Appendix B

KING'S LYNN TRANSPORT STRATEGY ASSESSMENT

Norfolk County Council

KING'S LYNN TRANSPORT STRATEGY

Appendix B

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Appendix B

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1 INTRODUCTION AND BACKGROUND

1.1.1. The King's Lynn Transport Strategy[1] sets out the vision, objectives and short, medium and long-term transport improvements required to support the existing community of King's Lynn and to assist in promoting economic growth in the area. It sets out a focus and direction for addressing transport issues and opportunities in the town by understanding the transport barriers to sustainable housing and economic growth and identifying the short, medium and long-term infrastructure requirements to address these barriers.

1.1.2. The overall vision of the Transport Strategy is: '***To support sustainable economic growth in King's Lynn by facilitating journey reliability and improved travel mode choice for all, whilst contributing to improve air quality; safety; and protection of the built environment'***.

1.1.3. King's Lynn is the largest town in the borough of King's Lynn and West Norfolk and it functions as the borough's administrative and cultural centre. King's Lynn acts as a sub-regional centre to the surrounding areas (including some beyond the borough boundary), providing an important service and retail function and with the potential to be the driver for the economic well-being of the sub-region.

1.1.4. The main objectives of the Transport Strategy are:

- Provide a safe environment for travel by all modes;
- Encourage town centre accessibility by all modes whilst conserving and enhancing King's Lynn's rich historic environment;
- Support sustainable housing and economic growth;
- Reduce the need to travel by car through development planning;
- Manage traffic congestion in King's Lynn;
- Increase active travel mode share for short journeys;
- Promote and encourage the use of public transport; and
- Reduce harmful emissions and air quality impacts.

[1] Norfolk County Council & Borough Council of King's Lynn & West Norfolk (December 2019). King's Lynn Transport Strategy. Draft for Consultation. https://www.west-norfolk.gov.uk/info/20010/regeneration/696/kings_lynn_transport_study_and_strategy#:~:text=Summary,bettering%20air%20quality

2 SUSTAINABILITY CONTEXT

2.1.1. **Table B-1** below summarises the key sustainability context of Kings Lynn.

Table B-1: Sustainability Context

SA Topic	Summary of Sustainability Context
Transport	Key transport infrastructure in the Borough Council of Kings Lynn include: ▪ A47, A149, A10 and A17. ▪ King's Lynn Train station (Blackfriars Road). ▪ Kings Lynn Bus Station. ▪ King's Lynn Ferry. ▪ Sustrans National Cycle Network Route 1 (on road and off road)[2].
Population	▪ King's Lynn and West Norfolk local authority has a population of 151,945. King's Lynn is home to a population of approximately 41,590 in 2016 (48,200 in the built-up area (King's Lynn and the Woottons)). The latter is closer to the area covered by the strategy. ▪ The population growth from 2007 - 2017 in King's Lynn and West Norfolk has been slightly lower (7.1%) than the average for Norfolk (7.2%). ▪ King's Lynn and West Norfolk has a population density of 106 people per km^2.
Air Quality	▪ The King's Lynn & West Norfolk 2020[3] Air Quality Annual Status Report 2020 reports exceedances of Nitrogen Dioxide within the borough. ▪ PM_{10} concentrations reported at these sites have remained below the annual mean and 24-hour mean Air Quality Strategy's objective limits since 2015. ▪ There are two Air Quality Management Areas (AQMAs) located in King's Lynn. The Railway Road AQMA, located to the town centre and the Gaywood Clock AQMA were both declared for exceedances of the NO_2 annual mean objective.
Biodiversity	▪ There are five Ramsar sites located in King's Lynn and West Norfolk – Ouse Washes, North Norfolk Coast, Dersingham Bog, Roydon Common and The Wash; ▪ There are four Special Areas of Conservation (SAC) sites in King's Lynn and West Norfolk - Ouse Washes, Roydon Common & Dersingham Bog, The Wash & North Norfolk Coast and Norfolk Valley Fens; ▪ There are four Special Protection Areas (SPA) sites located in King's Lynn and West Norfolk - Ouse Washes, North Norfolk Coast, The Wash and Breckland; ▪ The Norfolk Coast Area of Outstanding Natural Beauty (AONB) and spans across the coast through Kings Lynn, North Norfolk and Great Yarmouth;

