified as falling within the DCO boundary. These are the Poplars Farm building and Boyles Court Farm. Given that these properties are in active residential use, they have been assessed within the private dwelling section of this chapter.

Development land

- 13.7.11 Table 13.20 below provides the list of development land based on sites within 500 m of the DCO boundary and are shown on Figure 15.1 and drawn from the development proposals identified on the Planning Inspectorate’s website, and in relevant local authority local plans, proposals maps and planning registers.

Table 13.20: Development land

Borough	Location	Reference	Distance from DCO boundary	Description of proposed development
Brentwood Borough Council and London Borough of Havering	Great Eastern Mainline running south of junction 28	Brentwood Local Plan (2005) and London Borough of Havering Local Plan (2008)	Within DCO boundary and extending both to the east and west	Safeguarded land along the Great Eastern Mainline for Crossrail in their respective adopted Local Plans
Brentwood Borough Council and London Borough of Havering	Lower Thames Crossing (LTC)	Lower Thames Crossing NSIP	LTC boundary extends to within DCO boundary	The Lower Thames Crossing will be a new road crossing connecting Essex and Kent. Located east of Gravesend and Tilbury, this new crossing will offer the improved journeys, new connections and network reliability, and economic benefits that only a new, alternative crossing, away from Dartford, can provide. An application for development consent for LTC is yet to be submitted.
Brentwood Borough Council	Running along Brook Street, east of junction	Brentwood Borough Cycling Action Plan 2014	200 m to the south of the A12 leading towards Brentwood	Proposed cycleway located to the east of the site leading into

Borough	Location	Reference	Distance from DCO boundary	Description of proposed development
	28 and towards Brentwood			Brentwood town centre
Brentwood Borough Council	Land at Honeypot Lane	Brentwood Draft Local Plan (2016-2031) Preferred Site Allocation 022	200 m to the east of the boundary	Site Allocation - Development Site Proposal for 200 dwellings
Brentwood Borough Council	Land East of Nags Head Lane	Brentwood Draft Local Plan (2016-2031) Preferred Site Allocation 032	250 m to the southeast of the DCO boundary	Site Allocation - Development Site Proposal for 125 dwellings
Brentwood Borough Council	Regent House	16/00587/PNCOU – approved June 2016	300 m to the southeast of the DCO boundary	Prior Approval Notification Class O - Change of use from office space (B1(a)) to 126 residential flats (C3 use class).
Brentwood Borough Council	Boyles Court Farm	18/01827/FUL – approved May 2019	500 m to the east of the DCO boundary	Change of use, conversion and extension of existing building to provide 13 residential apartments and redevelopment of demolished secure wing and other structures and buildings to provide a courtyard of 17 family dwellings, with parking, garaging, attenuation pond and other associated hard and soft landscaping.
London Borough of Havering	Small, Medium, Large Wind Development Sites (Gooshays Ward)	Wind Development Sites in Gooshays Ward noted in London Borough of Havering emerging Local Plan (2016 – 2031)	Within the DCO boundary and numerous nearby sites to the northwest	Emerging Local Plan proposes one small, two medium and one large potential wind development sites within the red line boundary of the Scheme in the junction's north west quadrant.
London Borough of Havering	Caravan Park, Putwell Bridge	Site allocation 4.12 in London Borough of Havering Local Plan 2008	Within the DCO boundary	Emerging Local Plan allocates land at the Caravan Park, Putwell Bridge as a Gypsy and Traveller site. Understood to be under consideration for expansion.

13.7.12 It is understood that the Gardens of Peace (formerly known as Land at Oak Farm development) is currently being developed into a burial ground in accordance with planning permission reference P1742.14. Given the current status of the site, this receptor has been assessed under the community land section of this chapter.

Non-motorised users (NMU)

13.7.13 Road side paths, the cycle crossing, bridleways and footpaths provide amenity to recreational users and those travelling between the surrounding villages to access services, facilities, and Grove Farm.

13.7.14 The results of an NMU audit undertaken in 2014 to record the usage of NMU routes in the area show that NMUs use both the carriageway and traffic-free routes - footways, SUPs and PRow near junction 28. However, overall usage is low when compared to the overall traffic movements. The audit identified that on average 108 cyclist movements and 70 pedestrian movements per day between 7am and 7pm. Equestrian movements, although not audited, are unlikely to be significant in quantum. However, this could represent latent demand. The overall traffic figure shows 48,276 movements over the same period.

13.7.15 A walking, cycling and horse-riding assessment and review (WCHAR) has been undertaken in October 2018 to review the NMU audit findings. Given there have been no change to NMU conditions since 2014, it was not considered necessary to update the audit.

13.7.16 Accident data for 8 March 2013 to 30 December 2017 shows that no collisions involved NMUs. However, a number of rear-shunt or side-swipe accidents were recorded in the immediate vicinity of, and on, the roundabout. The sensitivity of the NMU's is therefore considered to be low.

13.7.17 Footways exist on the A12 and A1023. On the northern side of the A12, west of the junction 28 roundabout, a footway provides access to the vicinity of the roundabout and then to the southern side of the A12 via an uncontrolled crossing of the A12 entry slip and exit slip road. This connects with a SUP to the southern side of the A12/A1023.

13.7.18 SUPs exist on the A1023 immediately east of junction 28, through the southern side of the junction via one uncontrolled and one controlled crossing point. A SUP continues along the southern side of the A12 west of the roundabout towards Harold Wood providing a connection to NCNR 136.

13.7.19 A cycle crossing at grade within the southern portion of the roundabout at junction 28 provides a connection east to west between Brentwood and Harold Park, continuing along Brook Street and Colchester Road.

13.7.20 A grade separated crossing exists in the vicinity of Harold Wood to facilitate crossing movements of the A12.

13.7.21 The other paths in the study area are to the south east of junction 28 near Boyles Court Farm, south west of the junction near the sewage works on Nag's Head Lane, and north east of the junction, as well as footpaths along streets in the Brook Street area of Brentwood.

13.7.22 Colmar Farm Riding Centre, within the study area approximately 1.3 km to the north east of the junction on Weald Park Way, could be expected to generate equestrian trips within the vicinity.

13.7.23 Footpaths crossing the area of land to be used by the Scheme provide pedestrian links between Brook Street, Brentwood and Harold Park, Romford and other neighbouring areas.

13.7.24 Figure 13.1 shows the locations of the existing PRowS and Table 13.21 provides for a schedule of the existing PRow facilities within the study area.

Table 13.21: Existing Public Rights of Way (PRow)

PRow facilities	Relationship to Scheme	NMU location
Junction 28 Crossing Footpath	Within DCO boundary	378 m footpath running along the southern side of the existing junction 28 roundabout.
Brook Street Footpath	Within study area, outside of DCO boundary	548 m footpath running adjacent to Brook Street to the east of junction 28.
Wigley Bush Lane Footpath	Within study area, partially outside of DCO boundary	606 m footpath to the north east of junction 28 crossing the red line boundary area and crossing the A12 via a footbridge.
Weald Park Way Footpath	Within study area, partially outside of DCO boundary	609 m footpath leading off Wigley Bush Lane just outside of the red line boundary.
Spital Lane Footbridge Footpath	Within study area, partially outside of DCO boundary	272 m footpath to the north east of junction 28 crossing the A12 via footbridge and connecting residential properties along Brook Road to Weald Park Way.
Nags Head Lane Footpath	Within study area, outside of DCO boundary	1782 m footpath running from the residential properties to the east of junction 28 south across the railway and crossing the M25 to the south via a footbridge linking to Warley Road in the south.
Colchester Road Footpath	Within study area, outside of DCO boundary	1425 m footpath to the west of the junction leading from Romford to the roundabout and junction 28 crossing.
272_185 Footpath	Within study area, outside of DCO boundary	117 m footpath to the east of the M25 and south of junction 28 linking footpath 272_131 with the footbridge crossing over the M25.
272_131 Footpath	Partially within study area	1348 m footpath to the east of the M25 and south of junction 28, crossing arable land.
272_127 Footpath	Within study area, outside of DCO boundary	290 m footpath south of junction 28 leading away from the footbridge crossing the M25 and towards Great Warley.
272_168 Footpath	Within study area, outside of DCO boundary	234 m footpath south of junction 28 running adjacent to the M25 leading down to Warley Road.
272_110 Footpath	Partially within study area	1649 m footpath to the south of J28 crossing arable land and leading south-eastward away from the study area.

PRoW facilities	Relationship to Scheme	NMU location
No ID Footpath	Within study area, outside of DCO boundary	308 m footpath to the south of junction 28.
No ID Footpath	Within study area, outside of DCO boundary	418 m footpath to the south of junction 28.
No ID Footpath	Partially within study area	920 m footpath south of junction 28 connecting Tomkyns Lane and M25.
No ID Footpath	Within study area, outside of DCO boundary	703 m footpath south of junction 28 adjacent to M25 for approx. 400m and turning west for approx. 400m leading to Tylers common.
272_18 Footpath	Within study area, outside of DCO boundary	178 m of footpath located at Brook Street south of the A12.
272_173 Footpath	Within study area, outside of DCO boundary	67 m footpath located at Brook Street south of the A12.
272_186 Bridleway	Within study area, intersects DCO boundary	836 m bridleway on the south side of Nag's Head Lane, running to west and east of the M25 then away from the M25 to the east 866m of footpath partly intersecting the study area located along part of Nags Head Lane.
272_184 Bridleway	Within study area, intersects DCO boundary	1649 m bridleway to the south east of junction 28, 300 m from the red line boundary at its closest point.
272_175 Bridleway	Within study area	142m bridleway to the south of junction 28 adjacent to a footbridge crossing over the M25 linking with 272_110.
No ID Bridleway	Within study area	1776 m bridleway to the south of J28 circulating a field north of Warley Road.
No ID Bridleway	Partially within study area	616 m bridleway south of junction 28 leading off Tomkyns Lane.

Vehicle travellers: Views from the road

- 13.7.25 In general, views over the surrounding landscape from the road for VT on the study area's road network are intermittent and comprise a mixture of agricultural, residential and commercial properties, planted vegetation and engineering structures. The key VT routes in the study area, the M25 and A12, contain a varying degree of screening elements that obscure or block views completely.
- 13.7.26 The view from the M25, which crosses over the top of junction 28 roundabout north west to south east, is screened by vegetation on the east and west on both approaches to the junction. Far distance views of the undulating landscape of Essex, comprising agricultural land and wooded areas, are afforded when travelling clockwise on the M25 above the junction. When traveling along the motorway south of the junction, the road drops down to travel underneath the

Great Eastern Mainline railway bridge and various overhead structures are a prominent feature.

- 13.7.27 Views looking from the slip roads towards junction 28 roundabout, positioned below the M25 and above the A12, are of a planted wooded area. General views away from the roundabout are of planted vegetation and trees, with intermittent views of agricultural land. The M25 anticlockwise entry slip road has a partial view of a small residential property and scrap yard to the west. A partial view of the adjacent petrol station is visible from the eastern portion of the roundabout. A partial view of a dwelling house can be seen from the south-eastern portion of the roundabout.
- 13.7.28 Views from A12, which runs below junction 28 roundabout south west to north east, are restricted by vegetation to the north and south of the carriageway. General views at the junction and the approach from the A12 are of planted vegetation and trees with intermittent views of agricultural land. When traveling beneath the junction, views are of planted vegetation, elevated earthworks and retaining walls. Traveling along the west and east of the junction (Colchester Road and Brentwood bypass respectively) provides intermittent views of open land either side of the road, screened by planted vegetation, trees and woods.
- 13.7.29 The A1023 Brook Street east of junction 28 roundabout allows for intermittent views either side of the road, which include open land, commercial and residential properties. The road is screened by planted vegetation and trees.