[2] https://osmaps.ordnancesurvey.co.uk/52.54986,-2.31176,7
[3] King's Lynn & West Norfolk Air Quality Annual Status Report 2020. Available at: https://www.west-norfolk.gov.uk/info/20137/air_quality/169/air_quality_information

SA Topic	Summary of Sustainability Context
	▪ There are 30 Site of Special Scientific Interest (SSSI) sites located across the King's Lynn & West Norfolk Borough Council area; and ▪ King's Lynn and West Norfolk has five National Nature Reserves (NNR) sites - Dersingham Bog, Holme Dunes, Roydon Common, Scolt Head Island and The Wash.
Climate change	▪ The key challenges for Norfolk include increased flood risk, water scarcity and sea level rise. These challenges are likely to affect human, health during increasingly frequent extreme weather events, the ability of Norfolk's infrastructure to cope with changing demand and use and the organisational resilience to climate change and changes to natural systems. ▪ The effects of changes in sea level and climate change will impact greater on the coastline leading to coastal erosion. ▪ In 2016, the total CO^2 emissions from the transport network in King's Lynn & West Norfolk was 403.4kt, which was an increase on 2015 levels which where 394.3t[4]. ▪ The A Roads in King's Lynn & West Norfolk generated 235.2kt of CO^2 emissions, minor roads generated 156.9kt of CO2 emissions, railways 0.1kt of CO^2 and other transport generated 11.2kt of CO^2 emissions.
Community and Access	▪ There are key services such as schools, shops, GP surgeries, hospital, dentists and pharmacists located in King's Lynn & West Norfolk. ▪ King's Lynn & West Norfolk ranks 79th out of 317 local authorities nationally where a rank of 1 is the most deprived[5]. ▪ 8.0% of the population have no qualifications which is higher than the regional (7.2%) and national (7.7%) averages[6]. ▪ 15% of children are from low income families which is higher than the national average of 14%. ▪ Job growth in Norfolk is targeted to increase by 55,000 for the period 2001-2021.
Cultural Heritage and the Historic Environment	▪ There are 44 Conservation Areas in the King's Lynn & West Norfolk Borough Council area ▪ There are 1544 Listed Buildings, 130 Scheduled Monuments and 6 Listed park/garden in the King's Lynn & West Norfolk Borough Council area. ▪ Non-designated and unknown heritage assets may be present around Norfolk which may be of high value. These include, but are not limited to, locally listed buildings. The Norfolk Monuments Management project focuses on historic monuments that have no legal protection.

[4] 2005 to 2016 UK local and regional CO_2 emissions technical report. https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016

[5] https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

[6] https://www.nomisweb.co.uk/reports/lmp/la/1946157235/report.aspx?town=Kings%20Lynn#tabempunemp

SA Topic	Summary of Sustainability Context
Economy and Employment	▪ 83.2% of the population in King's Lynn and West Norfolk are economically active, which is lower than the regional (80.5%) and the national average (79.1%)[7]. ▪ 3.3% of the population are unemployed which is higher than the regional (3.2%) but lower national average (3.9%). ▪ Economic activity in males is higher than the regional (85.2%) and national (83.4%) average at 85.7%, with females showing also a higher trend compared to the national (74.9%) and regional (75.9%) averages at 80.8%. ▪ Average gross weekly earnings (full-time workers) are lower than the regional (£581.00) and national (£586.50) average at £553.206. ▪ The Employment Land Update (2012)[8] shows that over the last ten years (2001-2011) the average annual employment land take-up has been 2.3 hectares per year. If this trend were to continue throughout the plan period, then a total of 39.1 hectares would be needed to meet this level of demand. ▪ The main employment destinations are the town centre, North Lynn Industrial Estate, the Port, Austin Fields, Hardwick Industrial Estate, Horsley's Fields, Wisbech Road Industry, East Coast Business Park, Saddlebow Industrial Estate, Willows Business Park, Hardwick Narrows Industrial Estate, the College of West Anglia and The Queen Elizabeth Hospital.
Health	▪ Life expectancy for males and females in King's Lynn & West Norfolk is better than the national average. Life expectancy for males is 80.1 years compared to 79.2 years nationally and life expectancy for females is 83.1 years compared to 82.9 years nationally[9]. ▪ Under 75 mortality rates from all cancers is lower (130.1 per 100,000) than the national average (132.3 per 100,000)[8]. ▪ The number of people killed or seriously injured on the roads is higher (53.3 per 100,000) than the national average (42.6 per 100,000)8. ▪ Under 75 mortality rate from all cardiovascular diseases is higher (73.0 per 100,000) then the national average (71.7 per 100,000).
Landscape and Townscape	▪ There are four landscape character areas located in King's Lynn & West Norfolk – The Fens, North Norfolk Coast, North West Norfolk and Breckland. ▪ The Norfolk Coast AONB is located within King's Lynn. The key characteristics of the Norfolk Coast AONB are the geomorphology, diversity and integrity of landscape and marsh coastlands.