Vehicle travellers: Driver stress

- 13.7.30 Junction 28 is a major national and inter urban regional transport artery which plays a critical role providing access between the M25 and the A12, particularly the A12 towards Essex. It is therefore intrinsically linked to the performance of the surrounding highway network.
- 13.7.31 High levels of demand combined with limited capacity on the gyratory section due to the capacity of the signalised intersections result in delays and accidents. The north east quadrant of the M25 has high volumes of traffic and often experiences severe congestion, featuring in the top 10 percentile of all UK roads in terms of vehicle hour delay. This causes disruption and delays to the surrounding road network when emergency closures and lane closures of the motorway, gyratory and the Dartford Crossing are imposed.
- 13.7.32 Junction 28 experiences a high number of accidents and incidents, with a total of 97 recorded between 8 March 2013 to 30 December 2017. While the majority of these accidents were minor, in many cases these result in significant disruption to traffic and unreliable journey times.

Human health

- 13.7.33 Baseline information is provided at district and ward levels. It looks at health and wellbeing information of residents of Brentwood Council and the three key wards surrounding the junction from north to south, South Weald, Brentwood West and Warley wards. It also looks at Havering Council and the two key wards surrounding the junction, Gooshays and Harold Wood wards. In this health profile the word 'significantly' and 'not statistically significant' are used in the epidemiological sense of being a difference that is not due to chance i.e. that this is a real difference.

- 13.7.34 Most of the key health indicators for Brentwood are better than or in line with the England average^{29,30}. The health of Brentwood residents is therefore generally better than the average for England. Rates of early death from cardiovascular disease and cancer are significantly lower than the England average. Rates of early death from respiratory disease are in line with the England average. The rate of people killed or seriously injured on roads is significantly better than the England average (28.2 per 100,000 crude rate compared to the England average of 39.7). The percentage of people with diabetes who have been identified as such is significantly worse than for England (only 66.8% of those with diabetes have been diagnosed and are receiving treatment compared to 77.1% England average). Deprivation in Brentwood is low though inequalities in health are present. In 2015, all indicators were significantly better (healthier) than the England average or in line with the England average (none were significantly worse) whereas in 2018 many more indicators are in line with the England average and two, as described above are significantly worse. This is likely to reflect both improvements in other areas of England as well as some slow down or reversal in improvements in health and wellbeing in Brentwood.
- 13.7.35 Prevalence of depression and anxiety in Brentwood is in line with the England average³¹. Prevalence of new diagnosis of depression and long term mental health problems is significantly better than the England average (1.4% and 7.5% compared to the 1.6% and 9.1% England average). The latter two indicators are on a worsening trend compared to previous years.
- 13.7.36 Many key health indicators for Havering are better than or in line with the England average. Rates of early death from cardiovascular disease is significantly better than the England average while those for cancer are in line with the England average. The rate of people killed or seriously injured on roads is significantly worse than the England average (25.8.3 per 100,000 crude rate compared to the England average of 39.7). The percentage of people with diabetes who have been identified as such is significantly worse than for England (only 73% of those with diabetes have been diagnosed and are receiving treatment compared to 77.1% England average). The percentage of people with dementia who have been identified as such is significantly worse than for England (only 60.3% of those with dementia have been diagnosed and are receiving treatment compared to 67.9% England average). The proportion of adults who are physically active is significantly worse (59% compared to the England average of 61.3%). The proportion of children aged 10-11 years old who are obese is significantly worse (22.8% compared to the England average of 20%). Teenage pregnancies and initiation of breast feeding are also significantly worse than the England average. Violent crime is also significantly worse than the England average. In 2015 all, except two; physical activity in adults and violent crime, indicators were significantly better (healthier) than the England average or in line with the England average whereas in 2018 many more indicators are in line with the England average and two, as described above are significantly worse. This is likely to reflect both improvements in other areas of

²⁹ Public Health England (2018) *Brentwood health profile (short)*. Available at: <https://fingertips.phe.org.uk/profile/health-profiles> (Accessed: 13 July 2019).

³⁰ Public Health England (2019) *Brentwood local health profile (long)*. Available at:

http://www.localhealth.org.uk/GC_preport.php?lang=en&codegeo=E07000068&nivgeo=lalt_2013&id_rep=r01 (Accessed: 13 July 2019).

³¹ ³¹ Public Health England (2019) NHS Basildon and Brentwood Clinical Commissioning Group common mental health disorders.

Available at: <https://fingertips.phe.org.uk/profile/common-mental-disorders/data#page/1/gid/1938132720/pat/46/par/E39000046/ati/154/are/E38000007/iid/91872/age/1/sex/4> (Accessed: 13 July 2019).

England as well as some slow down or reversal in improvements in health and wellbeing in Havering.

- 13.7.37 Prevalence of depression and anxiety in Havering is significantly better than the England average (12% compared to the 13.7% England average)³². Prevalence of new diagnosis of depression and long term mental health problems is significantly better than the England average (1% and 6.7% compared to the 1.6% and 9.1% England average). The latter two indicators are on a worsening trend compared to previous years.
- 13.7.38 In Gooshays ward, Havering, the proportion of children under 16 years old is higher and the proportion of older people aged 65 years and over is lower than the England averages (25.3% and 11.2% compared to 19.1% and 18%). The proportion of white and non-white ethnic minority residents is lower than the England average (17.3% versus 20.2%). Life expectancy for women and men is significantly lower than the England averages (81.2 and 76.6 years compared to the England average of 83.1 and 79.5 years). Income, child and older people's deprivation is significantly worse (higher) than the England averages. Both overall employment and long term unemployment are significantly higher than the England averages. Deaths, at all ages, from all causes and particularly cancer, lung cancer, and respiratory disease and emergency hospital admissions for all causes - as well as coronary heart disease, heart attacks and chronic obstructive pulmonary disease - are significantly worse than the England average ratios. Early deaths in those under 75 years old is also significantly worse than the England average ratios for all causes, for cancer and for circulatory diseases. Rates of hospital stays for alcohol related self-harm are significantly worse, though hospital stays for self-harm are significantly better (lower) than the England average. Limiting long term illness or disability is significantly worse than the England average. The proportion of children in reception year (4 to 5 year olds) and Year 6 (10 to 11 year olds) who are overweight is significantly worse than the England average. The proportion of children in Year 6 who are obese is also significantly worse. Child development at age 5 is in line with the England average but GCSE achievement is significantly worse than the England average.
- 13.7.39 In Harold Wood ward, Havering, the proportion of children under 16 years old and older people aged 65 years and over is similar to the England averages (19% and 17.3% compared to 19.1% and 18%). The proportion of white and non-white ethnic minority residents is lower than the England average (14.1% versus 20.2%). Life expectancy for women is significantly better (higher) and for men is in line with than the England averages (84.9 and 79.6 years compared to the England average of 83.1 and 79.5 years). Income and older people's deprivation is significantly better (lower) than and child deprivation is in line with the England averages. Overall employment is significantly better than and long term unemployment is in line with the England averages. Deaths, at all ages, from all causes including cancer, coronary, circulatory and respiratory diseases is in line with the England ratios. Emergency hospital admissions for all causes is significantly better than the England average ratio and significantly worse for chronic obstructive pulmonary disease. Early deaths in those under 75 years old is in line with the England average ratios for all causes, for cancer and for

³² Public Health England (2019) *NHS Havering Clinical Commissioning Group common mental health disorders*. Available at: <https://fingertips.phe.org.uk/profile/common-mental-disorders/data#page/1/gid/1938132720/pat/46/par/E39000018/ati/154/are/E38000077/iid/91872/age/1/sex/4> (Accessed: 13 July 2019).

circulatory diseases. Rates of hospital stays for alcohol related self-harm and for self-harm are significantly better (lower) than the England average. Limiting long term illness or disability is in line with the England average. The proportion of children in reception year (4 to 5 year olds) and Year 6 (10 to 11 year olds) who are overweight or obese is in line with the England averages. Child development at age 5 and GCSE achievement are in line with the England averages.

- 13.7.40 In South Weald ward, Brentwood, the proportion of children under 16 years old is similar to and the proportion of older people aged 65 years and over is higher than the England averages (18.7% and 19.6% compared to 19.1% and 18%). The proportion of white and non-white ethnic minority residents is lower than the England average (13.7% versus 20.2%). There is no life expectancy information for South Weald specifically though for Brentwood life expectancy for women and men is significantly better (higher) than the England average (84.2 and 81.3 years compared to the England average of 83.1 and 79.5 years). Income, child and older people's deprivation is significantly better (lower) than the England averages. Overall employment is significantly better than the England average (no information is available on long term unemployment). Deaths, at all ages, from all causes is significantly better (lower) and deaths from cancer, coronary, circulatory and respiratory diseases is in line with the England ratios. Emergency hospital admissions for all causes is significantly better than the England average ratio and for coronary heart disease, heart attacks and chronic obstructive pulmonary disease are in line with the England average ratios. Early deaths in those under 75 years old is in line with the England average ratios for all causes, for cancer and for circulatory diseases. Rates of hospital stays for alcohol related self-harm and for self-harm are significantly better (lower), than the England average. Limiting long term illness or disability is significantly better than the England average. The proportion of children in reception year (4 to 5 year olds) and Year 6 (10 to 11 year olds) who are overweight or obese is in line with the England averages. Child development at age 5 and GCSE achievement are in line with the England averages.
- 13.7.41 In Brentwood West ward, Brentwood, the proportion of children under 16 years old is similar to and the proportion of older people aged 65 years and over is lower than the England averages (19.3% and 13.7% compared to 19.1% and 18%). The proportion of white and non-white ethnic minority residents is lower than the England average (15% versus 20.2%). Life expectancy for women and for men is in line with than the England averages (83.3 and 80.1 years compared to the England average of 83.1 and 79.5 years). Income, child and older people's deprivation is significantly better (lower) than the England averages. Overall employment and long term unemployment is significantly better than the England average. Deaths, at all ages, from all causes, cancer, coronary, circulatory and respiratory diseases is in line with the England ratios. Emergency hospital admissions for all causes and chronic obstructive pulmonary disease is significantly better than the England average ratios and for coronary heart disease, stroke and heart attacks are in line with the England average ratios. Early deaths in those under 75 years old is in line with the England average ratios for all causes, for cancer and for circulatory diseases. Rates of hospital stays for alcohol related self-harm and for self-harm are significantly better (lower) than the England average. Limiting long term illness or disability is significantly better than the England average. The proportion of children in reception year (4 to 5 year olds) who are overweight or obese is in line with the England averages. The proportion of children in Year 6 (10 to 11 year olds) who

are overweight or obese is significantly better than (lower) the England averages. Child development at age 5 and GCSE achievement are in line with the England averages.

- 13.7.42 In Warley ward, Brentwood, the proportion of children under 16 years old and older people aged 65 years and over is similar to the England averages (18.3% and 18.4% compared to 19.1% and 18%). The proportion of white and non-white ethnic minority residents is lower than the England average (15.1% versus 20.2%). Life expectancy for women and for men is in line with than the England averages (82.1 and 79.4 years compared to the England average of 83.1 and 79.5 years). Income, child and older people's deprivation is significantly better (lower) than the England averages. Overall employment and long term unemployment is significantly better than the England averages. Deaths, at all ages, from all causes is significantly worse than (higher) and for cancer, coronary, circulatory and respiratory diseases is in line with the England ratios. Emergency hospital admissions for all causes and chronic obstructive pulmonary disease is significantly better than the England average ratios and for coronary heart disease, stroke and heart attacks are in line with the England average ratios. Early deaths in those under 75 years old is in line with the England average ratios for all causes, for cancer and for circulatory diseases. Rates of hospital stays for alcohol related self-harm and for self-harm are significantly better (lower) than the England average. Limiting long term illness or disability is significantly better than the England average. The proportion of children in reception year (4 to 5 year olds) and Year 6 (10 to 11 year olds) who are overweight or obese is in line with the England averages. Child development at age 5 and GCSE achievement are in line with the England averages.
- 13.7.43 Havering is overall more deprived than Brentwood³³. Gooshays Ward has the highest levels of deprivation, in all domains of deprivation, compared to the others wards around junction 28.