[7] Nomis Labour Market Statistics, King's Lynn and Great Yarmouth Profile, available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157235/report.aspx?town=Kings%20Lynn

[9] Public Health England, Local Authority Profiles, King's Lynn and West Norfolk. Available at: https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/pat/6/par/E12000006/ati/201/are/E07000146/cid/4

SA Topic	Summary of Sustainability Context
Noise	▪ There are 22 Noise Important Areas (NIA) in King's Lynn & West Norfolk of which the roads are the key source. ▪ An increase in noise from transport can have an adverse effect on general health, sleep and can be seen as a nuisance.
Soils and Resources	▪ There are 7 waste sites and 2 existing landfill sites located in King's Lynn and West Norfolk. ▪ There is a need to provide 163,000 tonnes of new recycling, composting and source-segregated-anaerobic digestion capacity, about 703,000 tonnes of recovery infrastructure and about 2,060,000 m3 of new inert landfill/quarry restoration by 2026[10]
Water Resources and Flooding	▪ The River Babingley, Nar, Gaywood are key waterbodies located within the King's Lynn and West Norfolk Borough. ▪ The King's Lynn and West Norfolk Strategic Flood Risk Assessment (SFRA) [11] covers the Borough Council of King's Lynn and West Norfolk and provides information and guidance on flood risk for this area. The SFRA has identified that areas of King's Lynn and West Norfolk Borough are at high risk of flooding from tidal, coastal, fluvial and surface water sources.

[10] Norfolk Minerals and Waste Development Framework- Waste Site Specific Allocations Development Plan Document 2013

[11] Kings Lynn and West Norfolk Strategic Flood Risk Assessment. Available at: https://www.west-norfolk.gov.uk/downloads/file/5300/strategic_flood_risk_assessment_final_report

3 KINGS LYNN TRANSPORT STRATEGY PROPOSALS

3.1.1. The King's Lynn Transport Strategy is comprised of six packages of options, which are as follows:

- Options to encourage journeys by public transport;
- Options to promote and encourage travel by active modes;
- Options to reduce delay and congestion on the local highway network;
- Options to manage travel behaviour.

3.1.2. These options are set out for the short, medium and long term:

- Short-term options are planned for delivery by 2022;
- Medium-term options are planned for delivered between 2023 and 2030; and
- Long-term options are planned for delivery beyond 2030.

4 SUSTAINABILITY APPRAISAL

4.1.1. The sustainability appraisal of the King's Lynn Transport Strategy follows the same methodology and SA objectives as set out within the LTP4 SA Report. Each of the nine options have been assessed and broken down by their geographical scale and duration.

4.2 SHORT TERM

Options to Encourage the use of Public Transport

- **SPT1:** Access for buses to bus station via Albion Street; Improved Albion Road exit for buses.
- **SPT2:** Reduction in outbound delays at Hansa Road, Hardwick Road junction outbound for public transport; Hansa Road yellow box improvements for traffic exiting retail park.
- **SPT3:** Enhanced signage and publicity for King's Lynn ferry.
- **SPT4:** Additional car parking at West Lynn for the Ferry and secure storage for cycles.

Table B-2: Strategic Short-Term Options to Encourage the use of Public Transport

Option	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Options to encourage journeys by public transport	+	0	+	0	+	+	0	+	0	+	+	+	+	0	+
	Improvements to the access and road exits for bus services are likely to provide more reliable journeys and reducing journey time on some routes. These improvements will also encourage the potential switch from car to bus services and therefore may result in localised air quality benefits. Better access to public transport will help to improve economic prosperity across the local area and beyond, helping communities better reach jobs and services. There are additional benefits to health and wellbeing through improved														

Option	SA Objectives
	access to key services, jobs and recreation. The addition of secure cycle parking will allow cyclists to leave their bikes in secure places and could encourage residents to use their bikes more often. Addressing traffic signal delays at the Hansa Road and Hardwick Road junction, in addition to making improvements to the use of the yellow box will create benefits for all main road traffic in terms of reducing journey times and queues. This is likely to help to reduce driver stress and improve levels of safety. Enhanced signage and publicity for King's Lynn ferry through the use of IT will further promote and encourage its use. These improvements will encourage the community's use of the ferry and will benefit the retention of this facility in the community. Additional car parking at West Lynn for the Ferry and secure storage for cycles will provide benefits for travel into King's Lynn via the ferry. The strategy will help retain this facility within the community and help reduce vehicle numbers through King's Lynn. Given the scale of the development and the location of these options away from areas of high biodiversity, heritage and landscape value no effects have been identified.

Options to Encourage Journeys made by Active Modes

- **SAM5:** Cycle lane continuity through the town (including improved provision for cyclists including new routes / infrastructure / signage).
- **SAM6:** Port of King's Lynn highway design access improvements including pedestrians and cyclists at North Street and Cross Bank Road.
- **SAM7:** Tennyson Avenue Pedestrian & Cycle improvements: King George V Avenue pedestrian improvements; Tennyson Road, The Walks, Tennyson Avenue pedestrian improvements; Tennyson Avenue, Gaywood Road pedestrian improvements; Review of pedestrian crossing facilities on Extons Road and Tennyson Avenue.
- **SAM8:** Review pedestrian crossing provision on London Road. South Lynn to Hardwick pedestrian crossing review.

Table B-3: Options to encourage the use of active modes

Option Scale/Duration	**SA Objectives**														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+	+	+	0	+	++	+	+	0	+	++	+	++	+	+
Options to encourage journeys by active modes	A number of areas for further development of cycle provision and infrastructure around King's Lynn would further optimise and promote their use. Improvement options would enhance safety and permeability for pedestrians and cyclists, which would also include safer vehicular access arrangements. This could encourage more residents to cycle, reducing the number of single occupancy journeys, which has additional benefits in terms of noise, air pollution and human health. Opportunities for active travel should, however, ensure those with limited mobility are able to participate, incorporating measures for all levels of mobility in order to be fully inclusive. New cycle and pedestrian routes could involve small scale loss of habitat but could also be designed to enhance the biodiversity value, e.g. through creation of linking corridors, though new habitat would take time to establish. As with all linear infrastructure, habitat fragmentation could occur, but the scale of walking and cycle paths means any fragmentation would be minor due to the width of such paths. Improvements to existing routes create an opportunity to enhance habitats and ecological networks. Natural capital enhancements are possible through the connection of green														

Option Scale/Duration	SA Objectives
	spaces and protection of habitats linking population centres which may otherwise be lost of severed through a lack of maintenance or through other development. Well-designed walkways and cycleways can contribute to the sense of place and appearance of an area and could present opportunities to enhance the quality of visual amenity of landscapes and townscapes by managing public access through King's Lynn and beyond.

Options to Reduce Delay and Congestion on the Local Highway Network – Traffic Signals

- **STS9:** Review traffic signal timings at various locations to optimise traffic movements, including reviewing junctions where priority for buses is feasible.
- **STS10:** Linked and co-ordinated traffic signals.
- **STS11:** Gaywood Clock/ Queen Mary Road traffic light Improvements and junction redesign.
- **STS12:** Loke Road John Kennedy Road traffic signal optimisation or junction redesign.