13.8 Potential impacts

Private dwellings

Construction

Land take and severance

- 13.8.1 The construction of the Scheme will potentially impact upon the identified private dwellings through temporary and permanent land take as well as through severance. The potential temporary and permanent land take required during the construction phase of the Scheme is noted in Table 13.22.
- 13.8.2 As Table 13.22 shows, there will be a large amount of both temporary and permanent land take from Grove Farm. The permanent land take is required to facilitate the construction of the new loop road and for the new A12 off-slip and new M25 on slip. This includes associated earthworks, flood attenuation works and landscaping as demonstrated on the Works plans (application document TR010029/APP/2.3) which support this DCO application.

³³ Department of Communities and Local Government (2019) *Indices of deprivation 2015 explorer*. Available at: <http://dclgapps.communities.gov.uk/imd/idmap.html> (13 July 2019).

13.8.3 Temporary land take will also be required from Grove Farm to provide areas for the construction compound, haul roads and laydown areas in order to construct the Scheme.

Table 13.22: Residential temporary and permanent land take

Receptor	Temporary land take (only) m ²	Permanent land take m ²
Grove Farm	55,641	111,292
Maylands Cottage	0	0
Dwellings at Harold Park	0	0
The Poplars dwelling and farm buildings	0	0
Dwellings fronting Nags Head Lane	0	0
Dwellings and properties at South Weald Service Station	0	0
Dwellings and properties in Brook Street area	0	0
Dwellings and properties along Wigley Bush Lane and Weald Park Way	0	0
Putwell Bridge Caravan Park	0	0
Dwelling at Boyles Court Farm	0	0
Dwellings off Warley Road	0	0

13.8.4 The Statement of reasons (application document TR010029/APP/4.1) which supports this DCO application provides further justification as to why the land identified is required.

Amenity

13.8.5 The Scheme has potential to result in nearby residential and commercial receptors experiencing impacts relating to visual, air quality or noise and vibration during both construction and operation. These are explored in more detail within the specialised assessments within this ES (Chapters 5 and 6).

13.8.6 The air quality assessment (Chapter 5) notes that air quality impacts from HGVs at the construction stage are likely to be imperceptible.

13.8.7 The landscape and visual impact assessment (Chapter 9) identifies that potential impacts may arise at the construction stage through earthmoving operations, formation of temporary spoil areas, road formation/construction, creation of new earthworks, utilities diversions and proposed overbridges/structures.

13.8.8 These works could potentially impact on the visual amenity enjoyed by the properties at Grove Farm, Maylands Cottages, residents of the dwellings and properties at the South Weald Service Station and occupants of dwellings and properties at Harold Park.

13.8.9 The noise and vibration assessment (Chapter 6) found that during the construction phase, noise and vibration may have a temporary adverse impact on Grove Farm in both the daytime and the night-time. During the daytime, Maylands Cottages and 17 Colchester Road, located at Harold Park, could be adversely affected.

Operation

Land Take and severance

- 13.8.10 There is not anticipated to be any further land take required for the operational phase of the development, over and above the permanent land take identified in Table 13.22.
- 13.8.11 At the operational stage, the access to Grove Farm would be altered to connect with the newly constructed slip road. This access would be in a similar location to the existing access and would be wide enough to cater for the current uses.

Amenity

- 13.8.12 Again, the effects on amenity of residential receptors has been assessed within the specific chapters of this ES.
- 13.8.13 The air quality assessment (Chapter 5) identified that the receptors placed at Grove Farm are anticipated to experience a small increase in NO₂ concentrations ranging between +0.5 to +1.0 µg/m³. This is due primarily to the re-alignment of the A12 eastbound off-slip being located approximately 20 m closer to the properties and the creation of the loop road within 70 m of Grove Farm.
- 13.8.14 The noise assessment (Chapter 6) identifies that impacts during operation are considered to be negligible.
- 13.8.15 The landscape and visual impact assessment (Chapter 9) identifies that potential impacts may arise at the operational phase through the introduction of largescale infrastructure including earthworks and slip roads, changes to street lighting, introduction of gantries and signage, introduction of new landscaping measures and planting.
- 13.8.16 These works are anticipated to have an impact on the visual amenity enjoyed by the properties at Grove Farm, Maylands Cottages, residents of the dwellings and properties at the South Weald Service Station and occupants of dwellings and properties at Harold Park.

Community assets

Construction

Land take and severance

- 13.8.17 Table 13.23 below identifies the amount of temporary and permanent land take that would be required and the community asset receptors that would be affected by the Scheme.

Table 13.23: Community asset temporary and permanent land take

Receptor	Temporary land take (only) m ²	Permanent land take m ²
Maylands Golf Club	61,344	5,677
Henderson's Sports Club	0	0
Spirit Health Club	0	0

Receptor	Temporary land take (only) m ²	Permanent land take m ²
Gardens of Peace (formerly known as Land at Oak Farm)	5,755	1,570

- 13.8.18 In order to construct the Scheme, it is necessary to divert an existing underground Cadent Gas high pressure (33bar) gas pipeline and provide an area for ecological mitigation which will require the temporary use of and acquisition of interests in land from Maylands Golf Club and the Gardens of Peace (formerly known as Land at Oak Farm development).
- 13.8.19 With regards to the golf club, permanent land take of approximately 5,677 m² would be required.
- 13.8.20 1,717 m² of land would be required at plot 1/12 as noted in the Land plans (application reference TR010029/APP/2.2) and Book of reference (application reference TR010029/APP/4.3). This area is currently occupied by the tee off area to hole 2, which is located north west of junction 28 beyond Grove Farm. This is linked to works to facilitate the gas main diversion.
- 13.8.21 While the works to install the pipe diversion would be of short duration and would not affect the use of hole 2 during construction, a permanent easement would be required over the land for the benefit of the owner / operator of the new diverted section of gas pipeline. To take account of the future disruption that the presence of the gas pipeline might cause to the availability of hole 2 to users of the golf course, it is proposed to temporarily and permanently acquire land to allow for the remodelling of holes 1, 2 and 3. This is addressed in paragraph 13.8.24 below.
- 13.8.22 A further 3,447 m² of land occupied by the golf club (plots 1/13 and 3/22) is proposed to be permanently acquired. This is to enable the provision of a new ecological mitigation area. The land in question is situated to the east of the existing hole 3. The land is currently laid as woodland and does not form part of the playable golf course and does not form part of the proposed areas required for the remodelling of the golf course.
- 13.8.23 The remaining 513 m² of permanent land take proposed from land in which Maylands Golf Club enjoys an interest relates to plots 3/8 and 3/9. This land is required to enable the provision of replacement gantries across the M25. This land is currently laid out as a disused field to the north of the playable golf course.
- 13.8.24 The land to be used temporarily shown in plot 1/14, Plot 3/21 and Plot 3/23, comprises an area of 48,025 m². Temporary use is required to enable the remodelling of holes 1, 2 and 3 as well as providing an area for a temporary compound for contractors to carry out amendments to the golf course layout.
- 13.8.25 A further 7,421 m² of land (within plot 3/20) is also required permanently to enable the proposed remodelling of hole 2 and hole 3. As this land belongs to Glebelands Estate, the proposed acquisition has been assessed and is reported within the Rural Enterprises section of this chapter.
- 13.8.26 The remaining 13,319 m² of temporary land take which affects Maylands Golf Course relates to plot 3/2 which comprises a disused field to the north of the playable golf course. This area is temporarily required as construction area for the replacement gantries.

- 13.8.27 It is understood that an area of land belonging to the Glebelands Estate (within plot 1/11 and 1/11a), assessed under the Rural Enterprises receptors, is currently being used informally as a practice driving range by Maylands Golf Club. The area is defined by an area of mown grassland to the east of Maylands Cottages and situated to the south of the golf course. Approximately half of this area of mown grassland would be used temporarily during the construction phase of the Scheme as a works area. Approximately 30% of the mown area would form part of the proposed environmental bund and ecological mitigation area and is therefore proposed to be permanently acquired by Highways England in order to continue to provide the requisite maintenance to the area.
- 13.8.28 As regards the Gardens of Peace development site, temporary use of the land identified in the Land Plans (application reference TR101129/APP/2.2(2)) of approximately 5,755 m² (plot 1/8a) would be required in order to facilitate the proposed diversion of the existing underground Cadent Gas high pressure (33 bar) gas pipeline.
- 13.8.29 Following the completion of construction works, a permanent easement would be required over plot 1/8 for the benefit of the owner / operator of the new diverted section of gas pipeline. The area over which it is proposed the easement will be acquired extends to 1,570 m². However, this area is proposed, as part of the Gardens of Peace development, to be laid as an access road which will service a storage shed, alongside a section to the eastern extent of the burial plots.
- 13.8.30 As such, and in contrast to the position at Maylands Golf Course where the pipeline would lie directly beneath the playable course, the presence and future maintenance of the diverted section of underground gas pipeline within this site is not considered to give rise to disruption to the enjoyment of those parts of the Gardens of Peace development that are to be made available for recreational use by members of the community.

Amenity

- 13.8.31 Impacts on the amenity enjoyed by users of the identified community assets are outlined in detail within the Air Quality (Chapter 5), Noise and Vibration (Chapter 6) and Landscape and Visual (Chapter 9) chapters of the ES.
- 13.8.32 From an air quality perspective, the construction phase of the Scheme has the potential to give rise to dust emissions which may affect holes 1 and 2 of Maylands Golf Club.
- 13.8.33 From a landscape and visual impact perspective, the construction phase is anticipated to have an impact upon the visual amenity enjoyed by Maylands Golf Club through those works outlined in paragraph 13.8.9.
- 13.8.34 From a noise perspective, construction activities are not expected to have an impact on the identified community assets.

Operation

Land take and severance

- 13.8.35 No further land take from community assets would be required for the operation phase. Any land take would occur at the construction stage as noted above.
- 13.8.36 No new access arrangements are considered to be required and the Scheme is not expected to affect severance from the community assets identified.

Amenity

- 13.8.37 The Scheme is not expected to create an impact to the air quality of the community assets during the operational phase or lead to any significant adverse noise impacts over and above the existing noise levels.
- 13.8.38 The landscape and visual assessment (Chapter 9) outlines that there is expected to be an impact upon Maylands Golf Club as a result of the works noted in paragraph 13.8.9.

Rural enterprises

Construction

- 13.8.39 During the construction phase, the Scheme is expected to impact on the Glebelands Estate through the temporary use of land to construct the Scheme. This would include the land being physically occupied for the construction of the new loop road, slip roads and supporting structures with an area of land around the northern edge of the loop road required to facilitate the construction. The land to the west of the proposed loop road would be required for the main contractor's compound while the land to the north of the proposed loop road would be required as a working area to undertake works for the new M25 on slip.
- 13.8.40 7,421 m² of land within the Glebelands Estate would also be required for the construction of replacement golf hole 2 and 3 of Maylands Golf Club.
- 13.8.41 Access to the northern part of Glebelands Estate would be provided via an access track running under the proposed loop road both to allow for maintenance and to prevent severance of the area.
- 13.8.42 An area of land to the west of the proposed loop road, understood to be utilised as an informal driving range by Maylands Golf Club, would be required as an environmental bund during (and following) construction. This would occupy approximately half of the driving range area. Approximately 30% of the total area would be permanently occupied by the environmental bund.

Operation

- 13.8.43 During the operational phase of the development, permanent land take will be required for the new loop road, slip roads, supporting structures and to provide maintenance to the areas of ecological mitigation.
- 13.8.44 Permanent land take would also be required of the land to the north of the A12 slip road to provide for a new environmental mitigation area as is detailed on the Preliminary environmental design plans (Figure 2.2) (application document TR010029/APP/6.2). This land again belongs to Glebelands Estate.