Table B-4: Options to Reduce Delay and Congestion on the Local Highway Network – Traffic Signals

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Options to Reduce Delay and Congestion on the Local Highway Network – Traffic Signals	+/-	0	+/-	0	0	++	0	+	0	0	+	++	+	0	+/-
	This option aims to improve existing signals timings and co-ordinating traffic signals with the local bus scheduling to help improve traffic flow and reduced delays. These options also include address phasing issue between light and also to be developed to provide an alternative junction arrangement to further assist with traffic flow at the proposed locations. Both positive and negative effects have been identified in relation to air quality, carbon emissions and noise. Reduced levels of congestion will help to reduce levels of noise pollution and alleviate emissions, reducing air levels of air pollution. However, there could be a potential increase increased delay from side roads and may encourage more														

Option Scale/Duration	SA Objectives
	vehicular travel. This could lead to increases in noise and air pollution in other areas, which are more susceptible to the negative effects (e.g. residential areas).

Options to Reduce Delay and Congestion on the Local Highway Network – Highway Network

- **SHN13:** Railway station bus layby re-design.
- **SHN14:** Southgates roundabout highway capacity improvement scheme - small-medium scale.
- **SHN14a:** Vancouver Avenue – improved lane management.
- **SHN15:** Estuary Road / Edward Benefer Way junction improvements.
- **SHN16:** Low Road Castle Rising Rd Wootton Rd Grimston Rd junction improvements.

Table B-5: Options to Reduce Delay and Congestion on the Local Highway Network – Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Options to Reduce Delay and Congestion on the Local Highway Network – Highway Network	+/-	-	+/-	+/-	+/-	++	+	++	-	++	++	++	+	-	+/-
	This option is likely to bring about both positive and negative effects on air quality, carbon emissions and noise pollution. Easement of congestion through increasing highway capacity and improved lane management at key junctions providing access to King's Lynn will help to reduce levels of noise and air pollution; however, improvements could result in a greater volume of vehicles using the highway and convenience for car users, which could in turn increase levels of noise and air pollution and reduce resilience to climate change.														

Option Scale/Duration	SA Objectives
	Improving the flow of traffic and upgrading junction is likely to result in improvements to safety for road users, including pedestrians and cyclists. Improve connectivity and reliability on the network may provide residents with great access to key services, jobs and recreation. A loss of connectivity of, or a deterioration in biodiversity could occur as a result of capacity improvements and junction upgrades due to their scale and linear nature. This may result in a negative effect on biodiversity through a loss or degradation of ecosystem provision. The improvements could involve small scale loss of habitat. There are likely to be opportunities for mitigation, compensation and net gain, although this would take time to establish. On-line highway works could lead to a cumulative effect on the historic environment, townscape and landscape, both directly and indirectly, although this would be limited to the context of the existing highway. There may be opportunities to improve both landscape and setting of existing roads.

Options to manage travel behaviour – Travel management

- **STM17:** Provide a comprehensive Car Parking Strategy for King's Lynn.
- **STM18:** Work with schools and education in King's Lynn to provide safe alternatives to private car for school children.

Table B-6: Options to manage travel behaviour – Travel management

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Options to manage travel behaviour – Travel management	+/-	?	+/-	0	-	+	+	+	?	0	+	+	+	?	+/-
	The development of a parking strategy in King's Lynn could help to better manage car parking during peak periods and help to reduce levels of congestion within the town. Uncertain effects have been identified for air quality, carbon emissions and noise. The strategy could present opportunities to reduce levels of noise and air pollution through reduced congestion and parking restrictions within residential areas. However, this option could make travelling by														

Option Scale/Duration	SA Objectives
	car to King's Lynn a more convenient option, and see the town accommodate more vehicles, which could exacerbate noise and air pollution in other locations. The strategy could present opportunities to incorporate park and rides/park. Developing a campaign for King's Lynn to encourage parents not to drive children to school will help address air quality impacts on Wisbech Road at the schools taking part. Work with the schools to develop safer routes to school, walking buses, safe cycle routes, provision for secure cycle storage at the schools could encourage more pupils to cycle, reducing the number of single occupancy journeys, which has health, safety and wellbeing benefits for children in addition to influencing mode choice of future generations.

4.3 MEDIUM TERM (OPTIONS EXPECTED TO BE DELIVERED BY 2030)

Options to encourage the use of public transport – Public Transport

- **MPT1:** Increased use of Harding's Way for buses – address issues at Millfleet and Wisbech Road to Hardwick Road to make more advantageous for buses.
- **MPT2:** Town centre gyratory re-design. Various Options - Bus Lanes - Railway Rd, London Rd, Blackfriars Rd.
- **MPT3:** Provide enhanced access to the Ferry throughout the day / year to provide a more usable service for all.
- **MAM4:** Queen Mary Road, Fairstead, Hardwick improvements in linkages for pedestrians and cyclists.

Table B-7: Options to encourage the use of public transport – Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+	0	+	0	+	+	+	++	+/-	+	+	+	++	+	+
Options to encourage the use of public transport – Public Transport	Initiating Harding's Way as a bus only route to accommodate an increase in buses and bus usage will potentially result in reliability/journey time benefits whilst retaining a high level of provision for pedestrians / cyclists and especially vulnerable road users and mobility scooters. Redesign of traffic movements around gyratory will assist with improving air quality conditions around the AQMA and enhance road safety through reducing congestion and increased connectivity (enhanced access to bus station). Providing enhanced access for the ferry service will enable access for a wider range of people and provide improvements / alternatives to access during low tides. These improvements will encourage the community's use of the ferry and will benefit the retention of this facility in the community, whilst promoting social inclusion. Enhanced high quality access across the railway line and around the town for modes other than private car to relieve some of the congestion pressure in Gaywood area. The addition of enhancements to pedestrian links will provide a safe network for all users. These initiatives could help to reduce the number of private vehicles on the road, reducing overall levels of emissions and air pollution from the transport network. The impact will depend on the number of people who use the alternative														

Option Scale/Duration	SA Objectives
	transport services. The impact of improving the local bus network on reducing carbon emissions could depend on the fuel efficiency and emission levels of the buses used. Some options are located within the Friars Conservation Area. Insensitive design and large land take could result in negative effects on the town's designated heritage assets, however, if the design takes into account the character and setting, there may be opportunity to protect and enhance distinctive heritage assets. Air pollution is a key factor in the degradation of surfaces of historical buildings and monuments and the impact of pollutants emitted into the atmosphere on materials is significant and often irreversible. The reduction in single occupancy journeys will help to reduce air pollution, which could help prevent further degradation of some of the region's unique historic assets. The reduction in noise pollution from lower levels of traffic in some areas could result in increased tranquillity, contribute to overall sense of place and the unique setting of heritage assets

Options to reduce delay and congestion on the local highway network – Highway Network

- **MHN5:** Hardings Way opened for additional traffic.
- **MHN6:** South Gate highway capacity enhancements - providing two lanes in both directions / large scale redesign.
- **MHN7:** Queen Mary Road link to Fairstead.
- **MHN8:** Winston Churchill Drive QEH access widening.
- **MHN9:** QEH roundabout Capacity improvements.
- **MHN10:** A149 Dualling up to Knights Hill; Knights Hill junction Capacity improvements.
- **MHN11:** A149 Jubilee Roundabout Capacity improvements.
- **MHN12:** West Winch Housing Access Road.

Table B-8: Options to reduce delay and congestion on the local highway network – Highway Network

Option Scale/Duration	SA Objectives														
Options to reduce delay and congestion on the local highway network – Highway Network	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)