Development land

Construction

- 13.8.45 A comparison of the Land plans (application reference TR010029/APP/2.2) and the plan of development schedule for cumulative effects assessment and zones of influence shown on Figure 15.1 identifies that some of the sites which are suitable for small, medium and large scale wind development would be required either as land where the loop road and slip road would be constructed, or for

land which would be required for the construction compound or land which is required for environmental mitigation.

Operation

- 13.8.46 During the operation phase the new road and the associated environmental mitigation works would be occupying land which has been identified as suitable for wind development.
- 13.8.47 In addition, the improved transport connections and traffic movements is likely to provide a facilitator for new developments coming forward including those identified in the development land baseline scenario section of this chapter.

Non-motorised users

Construction

Severance

- 13.8.48 The majority of the identified NMU routes and PRow are not anticipated to be affected by the construction of the Scheme.
- 13.8.49 As set out within the WCHAR, the only NMU route which is expected to be affected as a result of the Scheme is the existing footway along the A12 off-slip. The existing off-slip will be demolished and replaced along the re-aligned slip road. The width of the shared use footway would be widened from between 1.6 m and 2 m to 2.6 m. The new footway would also be constructed and made available for use prior to the closure of the exiting footway to avoid any disruption to access.

Amenity

- 13.8.50 NMUs are likely to experience changes in amenity during construction and operation of the Scheme. There are not anticipated to be any air quality or noise impacts on NMUs arising from the Scheme. The landscape and visual assessment (Chapter 9) identifies potential moderate adverse visual impacts spanning the construction and operational phases of the Scheme on users of the bridleway following Nag's Head Lane and along the crest of the M25 cutting, and users of the public footpath located along the Wigley Bush Lane overbridge.

Operation

Severance

- 13.8.51 During the operational phase of the development, the existing NMU routes and PRow routes will remain unaffected by the Scheme in regard to severance.

Amenity

- 13.8.52 As noted above at para 13.8.41, moderate adverse visual impacts are expected during the operational phase for users of the bridleway following Nag's Head Lane and along the crest of the M25 cutting, and users of the public footpath located along the Wigley Bush Lane overbridge.
- 13.8.53 During its operational phase, the Scheme's design will seek to protect access for cyclists and pedestrians. While the footway along the A12 slip road will become marginally longer, there is not anticipated to be any other alteration to NMUs as a result of this Scheme.

Vehicle travellers

Construction

Views from the road

- 13.8.54 Existing views from the road are intermittent. The construction of the Scheme is likely to hinder views and diminish quality of the views of users of the A12 westbound of junction 28.

Driver stress

- 13.8.55 During construction of the Scheme, driver stress is anticipated to be temporarily adversely affected, due to traffic management, changed road alignments and temporary signs and lanes. These factors will bring about increased: driver frustration due to reduced speeds; driver fear linked to reduced lane width and presence of other vehicles; and route uncertainty associated with temporary road layouts and signage.

Operation

Views from the road

- 13.8.56 The introduction of large scale infrastructure including earthworks and slip roads is likely to impact upon the views of users of the A12, west of junction 28 and diminish the quality of those views.

Driver stress

- 13.8.57 Once operational, driver stress is expected to reduce through a more efficient road network, reduced route uncertainty, reduced queueing, congestion and risk of conflicts and collisions. This is expected to result in a reduction in driver frustration, fear and uncertainty.
- 13.8.58 In the longer term, the trend for increased vehicle flows means that driver stress is expected to have returned to high levels by 2037. However, if the Scheme were not to take place it would be expected that driver stress in the context of future traffic scenarios will be greater than with the Scheme.

Human health

- 13.8.59 The Scheme has the potential to impact public health during construction through individual and combined impacts relating to traffic, air quality, noise, vibration, drainage/water environment, geology and soils, and visual impact. There may also be some disruption to lifestyles and daily routines for example travelling to school, work or retail amenities due to construction traffic and activity, congestion and potential decreased connectivity to public and commercial services.
- 13.8.60 There may be some benefits to local employment and the wider economy through the construction jobs created and the associated procurement of road building materials from businesses in the region and the districts in and around the Scheme.
- 13.8.61 During construction the majority of impacts are likely to be temporary and of a short duration.

13.8.62 During operation, the Scheme may lead to a small increase in air pollution due to the A12 eastbound off-slip being realigned approximately 20 m closer to buildings at Grove Farm. There is also likely to be a benefit to communities through reduced congestion, improved road journey times and improved road safety.

13.9 Design, mitigation and enhancement measures

13.9.1 There are opportunities to introduce mitigation and enhancement measures into the Scheme design, and the management of construction of the Scheme. The design has been developed with the impacts on communities, future development and housing requirements in mind. The use of best practice construction methods will reduce disruption to users of residential, community and other receptors near the Scheme and minimise the effects on the community, especially those susceptible or vulnerable to health issues.

Construction

13.9.2 The following proposed mitigation measures have been incorporated into the construction phase of the Scheme and are outlined in the Outline Construction Environmental Management Plan (CEMP) (application document TR010029/APP/7.2) and the Register of Environmental Actions and Commitments (REAC) (application document TR010029/APP/7.3):

- The Scheme construction compound plan has been developed with a mind to limiting the amount of land take required.
- The Scheme has been designed to limit the extent of direct, permanent land take and severance affecting identified individual receptors.
- The location of the compound and haul roads solely to the north west of the existing junction limits severance to the adjacent communities.
- Noise mitigation barriers would be proposed along the boundary of the loop road to limit impact on Maylands Golf Club and to Grove Farm.
- A temporary noise barrier would also be provided between Putwell Bridge Caravan Park and the Gardens of Peace site during construction of the gas main diversion, subject to agreement with the land owners.
- A clear and consistent signage strategy would be implemented to clearly direct traffic and pedestrians during the construction phase of the works.
- A re-modelling of Maylands Golf Club would be undertaken following collaboration with the golf course owners.
- The affected public footway along the eastbound carriageway of the A12 would be kept open until the replaced footway is made available for use.
- Ensure public transport routes and stops are maintained and disruption is managed. Potential disruption should be discussed with local public bus companies well in advance.
- Clear signage and provision of access information for all users before operation.
- Communication of the improvements to accessibility, connectivity and journey times delivered.

- Ensure pedestrian linkages and accessibility maintained.
- Best Practicable Means approach taken to daytime and night-time construction works to minimise noise, vibration and dust disposal impacts at residential and community receptors.
- Ensure a clear stakeholder plan is established to provide consistent and regular communication with a range of stakeholders. The plan must acknowledge the differing perspectives and issues of each stakeholder.
- Ensure a clear and easy to access complaints and advice helpline and ensure that complaints are responded to, investigated and addressed promptly.
- Take on board the environmental design mitigation from the other topics, notably landscape, air quality and noise and vibration which are linked to this topic.

Operation

13.9.3 The following mitigation measures have been incorporated into the operational phase of the Scheme:

- No interference with availability of existing access to identified receptors.
- Ensure monitoring of key design aspects as identified in other health relevant chapters of the ES, air quality, noise and vibration, landscape, geology and soils, road drainage and water environment, and materials and waste. This should include monitoring for the need for additional noise barriers and effectiveness of designed in/existing noise barriers, numbers of road traffic incidents to ensure that road safety has been improved, traffic flows to ensure that congestion is reduced and use of PROW, footpaths and cycleways to ensure that there is no reduction in usage.
- Mitigation measures such as noise barriers and landscaping would be maintained during the operational phase.
- Land has been provided within the red line boundary to facilitate the provision of a replacement golf hole.

13.10 Assessment of effects

Private dwellings

Construction

Land take and severance

13.10.1 Table 13.24 provides the findings of the assessment of effects on private dwellings. The sensitivity of all residential receptors, including their access, is considered to be high for the purpose of this assessment. Commercial property receptors are considered to be of medium sensitivity. Where a cluster of receptors contains both residential and commercial properties, the sensitivity has been considered as high for the purposes of this assessment. The location of the receptors is indicated on Figure 13.1.

Table 13.24: Potential significant effects on land take and severance of private dwellings and property

Receptor	Nature of impact	Sensitivity of receptor	Magnitude of impact	Significance of effect
Grove Farm	85,615 m ² temporary land take and 77,156 m ² of permanent land take	High	Moderate (adverse)	Large adverse (Significant)
Maylands Cottage	No impact	High	No change	Neutral (Not significant)
Dwellings at Harold Park	No impact	High	No change	Neutral (Not significant)
The Poplars dwelling and farm buildings	No impact	High	No change	Neutral (Not significant)
Dwellings fronting Nags Head Lane	No impact	High	No change	Neutral (Not significant)
Dwellings and properties at South Weald Service Station	No impact	High	No change	Neutral (Not significant)
Dwellings and properties in Brook Street area	No impact	High	No change	Neutral (Not significant)
Dwellings and properties along Wigley Bush Lane and Weald Park Way	No impact	High	No change	Neutral (Not significant)
Putwell Bridge Caravan Park	No impact	High	Negligible)	Neutral (Not significant)
Dwelling at Boyles Court Farm	No impact	High	No change	Neutral (Not significant)
Dwellings off Warley Road	No impact	High	No change	Neutral (Not significant)

13.10.2 Grove Farm will be most affected by the Scheme. While the design of the Scheme has been developed to minimise the amount of land which is required and excludes the existing dwellings and storage area for the operating business, there will be some land take to the wider extent of land belonging to Grove Farm to the north and at the existing access points. This is demonstrated further on the Land plans (application reference TR010029/APP/2.2) submitted in support of this DCO. Accordingly, there is expected to be a significant adverse effect on Grove Farm arising from both the construction and operational phases of the development.

Amenity

13.10.3 The landscape and visual assessment (Chapter 9) identifies that in regard to visual amenity, the impact to the residential dwellings at Grove Farm and Maylands Cottages would be considered a large adverse effect (significant).

13.10.4 Dwellings at Harold Park, dwellings and properties at South Weald Service Station, properties along Wigley Bush Land and residents at the Putwell Bridge

Caravan Park would experience a slight adverse effect (not significant) during the construction phase.

- 13.10.5 There is considered to be a neutral effect (not significant) on the remaining residential and commercial receptors in terms of visual effects.
- 13.10.6 The air quality assessment (Chapter 5) indicates that any adverse air quality effects due to construction will be temporary and can be suitably minimised by the application of standard and appropriate mitigation measures. On this basis, there is unlikely to be a significant effect on air quality due to the construction of the Scheme.
- 13.10.7 The noise assessment (Chapter 6) anticipates that without mitigation Grove Farm would experience significant adverse effects from construction noise both during the daytime and night-time. Maylands Cottages are anticipated to experience significant adverse effects from the daytime noise levels of construction and slight adverse effects for the night-time levels without mitigation. However, with the incorporation of the identified mitigation measures, these effects would be not significant. Putwell Bridge Caravan Park and the dwellings at Harold Park are expected to experience slight adverse daytime and night-time noise levels during construction.
- 13.10.8 Table 13.25 provides a summary of the effects on amenity to the identified private dwellings. An assessment is provided of the pre-mitigation effect and post-mitigation effects once the mitigation measures set out in section 13.9 of this chapter are implemented.

Operation

Land take and severance

- 13.10.9 At operational stage, permanent land take is required at Grove Farm. The effect is considered to still be a moderate to large adverse effect (significant).
- 13.10.10 Permanent land take is not expected at any other private dwelling receptor and therefore not expected to cause an effect.
- 13.10.11 With regard to severance, whilst there may be some minor increases in journey lengths and times as a result of the new highway alignments and traffic management systems, these are likely to be offset by improvements in traffic management and a higher network capacity.

Amenity

- 13.10.12 The air quality assessment (Chapter 5) notes that none of the receptors are estimated to exceed the annual mean NO₂ air quality objective, or the PM₁₀ air quality objectives hence the Scheme is not expected to have a significant effect on human health receptors.

Table 13.25: Potential effects on amenity of private dwellings during construction

Receptor	Sensitivity of receptor	Magnitude of amenity impact pre-mitigation	Magnitude of residual amenity impact post-mitigation	Post-mitigation amenity effect (yes or no)	Post mitigation significance
Grove Farm	High	Major adverse	Major adverse	Yes	Large adverse

Receptor	Sensitivity of receptor	Magnitude of amenity impact pre-mitigation	Magnitude of residual amenity impact post-mitigation	Post-mitigation amenity effect (yes or no)	Post mitigation significance
					(Significant)
Maylands Cottage	High	Major adverse	Major adverse	Yes	Large adverse (Significant)
Dwellings at Harold Park	High	Slight adverse	Slight adverse	Yes	Slight adverse (Not significant)
The Poplars dwelling and farm buildings	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings fronting Nags Head Lane	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings and properties at South Weald Service Station	High	Slight adverse	Slight adverse	No	Slight adverse (Not significant)
Dwellings and properties in Brook Street area	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings and properties along Wigley Bush Lane and Weald Park Way	High	Slight adverse	Slight adverse	No	Slight adverse (Not significant)
Putwell Bridge, Caravan Park	High	Slight adverse	Slight adverse	No	Slight adverse (Not significant)
Dwelling at Boyles Court Farm	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings off Warley Road	High	Neutral	Neutral	No	Neutral (Not significant)

13.10.13 The landscape and visual assessment (Chapter 9) identifies that as regards visual amenity, the impact to the residential dwellings at Grove Farm continues to be a significant effect at operational stage.

13.10.14 Maylands Cottages, dwellings at Harold Park, dwellings and properties at South Weald Service Station, dwellings and properties along Wigley Bush Land and residents at the Putwell Bridge Caravan Park would experience a slight adverse effect during the operational phase arising from the visual impact of the Scheme.

13.10.15 There is considered to be a neutral impact on the remaining residential receptors in terms of visual effects.

13.10.16 The noise assessment (Chapter 6) notes that the noise levels during operational phase are expected to be imperceptibly higher than existing. The impact on amenity is therefore considered to be neutral (not significant).

13.10.17 Table 13.26 below provides a summary of the amenity effects on private dwellings during the operational phase.

Table 13.26: Potential effects on amenity of private dwellings during operation

Receptor	Sensitivity of receptor	Magnitude of amenity impact pre-mitigation	Magnitude of residual amenity impact post-mitigation	Post-mitigation amenity effect (yes or no)	Post mitigation significance
Grove Farm	High	Major adverse	Major adverse	Yes	Large adverse (Significant)
Maylands Cottage	High	Major adverse	Slight adverse	Yes	Slight adverse (Not significant)
Dwellings at Harold Park	High	Slight adverse	Slight adverse	Yes	Slight adverse (Not significant)
The Poplars dwelling and farm buildings	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings fronting Nags Head Lane	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings and properties at South Weald Service Station	High	Slight adverse	Slight adverse	No	Slight adverse (Not significant)
Dwellings and properties in Brook Street area	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings and properties along Wigley Bush Lane and Weald Park Way	High	Slight adverse	Neutral	Yes	Neutral (Not significant)
Putwell Bridge, Caravan Park	High	Slight adverse	Slight adverse	No	Slight adverse (Not significant)
Dwelling at Boyles Court Farm	High	Neutral	Neutral	No	Neutral (Not significant)
Dwellings off Warley Road	High	Neutral	Neutral	No	Neutral (Not significant)

Community assets

Construction

Land take and severance

- 13.10.18 Maylands Golf Course and the Gardens of Peace development at Oak Farm are the identified community assets which would be subject to land take as a result of the Scheme. No other community asset receptors are anticipated to be subject to land take.
- 13.10.19 Given the need to divert the high-pressure gas main around the perimeter of the proposed loop road and to provide an area of ecological mitigation, it is necessary to utilise land within both of these sites.
- 13.10.20 With regard to Maylands Golf Course, a permanent acquisition of a right over an area of land extending to 1,717 m² is required. This is required to facilitate the diversion of, and provision of an easement to maintain, the high-pressure underground gas pipeline on land which is currently comprised of the tee off area to hole 2.
- 13.10.21 To mitigate against this, discussions have been held with the owners of the golf club and a proposal for the re-modelling of holes 1, 2 and 3 has been developed. An area of 48,025 m² within the demise of the existing golf course would be temporarily used to facilitate the alteration to hole 1 to utilise the existing hole 2 green, the creation of a new hole 2 fairway and green on the existing hole 3 fairway and the creation of a new hole 3 tee and fairway to play to the existing hole 3 green.
- 13.10.22 An area of 7,421 m² of land within Glebelands Estate being permanently acquired to enable the provision of this remodelling which would then be leased back to the golf course through an agreement between the parties.
- 13.10.23 Given that the works to install the diverted high-pressure gas pipeline can be undertaken without requiring the closure of the existing golf hole, it is proposed that any replacement hole be constructed whilst the existing hole remains playable.
- 13.10.24 It is noted that a further 3,960 m² of permanent land take and a further 13,319 m² of temporary land take is required from land which is within the leasehold ownership of Maylands Golf Club. However, this affects land which is either part of existing woodland or within a disused field and not part of the playable golf course, nor does it involve land that is required for the remodelling of the golf holes 1, 2 and 3. As such, the impact of land take on the golf course itself is considered to be low.
- 13.10.25 Additionally, it is also understood that Maylands Golf Club informally utilise an area of land on the Glebelands Estate as a practice driving range. During the construction phase of the Scheme, approximately half of this area would be required for construction compound and for the creation of an environmental bund. During the operational phase, approximately 30% of this area would be occupied by the environmental bund and permanently acquired in order to facilitate the maintenance of the bund and ecological mitigation in the area.
- 13.10.26 Given that the area of the playable golf course which is affected by the Scheme constitutes a small part of the entire 18 hole golf course and significantly less

than 25% of the whole receptor, the impact to the golf course is considered to be minor adverse.

- 13.10.27 While the golf club requires visitors to either be a member or to pay to play rather than being able to freely access the site such that the course is not considered to constitute open space within the meaning of the Planning Act 2008, the Havering Local Plan designates the course as a park, open space or playing field. The sensitivity of the receptor is therefore considered to be high.
- 13.10.28 With a minor adverse impact expected and the receptor deemed to be of a high sensitivity, the significance of the effect is considered to be moderate (significant). However, discussions have taken place with the golf course with regard to the options for a replacement hole. The provision of a replacement hole is intended to ensure a like for like replacement which will ensure that the golf course is left with a situation that is no worse than existing. It is considered that with mitigation measures designed to facilitate the provision of a replacement hole 2 in place, the residual effect to the golf course on land take and severance is considered to be neutral.
- 13.10.29 As regards to the Gardens of Peace development site, a 5,755 m² area of land is noted in table 13.23 as temporary land take, in order to facilitate the construction of the proposed diversion of an existing underground Cadent high pressure (33bar) gas main. As there is also a requirement to provide an easement for Cadent Gas for future operation and maintenance of the gas pipeline, an area of 1,570 m² is required for the permanent acquisition of rights for Cadent Gas.
- 13.10.30 The area of land affected within the Gardens of Peace development site has been minimised as far as possible following extensive discussions with Cadent Gas regarding the most appropriate design solution for the diversion.
- 13.10.31 Discussions have been undertaken with the owners of the Gardens of Peace development site burial ground regarding the construction proposals to establish that the operation of the burial site can continue whilst the diversion of the gas pipeline takes place and to understand the nature of public access to the site, once operational.
- 13.10.32 It has been established that the route of the proposed gas pipeline diversion would be situated beneath an internal service access road leading to a storage area for operation equipment of the burial site. The area required for construction compound would require some land earmarked for grave sites however it has been indicated that burials can begin at the western end of the site to avoid a conflict from arising. It is therefore considered that both the operation of the burial ground, and its function as an area where people can visit and walk around, can continue throughout the construction phase of the Scheme.
- 13.10.33 While the construction impacts of the Scheme are temporary, there is a permanent acquisition of a right over the land. For the right of access to provide an easement, given there is an existing easement over the area attributed to the existing gas main, the impact of this element is considered to be neutral. However, regarding the construction works, while the impacts are temporary, they are expected to cause disruption and inconvenience to the burial site. Accordingly, there is considered to be a minor adverse effect during construction.

Amenity

- 13.10.34 Table 13.27 below provides a summary of the amenity effects on the identified community assets during the construction phase:

Table 13.27: Amenity effects on community assets during construction

Receptor	Amenity effects pre-mitigation	Amenity effects post-mitigation	Sensitivity	Amenity effect (yes or no)	Magnitude	Post mitigation significance
Maylands Golf Club	Potential effects arising from dust emissions to holes 1 and 2. Effects on visual amenity arising from construction work. Negligible noise impacts expected	No negative air quality or noise impacts following standard mitigation practices. Impact on visual amenity expected following mitigation.	High	Yes	Moderate adverse	Moderate adverse (Significant)
Henderson's Sports Club	No air quality or noise impacts expected. Effects on visual amenity arising from construction expected	No air quality or noise impacts expected. Effects on visual amenity arising from construction expected	Low	Yes	Slight adverse	Neutral or slight adverse (Not significant)
Spirit Health Club	No air quality or noise impacts expected. Effects on visual amenity arising from construction expected	No air quality or noise impacts expected. Effects on visual amenity arising from construction expected	Low	Yes	Slight adverse	Neutral or slight adverse (Not significant)
Gardens of Peace (formerly known as Land at Oak Farm)	No air quality or noise impacts expected. Minor effects on visual amenity arising from construction expected	No air quality or noise impacts expected. Effects on visual amenity arising from construction expected	Medium	Yes	Slight adverse	Slight adverse (Not significant)

Operation

Land take and severance

- 13.10.35 All land take will take place in the construction phase. While 1,570 m² of land would be subject to a permanent right of access to provide an easement to Cadent Gas, any access would be on a temporary basis and is no different to the current situation in relation to the existing high-pressure gas main which runs through the site.
- 13.10.36 It is noted that once operational, the burial ground would be accessible to the general public, albeit use would be restricted to opening hours, restricted to a single point of access and would be subject to regulations such as a dress code. While use of the site is expected to revolve primarily around those using the site for burial purposes, public access is possible and therefore the burial ground is considered to be of a medium sensitivity.
- 13.10.37 Accordingly, the effect of the Scheme on the burial ground is considered to be neutral.
- 13.10.38 No further land take is required during operation for any other receptor. All land take effects are therefore considered under the construction phase assessment.

Amenity

- 13.10.39 Table 13.28 below provides a summary of the amenity effects on the identified community assets during the operational phase.

Table 13.28: Amenity effects on community assets during operation

Receptor	Amenity effects pre-mitigation	Amenity effects post-mitigation	Sensitivity	Amenity effect (yes or no)	Magnitude	Post mitigation Significance
Maylands Golf Club	No air quality or noise impacts expected. Scheme expected to impact on visual amenity enjoyed by patrons.	Landscaping works expected to reduce visual impact of Scheme	High	Yes	Minor adverse	Slight adverse (Not significant)
Henderson's Sports Club	No air quality or noise impacts expected. Scheme expected to impact on visual amenity enjoyed by patrons.	Landscaping works expected to reduce visual impact of Scheme	Low	Yes	Slight adverse	Neutral or slight adverse (Not significant)

Receptor	Amenity effects pre-mitigation	Amenity effects post-mitigation	Sensitivity	Amenity effect (yes or no)	Magnitude	Post mitigation Significance
Spirit Health Club	No air quality or noise impacts expected. Scheme expected to impact on visual amenity enjoyed by patrons.	Landscaping works expected to reduce visual impact of Scheme	Low	Yes	Slight adverse	Neutral or slight adverse (Not significant)
Gardens of Peace (formerly known as Land at Oak Farm)	No air quality or noise impacts expected. Scheme expected to impact on visual amenity enjoyed by patrons.	Landscaping works expected to reduce visual impact of Scheme	Medium	Yes	Slight adverse	Slight adverse (Not significant)

Rural enterprises

Construction

- 13.10.40 As noted in paragraph 13.7.9, the Glebelands Estate land is not considered to have been in any active agricultural use for some time. The quality of the land is considered to be of an Agricultural Land Classification Grade 4 and therefore of poor quality. As such, the sensitivity of the receptor is considered to be low.
- 13.10.41 It is anticipated that permanent land take of all of the land at the Glebelands Estate would be required for the construction phase of the development and thereby having a large adverse impact.
- 13.10.42 The resultant effect of significance is considered to be a slight adverse effect and not significant.

Operation

- 13.10.43 During the operational phase of the development, the land at Glebelands Estate would continue to be required on a permanent basis in order to facilitate both the Scheme itself and the associated environmental mitigation works.
- 13.10.44 Given the sensitivity of the receptor, it is considered that there would continue to be a slight adverse effect at the operational phase and not considered significant.

Development land

Construction

13.10.45 The effect on development sites listed in Table 13.20 and shown in Figure 13.1 would be neutral (not significant) during construction.

Operation

13.10.46 As developments identified in Table 13.20 are constructed and come into active use, it is expected that there will be a noticeable increase in the amount of traffic over and above the existing conditions. Without the improvements that the Scheme will bring, the road network will become highly congested resulting in considerable delays. Therefore, the Scheme presents a beneficial impact and opportunity to support and facilitate development growth.

13.10.47 The impact on the land identified as suitable for wind related development remains a large adverse impact given that the Scheme would prevent future development on the affected sites. However, this is considered to be of low significance given the alternative sites available. The result effect is therefore considered to be negligible.

Non-motorised users (NMU)

Construction

13.10.48 The assessment of the effects on NMUs at the construction stage is presented in Table 13.29.

13.10.49 Overall, the construction stage is not anticipated to result in any significant effects on NMUs. A slight adverse effect is expected during the construction phase from the PRow located directly south of the existing junction in regard to visual amenity although this is not considered to be significant.

Operation

13.10.50 The assessment of the effects on NMUs at the operational phase is presented in Table 13.30 below.

13.10.51 As total usage is low, other paths are available in the study area, and most users are 'transitory' (not exposed to altered amenity for prolonged lengths of time) so impacts are anticipated to be of minor adverse magnitude, and therefore neutral, not significant, during both phases.

13.10.52 A slight adverse effect is expected during operational phase from the PRow located directly south of the existing junction in regard to visual amenity although this is not considered to be significant.

13.10.53 The widening of the footway to the north of the A12 off slip is expected to result in a slight beneficial effect.

Table 13.29: Amenity and Severance effects on NMU during construction

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
Junction 28 Crossing Footpath	While this footpath is located in the middle of the proposed works, the footpath would remain open until the replacement footpath is open.	No impact	No	Low	No Change	Neutral (Not significant)
Brook Street Footpath	The construction of the Scheme would not impact upon this footpath.	No impact	No	Low	No change	Neutral (Not significant)
Wigley Bush Lane Footpath	The construction of the Scheme would not impact upon this footpath.	No impact	No	Low	No change	Neutral (Not significant)
Weald Park Way Footpath	The construction of the Scheme would not impact upon this footpath.	No impact	No	Low	No change	Neutral (Not significant)
Spital Lane Footbridge Footpath	The construction of the Scheme would not impact upon this footpath.	No impact	No	Low	No change	Neutral (Not significant)
Nags Head Lane Footpath	Construction impacts of the scheme would impact upon the views enjoyed from this PRow	No impact	Moderate impact on visual amenity during construction	Low	Moderate adverse effect on amenity	Slight adverse (Not significant)
Colchester Road Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_185 Footpath	Construction impacts of the Scheme would impact upon the views enjoyed from this PRow	No impact	Moderate impact on visual amenity during construction	Low	Moderate adverse effect on amenity	Slight adverse (Not significant)

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
272_131 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_127 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_168 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_110 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_18 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_173 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
272_186 Bridleway	The construction of the Scheme would not impact upon this bridleway	No impact	No	Low	No change	Neutral (Not significant)
272_184 Bridleway	The construction of the Scheme would not impact upon this bridleway	No impact	No	Low	No change	Neutral (Not significant)

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
272_175 Bridleway	The construction of the Scheme would not impact upon this bridleway	No impact	No	Low	No change	Neutral (Not significant)
No ID Bridleway	The construction of the Scheme would not impact upon this bridleway	No impact	No	Low	No change	Neutral (Not significant)
No ID Bridleway	The construction of the Scheme would not impact upon this bridleway	No impact	No	Low	No change	Neutral (Not significant)

Table 13.30: Amenity and Severance effects on NMU during operation

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
Junction 28 Crossing Footpath	The footpath adjacent to the A12 off-slip would be widened from between 1.6m and 2m to 2.6m providing more space for a shared use.	Slight beneficial	No	Low	Slight beneficial	Slight beneficial (Not significant)
Brook Street Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
Wigley Bush Lane Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
Weald Park Way Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
Spital Lane Footbridge Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
Nags Head Lane Footpath	The existence of the Scheme at the operational phase would impact upon the upon the views enjoyed from this PRow	No impact	Moderate impact on visual amenity during operation	Low	Moderate adverse effect on amenity	Slight adverse (Not significant)
Colchester Road Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_185 Footpath	The existence of the scheme at the operational phase would impact upon the upon the views enjoyed from this PRow	No impact	Moderate impact on visual amenity during operation	Low	Moderate adverse effect on amenity	Slight adverse (Not significant)
272_131 Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_127 Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_168 Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_110 Footpath	The construction of the Scheme would not impact upon this footpath	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
No ID Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)

NMU facility	Qualitative commentary	Impact on severance	Change in amenity	Sensitivity	Magnitude	Post-mitigation significance of effects
No ID Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_18 Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_173 Footpath	Footpath would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_186 Bridleway	Bridleway would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_184 Bridleway	Bridleway would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
272_175 Bridleway	Bridleway would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
No ID Bridleway	Bridleway would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)
No ID Bridleway	Bridleway would not be impacted at operational stage	No impact	No	Low	No change	Neutral (Not significant)

Vehicle travellers

Construction

Views from the road

- 13.10.54 Views from the road are likely to change during the construction period due to potential loss of screening as well as the presence of construction machinery and equipment. A full assessment of the impact on visual amenity afforded to users of the A12, in particular from the west of the junction, is provided in the Landscape and Visual chapter (Chapter 9) of this ES.
- 13.10.55 Major impacts are expected to the users of the A12 to the west of the junction during the construction phase. Given the sensitivity of these users is considered to be low, this would result in a slight adverse effect and not significant.

Driver stress

- 13.10.56 Driver Stress is not calculated during the construction phase as the effects are temporary. However, it is likely that there would be some disruption and increase in driver stress during the construction phase. The level of driver stress experienced by vehicle travellers could be reduced through clear signage, prior notification of works, and traffic management measures.

Operation

Views from the road

- 13.10.57 In Year 1 moderate adverse effects on road users around junction 28 and on the A12 and M25 would remain due to mitigation planting not yet becoming established and with new highways elements remaining visible. By Year 15 planting would reduce impacts to a slight adverse effect (not significant).
- 13.10.58 Side roads would continue to have slight adverse effects in Year 1. Once mitigation plantation has matured (by Year 15), the significance of effect would consequently be reduced to neutral (not significant).
- 13.10.59 For the full visual assessment see the Landscape and Visual chapter (Chapter 9).
- 13.10.60 Although an adverse visual impact will affect a large number of vehicular trips per day, which Transport Analysis Guidance (TAG) suggests should be considered of moderate/high significance, this is mediated by consideration of the limited pre-development views available to travellers and the minor magnitude of change. As such, users of the A12 dual carriageway are considered to be of low sensitivity and it is considered that the Scheme is likely to give rise to a slight adverse effect and not significant.

Driver stress

- 13.10.61 Appendix 13.1 (application document TR010029/APP/6.3) provides detailed breakdowns of the driver stress calculation by road link and shows the visual representation of the driver stress assessment in the Do Minimum (DM) scenario and Do Something (DS) scenario in the opening year (2022) and design year (2037). Changes in Annual Average Daily Traffic (AADT) (%) are also shown in Appendix 13.1.

13.10.62 Table 13.31 below provides a qualitative summary of the data presented in Appendix 13.1.

Table 13.31: Driver stress and AADT during operation

Route	Qualitative commentary
M25	<p>At junction:</p> <p>In the opening year, the southbound carriageway in both the DM and DS scenario show a moderate level of driver stress. The northbound carriageway in the DM scenario shows a low level of driver stress with the DS scenario showing a moderate increase. By 2037, there is no significant difference at the junction between the DM and DS scenarios. AADT levels show a neutral difference at both opening year and by 2037.</p> <p>North of junction:</p> <p>At opening year stage, the slip road to the northbound carriageway of the M25 shows an improvement in the DS scenario to a low level of driver stress from a moderate level show in the DM scenario. All other carriageways are broadly similar. 2037 shows a similar pattern with the DM scenario showing the slip road having worsened to high with the DS scenario showing a moderate level of driver stress.</p> <p>At opening year, AADT levels are shown as neutral however by 2037, there is anticipated to be a more than 30% increase in traffic flows leading onto the northbound carriageway of the M25.</p> <p>South of junction:</p> <p>In the opening year, the northbound carriageway approaching the junction shows a moderate level of driver stress in the DS scenario compared to low in the DM scenario. By 2037, the northbound carriageway south of the junction shows a high level of driver stress in the DS scenario and moderate in the DM scenario.</p> <p>At opening year, AADT levels are shown having reduced by more than 30% on the northbound carriageway however this returns to neutral by 2037. Moreover, there is anticipated to be a more than 30% increase in traffic flows leading onto the Southbound carriageway of the M25 by 2037.</p>
A12	<p>At Junction:</p> <p>In all scenarios, the level of driver stress around the roundabout at the junction remains high while the level of stress for westbound traffic remains low. For eastbound traffic at opening year, the DS option shows an improvement to the DM option from a moderate to a low level of driver stress. This remains the case by 2037.</p> <p>It is predicted that the AADT levels through the junction on the eastbound carriageway are expected to increase by 30% by opening year. This continues to be the case by 2037.</p> <p>East of junction:</p> <p>To the east of the junction leading east along the A12 at opening year, the DS scenario shows an improvement in driver stress to a section of moderate stress and short section for high stress from the DM scenario which shows the full stretch of road as high levels of driver stress. This pattern is repeated in the modelling for 2037.</p>

Route	Qualitative commentary
	<p>By opening year, there is expected to be a reduction of more than 30% in AADT levels leading onto the eastbound carriageway. This still expected to be the case by 2037.</p> <p>West of junction: The westbound carriageway is broadly similar between all scenarios however the eastbound carriageway shows a significant improvement at the DS scenario with driver stress on the approach to the junction at low and moderate levels in both opening year and by 2037. The DM scenario shows the driver stress level as high in both years for this stretch of road.</p> <p>AADT levels are expected to be neutral at all scenarios modelled.</p>
Other surrounding roads	<p>The level of driver stress on other surrounding roads is largely the same between all of the scenarios modelled.</p> <p>AADT levels are also expected to remain neutral.</p>

13.10.63 Overall, while there continues to be a moderate to high level of driver stress around the junction, the level of driver stress for those heading eastbound onto the A12 is anticipated to be significantly improved by opening year and continuing through to 2037.

13.10.64 This improvement is mirrored through the modelling of AADT levels which shows a reduction in the traffic flows leading eastbound on the A12.

13.10.65 The operational stage of the Scheme is therefore considered to have a moderate beneficial effect upon the level of driver stress (significant).

Human health

13.10.66 Table 13.32 provides an assessment of potential impact on human health by key health determinants.

Table 13.32: Assessment of potential impact on human health

Health aspect	Pathway	Baseline	Construction without mitigation	Construction without mitigation	Mitigation Measures	Construction with mitigation	Construction with mitigation	Operation with mitigation (both designed-in and additional)	Operation with mitigation (both designed-in and additional)
		Sensitivity	Magnitude	Significance		Magnitude	Significance	Magnitude	Significance
Health outcome									
Communicable disease	Communicable diseases are spread by person to person contact, contact with infected materials such as water and food, and by contact with animal vectors such as mosquitos such as respiratory infections, water borne, and vector borne diseases, and sexually, blood and needle transmitted diseases.	Low	Negligible	Neutral	Not required	Negligible	Neutral	Negligible	Neutral
Non-communicable disease	Increases in air pollution, noise and vibration, and anxiety and worry caused by, for example relocation, land take and loss of amenity, as well as disruption to daily routines, both temporary and long term, can increase the risk of non-communicable disease. The key categories of non-communicable diseases are cardiovascular disease (heart disease, heart attacks and stroke), respiratory conditions (asthma, bronchitis and chronic obstructive pulmonary disease) and cancer. Some groups are more sensitive e.g. older people are more likely to be at risk of cardiovascular disease, respiratory condition and cancer; children and young people are more likely to be sensitive to respiratory conditions. Individuals from lower socio-economic groups are more likely to be sensitive to all three conditions.	Medium-High	Minor-Moderate	Slight-Moderate	See construction and operation-related mitigation measures in air quality, noise, people and communities, landscape, geology and soils, road drainage and water management, and materials and waste.	Minor	Slight	Minor	Slight
Mental health and wellbeing	Lower wellbeing and, to a lesser extent, exacerbation of, or increase in, mental illness is linked to increases in noise and anxiety and worry caused by, for example relocation, land take, loss of amenity and noise and vibration, as well as disruption to daily routines, both temporary and long term.	Low-Medium	Minor-Moderate	Slight-Moderate	As above	Minor	Slight	Negligible-Minor	Slight
Physical injury	Physical injuries due to construction traffic, construction accidents and exposure to hazards through air, water and soil due to construction and remediation activities.	Medium	Minor-Moderate	Slight-Moderate	As above	Low	Slight	Low	Slight
Nutritional disorders	Nutritional disorders include under-nutrition (reduced calories, vitamin and mineral deficiencies, reduced diversity. In the case of obesity this is, to a lesser extent, also linked to	Low-Medium	No change-Negligible	Neutral- Slight	As above, ensuring continued access to public transport as well as footpaths and cycleways.	No change	Neutral	No change	Neutral

Health aspect	Pathway	Baseline	Construction without mitigation	Construction without mitigation	Mitigation Measures	Construction with mitigation	Construction with mitigation	Operation with mitigation (both designed-in and additional)	Operation with mitigation (both designed-in and additional)
		Sensitivity	Magnitude	Significance		Magnitude	Significance	Magnitude	Significance
	reduced physical activity as well as increased or changed food intake.								
Health determinants									
Population change	The Scheme will not change the population though a small number of construction workers are likely to move into the local area. An increase in population, on a temporary or permanent basis, can change a range of factors leading to long term changes in health status in a local community.	Low	Negligible-Minor	Neutral-Slight	Not applicable	Negligible-Minor	Neutral-Slight	Not applicable	Not applicable
Housing	The Scheme affects Putwell Bridge Caravan Park which is used by Gypsies and Travellers. During construction there will be some adverse amenity effects. The Scheme does not involve relocating existing residents living in the area and existing housing is too far for vibration effects to have any impact on local residents. Relocation, losing some part of a property through land take, severance and amenity because of the Scheme can increase the risk of non-communicable disease and low mental health and wellbeing. Vibration effects during the construction phase of the Scheme can cause actual damage to homes and/or cause anxiety about possible damage,	Low-Medium	Negligible-Moderate	Neutral-Moderate	As above	Low	Slight	Minor	Slight
Local economy and employment	An increase in the number and quality of jobs and the stability of jobs through an improvement in the wider economy because of the Scheme has positive health benefits on non-communicable disease, mental health and wellbeing, and, to a lesser extent, nutritional disorders.	Low-Medium	Minor-Moderate Beneficial	Slight-Moderate	Ensuring that local job centres are actively make local residents aware of the job opportunities on the Scheme. Scheme to promote recruitment locally and regionally.	Moderate Beneficial	Moderate	Not applicable	Not applicable
Transport and connectivity (including lifestyle and daily routines)	An improvement in transport modes (public transport, foot and cycle) and connectivity has positive health benefits non-communicable disease, mental health and wellbeing, physical injuries and, to a lesser extent, nutritional disorders. However, during the construction phase there can be disruption to existing travel modes affecting lifestyles and daily routines.	Medium	Minor-Moderate	Slight-Moderate	See construction and operation-related mitigation measures in air quality, noise, people and communities. Ensuring continued access or safe (well-lit, good physical quality, well sign-posted) diversions to public	Minor	Slight	Minor-Moderate Beneficial	Slight-Moderate Beneficial

Health aspect	Pathway	Baseline	Construction without mitigation	Construction without mitigation	Mitigation Measures	Construction with mitigation	Construction with mitigation	Operation with mitigation (both designed-in and additional)	Operation with mitigation (both designed-in and additional)
		Sensitivity	Magnitude	Significance		Magnitude	Significance	Magnitude	Significance
	There is a potential for improved road safety during the operation phase.				transport as well as footpaths and cycleways.				
Learning and education	Schools can be affected by air pollution and noise and have reduced transport and connectivity because of the Scheme which can adversely affect learning and education in children and young people. There is a potential during operation for improvements in traffic flows that make it easier to get to and from school.	Low-Medium	Negligible-Minor	Neutral-Slight	As above	Negligible	Neutral-Slight	Negligible-Slight Adverse and Beneficial	Neutral-Slight Beneficial
	Construction workers on the Scheme would benefit from the opportunities for learning and training the Scheme provided.	Low-Medium	Minor-Moderate	Slight-Moderate Beneficial	Market construction jobs via local job centres and recruitment companies in the districts around the Scheme to increase uptake of jobs by people in the surrounding districts. Use construction contractors that are committed to providing training and support for their construction workers.	Moderate Beneficial	Slight-Moderate Beneficial	Not applicable	Not applicable
Crime and safety	Development projects can influence crime and safety by, for example, making areas feel less safe because of disruption to existing walking and cycling routes and changes in lighting, the influx of construction workers into an area, or the availability of new equipment and materials that can be stolen,	Low-Medium	Negligible-Minor	Neutral-Slight	See construction and operation-related mitigation measures in air quality, noise, people and communities. Ensuring continued access or safe (well-lit, good physical quality, well sign-posted) and diversions to public transport as well as footpaths and cycleways. Ensure appropriate security around the development site.	Negligible	Neutral	Negligible	Neutral
Social capital and community cohesion	Development projects can increase or reduce social capital and community cohesion by creating barriers or separating communities to communities and residents socially interacting.	Low-Medium	Minor-Moderate	Slight-Moderate	As above	Negligible	Neutral	Negligible	Neutral

Health aspect	Pathway	Baseline	Construction without mitigation	Construction without mitigation	Mitigation Measures	Construction with mitigation	Construction with mitigation	Operation with mitigation (both designed-in and additional)	Operation with mitigation (both designed-in and additional)
		Sensitivity	Magnitude	Significance		Magnitude	Significance	Magnitude	Significance
	This includes the impact of noise and traffic flows. Some relocation is involved which will create a permanent change in some social capital and community cohesion.								
Health and social care and public services	Development project can delay emergency vehicles and also increase the demand for health and other public services. For this Scheme the number of construction workers is unlikely to increase demands on existing public services.	Low-Medium	Minor	Slight	Ensure emergency vehicles have good access during the construction phase.	Negligible	Neutral	Minor Beneficial	Slight Beneficial
Shops and retail amenities	Development projects can improve or reduce access to shops and retail amenities as well as relocate or disrupt them. The Scheme does not relocate any business and any disruption to business will be temporary.	Low-Medium	Minor	Slight	See construction and operation-related mitigation measures in air quality, noise, people and communities. Ensuring continued access or safe (well-lit, good physical quality, well sign-posted) diversions to public transport as well as footpaths and cycleways.	Negligible	Neutral	Minor Beneficial	Slight Beneficial
Leisure and recreation	The Scheme is expected to take some land from Maylands Golf Club. This is a members only golf course. Development projects can improve or reduce access to open and green spaces and make walking and cycling more difficult (or vice versa).	Low-Medium	Minor	Slight	See construction and operation-related mitigation measures in air quality, noise, people and communities. Ensuring continued access or safe (well-lit, good physical quality, well sign-posted) diversions to public transport as well as footpaths and cycleways.	Negligible	Neutral	Minor Beneficial	Slight Beneficial
Energy and waste	There is no energy generation linked to the scheme and at this stage low emission vehicles and equipment are not envisaged. A more detailed ground investigation will be undertaken later, and hazardous materials will be collected treated and disposed of appropriately.	Low	No change-Negligible	Neutral-Slight	See construction-related mitigation measures in geology and soils, road drainage and water environment, and materials and waste chapters.	Negligible-Slight Beneficial	Neutral-Slight Beneficial	Not applicable	Not applicable

Health aspect	Pathway	Baseline	Construction without mitigation	Construction without mitigation	Mitigation Measures	Construction with mitigation	Construction with mitigation	Operation with mitigation (both designed-in and additional)	Operation with mitigation (both designed-in and additional)
		Sensitivity	Magnitude	Significance		Magnitude	Significance	Magnitude	Significance
Land and spatial	There will be some land take as part of the Scheme. Some of this is residential and agricultural land. The amount of land take is small.	Low	No change-Negligible	Neutral-Slight	See construction-related mitigation measures in geology and soils, road drainage and water environment, and materials and waste chapters.	Negligible-Slight Adverse	Neutral-Slight Adverse	Negligible-Slight Adverse	Neutral-Slight Adverse

Construction

- 13.10.67 Individually (and in-combination) increases in air pollution, noise and vibration, or anxiety and worry caused by land take and loss of amenity, as well as disruption to daily routines, both temporary and long term, can increase the risk of non-communicable disease during the construction phase. The key categories of non-communicable diseases are cardiovascular disease (heart disease, heart attacks and stroke), respiratory conditions (asthma, bronchitis and chronic obstructive pulmonary disease) and cancer. Some groups are more sensitive e.g. older people are more likely to be at risk of cardiovascular disease, respiratory condition and cancer; children and young people are more likely to be sensitive to respiratory conditions. Individuals from lower socio-economic groups are more likely to be sensitive to all three conditions.
- 13.10.68 The Scheme is expected to result in temporary increase to air pollution and noise and vibration although noise barriers will be put in place in key locations as set out the Noise and Vibration chapter (Chapter 6). It is also likely to cause anxiety and worry in some local residents and users of the existing road network and PRowS, footpaths and cycleways leading to an increased risk of non-communicable disease in some residents. Without mitigation this is considered to have a slight to moderate adverse effect on health. With mitigation this effect will be slight adverse and not significant.
- 13.10.69 Good quality, secure employment reduces the risk of non-communicable disease. Some groups are more sensitive and can benefit more e.g. those who are unemployed or on low incomes and in more insecure jobs.
- 13.10.70 The Scheme will create construction jobs and maintain or increase jobs in construction related business that support the proposed Scheme. This is likely to lead to a reduced risk of non-communicable disease in construction workers and workers in construction businesses that the Scheme procures from. There is a moderate beneficial effect on local residents and others who obtain construction jobs or jobs in construction businesses that the Scheme procures from.
- 13.10.71 Lower wellbeing and, to a lesser extent, exacerbation of, or increase in, mental illness is linked to increases in noise and anxiety and worry caused by, for example relocation, land take, loss of amenity and noise and vibration, as well as disruption to daily routines, both temporary and long term. Some groups are more sensitive e.g. children in school, night shift workers, some older people and some individuals with long term health conditions. Relocation has a major effect on lowering mental health and wellbeing and in some cases can lead to mental health conditions such as depression.
- 13.10.72 The changes to increase noise and vibration are likely to cause anxiety and worry in some local residents and users of the existing road network and PRowS, footpaths and cycleways leading to an increased risk in lower mental wellbeing in some residents. Without mitigation this is considered to have a slight to moderate adverse effect on health. With mitigation the effect is anticipated to be slight adverse and not significant. There is a moderate beneficial effect on local residents who obtain construction jobs or jobs in construction businesses that the Scheme procures from.
- 13.10.73 Construction traffic, construction accidents and exposure to hazards through air, water and soil due to construction and remediation activities can increase the risk of physical injuries. Some groups are more sensitive e.g. children from lower socio-economic backgrounds, people with mobility problems.

13.10.74 The Scheme is likely to increase exposure to construction traffic and construction related activities which could increase the risk of physical injuries for some local residents. Without mitigation this is considered to have a slight to moderate adverse effect on health. With mitigation the significance of effect is reduced to slight adverse and not significant.

13.10.75 The main pathways of impact for the above health effects are on housing and shelter, local economy and employment, and transport and connectivity. Details are provided in Table 13.32 describing the overall findings of the health assessment.

Operation

13.10.76 The Scheme is expected to have a negligible effect on air pollution and noise during the operational phase and is considered to result in a negligible effect on human health. Potential increased risk of in non-communicable disease and reduced mental health and wellbeing are likely to be small.

13.10.77 The Scheme is designed to improve road safety and improve traffic flows this is likely to reduce traffic-related physical injuries and deaths and improved journey times and quality of journeys. This is considered to have a slight to moderate beneficial effect on health.

13.10.78 The main pathways of impact for the above health effects is transport and connectivity. Details are provided in Table 13.32 describing the overall findings of the health assessment.

Residual effects

13.10.79 Residual effects are those environmental effects predicted to remain after the implementation of mitigation. Significant residual effects are those that have an irreversible effect and that would not have been completely mitigated by the Scheme and the proposed mitigation.

Private dwellings (land take, changes in access and amenity combined)

Construction

13.10.80 A significant adverse residual effect is expected at Grove Farm and associated dwellings during the construction phase arising from both the impact of land take and impact on amenity. Given the site is enclosed by the new loop road, it is considered that this effect is unavoidable.

13.10.81 A significant residual effect is also expected Maylands Cottage as a result of the amenity impacts. Given the proximity of the site to the new loop road, it is considered that such an effect is unavoidable.

13.10.82 Standard mitigation measures to reduce the impact on air quality and noise during the construction phase are to be implemented. These are set out within the REAC (application document TR010029/APP/7.3).

Operation

13.10.83 The significant residual effect to Grove Farm is expected to remain during the operational phase given the existence of the new loop road. Mitigation is proposed as outlined within the noise and landscape chapters (Chapter 6 and 9) of the ES however it is considered that the impact is unavoidable given the location of the receptor.

Community assets (land take, severance and amenity combined)

Construction

13.10.84 During the construction phase, the existing golf hole no 2 on Maylands Golf Club can remain operational while the construction of the new hole takes place. This effect is therefore not considered to be significant. However, there is expected to be a residual moderate adverse effect on amenity while the landscaping mitigation matures.

Operation

13.10.85 At operational stage, the provision of a replacement golf hole of equal value is considered to result in a neutral effect and therefore not significant.

13.10.86 The landscaping mitigation measures introduced during the construction phase are also expected to have matured to reduce the residual effect on amenity from moderate to slight and therefore not significant.

Rural Enterprises

Construction

13.10.87 Given the low sensitivity of the Glebelands Estate the anticipated effects of the Scheme at the construction phase are not considered to be significant.

Operation

13.10.88 Given the low sensitivity of the Glebelands Estate the anticipated effects of the Scheme at the operational phase are not considered to be significant.

Development land

Construction

13.10.89 No significant effects are anticipated during the construction phase.

Operation

13.10.90 No significant effects are anticipated during the operational phase.

Non-motorised users

Construction

13.10.91 No significant effects are anticipated on NMUs at the construction phase.

Operation

13.10.92 significant effects are anticipated on NMUs at the operational phase.

Vehicle travellers

Construction

13.10.93 No significant adverse effects are expected on VTs at the construction phase.

Operation

13.10.94 No significant adverse effects are expected on VTs at the operational phase.

13.10.95 A significant beneficial effect is expected to the levels of driver stress as a result of the improvements to the traffic flows through the junction.

Human health

Construction

13.10.96 The residual health effects, during the construction phase, after mitigation and enhancement measures that are appropriately implemented during the construction phase are expected to be neutral or slight adverse and slight-moderate beneficial significance. This is therefore judged to be a slight to minor adverse (not significant) residual effect.

Operation

13.10.97 The residual health effects, during the operation phase, after mitigation and enhancement measures that are appropriately implemented during the operational phase are expected to be neutral or slight adverse and slight-moderate beneficial significance.

13.11 Cumulative effects

13.11.1 The full assessment of cumulative effects of the Scheme with other developments is provided in the Assessment of Cumulative Effects chapter (Chapter 15) of this ES.

13.11.2 Table 13.33 below summarises the cumulative effects during construction and operation on people and communities.

Table 13.33: Cumulative effects on people and communities

Other development	Distance from junction 28 (km)	Cumulative effects during construction	Cumulative effects during operation
Small, Medium, Large Wind Development Sites	Within DCO boundary	Figure 13.1 indicated the land which has been identified as having potential for small, medium and large wind development sites and falls within the DCO boundary. The construction of the Scheme would prevent any development coming forward as the land would either be used for the loop road itself. There is therefore not expected to be any overlap in the Schemes as wind development would be prevented from coming forward at the identified sites.	No further impact is anticipated during operation phase although the existence of the road and the environmental mitigation would continue to have a significant adverse impact on the ability of the identified sites to come forward as wind development sites.
Cycleway Proposals	Within DCO boundary	Highways England are in discussions with the relevant stakeholders regarding the upgrading of the cycle infrastructure crossing the roundabout. There is the potential for upgrade works to be incorporated within the construction of the junction 28 improvements which could have a significant beneficial impact.	There is the potential for the cycle infrastructure to be upgraded and functional during the operational phase of the development and to have a significant beneficial impact.
Lower Thames Crossing	Within DCO boundary at northern most extent	It has not yet been identified whether there will be any crossover in the construction programmes as between the Scheme and LTC. However, adopting a cautious approach and anticipating there may be some cross over between the schemes, it is considered that through programme liaison undertaken by the Applicant, construction works for the two schemes could take place without generating any significant increases to traffic flows or any significant impacts to people and communities.	The improvement to traffic flows is expected to complement the improvements anticipated by LTC.
Gallows Corner	2.70	The construction stage of the Scheme is not anticipated to coincide with the Gallows Corner scheme. The impact is therefore considered to be neutral.	The operational phase of the Scheme is not anticipated to affect the Gallows Corner scheme and the impact is therefore considered to be neutral.

Other development	Distance from junction 28 (km)	Cumulative effects during construction	Cumulative effects during operation
The Caravan Park, Putwell Bridge	Within DCO boundary	<p>The construction stage would overlap with a small area of land being required from the Caravan Park temporarily to construct the Scheme.</p> <p>The two developments in combination are not expected to lead to any further significant effects over and above those identified within this Chapter.</p>	The improved traffic flows are expected to result in a slight beneficial impact for occupants of the Caravan Park.
Land East of Nags Head Lane	0.25	The construction stage would not require any land take from the development site. It is therefore considered to have a neutral impact.	The improved traffic flows resulting during the operational phase of the scheme are expected to result in a slight beneficial impact.
Westbury Road Car Park	1.30	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Chatham Way/ Crown Street Car Park	1.50	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Land at Hunter House	1.40	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
William Hunter Way Car Park	1.50	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Dunton Hills Garden Village	6.30	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Gardens of Peace (formerly known as Land at Oak Farm)	Within DCO boundary	While temporary land take is required for the construction of the Scheme and a permanent acquisition of a right over the land is required, it is not expected to prevent the burial site coming forward.	During operation, the improved traffic flows as a result of this Scheme is expected to result in a slight beneficial effect.

Other development	Distance from junction 28 (km)	Cumulative effects during construction	Cumulative effects during operation
		The in-combination effect of the two schemes coming forward is not expected to result in significant effects on People and Communities over and above those effects identified within this Chapter.	
Former Harold Wood Hospital	1.60	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Regent House	0.30	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Regent House	0.30	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Essex Police & La Plata House,	1.10	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
141 to 147 High Street	1.35	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Kings House 101 – 135 Kings Road	1.50	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral
Land Formerly Known as NV Tools	1.45	Outside zone of influence (500 m from DCO boundary), impact expected to be neutral	Outside zone of influence, impact expected to be neutral

13.12 NPS NN compliance

- 13.12.1 Paragraph 3.19 of the NPS NN identifies the Government's commitment to creating a more accessible and inclusive transport network that provides a range of opportunities and choices for people to connect with jobs, services and friends and family. The Scheme objectives include to protect access for non-motorised users (pedestrians and cyclists) and improve conditions where possible. This Chapter has set out how the Scheme ensures that the quality of existing NMU routes is maintained.
- 13.12.2 In compliance with paragraph 5.165, this chapter has identified existing and proposed land uses near the project and assessed the effects of precluding new development or proposed uses in the development plan. The chapter covers the potential effects of the Scheme on existing land uses, development land and planning applications.
- 13.12.3 Paragraph 5.166 states that "Existing open space, sports and recreational buildings and land should not be developed unless the land is surplus to requirements or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location." As set out in the community assets assessment, the Scheme would encroach onto hole 2 of Maylands Golf Club. As such, land is proposed to be permanently acquired to enable the provision of a replacement hole to mitigate this effect and ensure that the land taken is replaced by equivalent or better provision in terms of quality and in a suitable location. Whilst an indicative design has already been developed for the layout of the replacement hole, the Applicant continues to engage with Maylands Golf Club as regards the precise design to be implemented on the land proposed to be acquired for this purpose.

13.13 Monitoring

- 13.13.1 The monitoring of the effects of this Scheme on people and communities will primarily take place in line with the recommendations set out within the specific chapters of this ES including namely air quality, noise and landscape and visual impact (Chapters 5, 6 and 9).
- 13.13.2 This includes monitoring process such as monitoring the need for additional noise barriers, and the effectiveness of designed in/existing noise barriers, number of road traffic incidents to ensure road safety has been improved, traffic flows to ensure that congestion is reduced and the continued monitoring of the use of Prow's, footpaths and cycleways. Further detail can be found in the specific chapters noted above.
- 13.13.3 Monitoring suggested in other chapters may be relevant to receptors in the people and communities chapter, particularly around human health and amenity.

13.14 Summary

- 13.14.1 The Scheme will likely result in a large adverse (significant) residual effect on the private dwelling at Grove Farm as a result of the required land take. The changes to the level of amenity enjoyed by both Grove Farm and Maylands Cottage is also anticipated to result in a large adverse (significant) residual effect during construction of the Scheme. During operation, the significant adverse

effect on Grove Farm will remain however, the effect on Maylands Cottages will reduce to slight adverse and not significant.

- 13.14.2 A moderate adverse (significant) effect to amenity is also expected at Maylands Golf Course during the construction phase as a result of new highway being built closer to the course than is currently the case, and the mitigation planting taking time to mature. This is expected to drop to a slight adverse effect and not significant during the operational phase.
- 13.14.3 Given that a remodelling of holes 1, 2 and 3 to provide a course of equal quality is being proposed to mitigate the impact the Scheme is having on the existing course, there is not considered to be a residual significant effect.
- 13.14.4 A moderate beneficial effect is expected to the driver stress levels during the operation phase of the Scheme as a result of the improvement to the traffic flows that would be generated following the completion of the works.
- 13.14.5 Engagement has taken place with the affected land owners to ensure that the mitigation which is proposed in response to the anticipated impacts is as effective as possible.

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