Option Scale/Duration	SA Objectives														
	+/-	-	+/-	- -	?	+	0	++	-	+	+	++	+	- -	+/-
	The proposed options have potential to result in significant negative effects on biodiversity, through habitat loss and severance. Given its proximity to River Nar SSSI site, and its location within close proximity to other statutory protected areas, including SACs, SSSIs, Ramsar and NNR. The modifications have the potential to negatively affect habitats and species that make up these protected sites, particularly if land take is required, or indirectly through changes to drainage and emission to air. There is also likely to be a negative impact on heritage assets from new roads, particularly on buried archaeology and historic landscapes but also on the setting of other historic assets. The historic environment, landscapes and tranquillity are under pressure from development throughout Norfolk and opportunities to mitigate for new roads should be undertaken at a landscape scale to support wider green infrastructure networks. Given King's Lynn close proximity to the Norfolk Coast AONB, the works have the potential to erode the unique landscape character and could lead to an effect on the townscape and landscape, both directly and indirectly. Options are likely to bring about both positive and negative effects on air quality, carbon emissions and noise pollution. Easement of congestion will help to reduce levels of noise and air pollution; however, improvements could result in greater capacity and convenience for car users, which could in turn increase levels of noise, air pollution and carbon emissions. Improving the flow of traffic and upgrading junction is likely to result in improvements to safety for road users, including pedestrians and cyclists. Improve connectivity and reliability on the network may provide residents with great access to key services, jobs and recreation. The vulnerability of the options to climate change would depend on whether they were built in areas prone to flooding and are relieving other transport routes in areas of flood risk, in addition to the resilience of materials used in design to withstand higher temperatures and storms. The upgrades are likely to result in modifications and discharges to watercourses, given King's Lynn falls entirely within a flood zone 3 and there is potential for significant negative effects if this isn't well managed.														

4.4 LONG TERM OPTIONS (EXPECTED TO BE DELIVERED AFTER 2030)

Options to reduce delay and congestion on the local highway network – Highway Network

- **LHN1:** Hospital to A149 direct access link.
- **LHN2:** Wisbech Road to Nar Ouse Way link Road.

Table B-9: Options to reduce delay and congestion on the local highway network – Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+/-	-	+/-	+/-	+/-	+	+	++	-	+	++	+	+	-	+/-
Options to reduce delay and congestion on the local highway network – Highway Network	This option looks to investigating for providing a highway link in order to improve traffic flow at Southgates, as well as providing a direct access link to the hospital.. This will help residents better access to jobs, services, facilities and recreation, which will have additional benefits for health and wellbeing. This option could redirect more cars on the roads past sensitive receptors, increasing both noise and air pollution. However, reduced levels of congestion and improved flow, could reduce levels of noise and air pollution around the AQMA. This option could also result in the provision for other modes of transport, such as walking and cycling. This could help to work towards a modal shift and help to reduce overall levels of noise and air pollution from the transport network. A loss of connectivity of, or a deterioration in ecosystems could occur as a result of new link road and junction upgrade. This may result in a negative effect on the region's natural capital through a loss or degradation of ecosystem provision. The improvements could involve small scale loss of habitat. There are likely to be opportunities for mitigation, compensation and net gain, although this would take time to establish. Options will result in the use of raw materials. Any works in brownfield sites could encounter contaminated land/soil requiring remediation or removal and disposal but the opportunity may exist, where practicable, for upgrade works to reuse existing materials and minimisation and sustainable use of materials. Although watercourses may be affected,														

Option Scale/Duration	SA Objectives
	highway improvements could provide the opportunity to improve existing drainage network, reducing polluted run-off and potential for contamination. On-line highway works could lead to a cumulative effect on the historic environment, townscape and landscape, both directly and indirectly, although this would be limited to the context of the existing highway. The addition of the Wisbech Road to Nar Ouse Way link Road could have a negative effect on landscape and townscape. There is also likely to be a negative impact on heritage assets from new roads, particularly on buried archaeology and historic landscapes but also on the setting of other historic assets such as scheduled monuments, listed buildings and undesignated assets of importance.

Options to encourage the use of public transport – Public Transport

- **LPT3:** Train frequency improvements.

Table B-10: Options to encourage the use of public transport – Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Options to encourage the use of public transport – Public Transport	+/-	0	+/-	0	+	+	+	++	0	+	++	+	+	0	?
	Improving the frequency of rail services will improve rail links to Cambridge and London, as well as improving connecting services - connections to Norwich from Ely. This will help to encourage modal shift through improve public transport facilities, whilst improving access to key services, jobs and recreation. This has additional benefits for health and wellbeing. Increased frequency of rail services has resulted in uncertain effects on noise pollution. There is potential for levels of noise to increase from a more frequent service, however, better connectivity could also help to reduce the number of private vehicles on the road, reducing overall levels of noise from the transport network. There is potential for both positive and negative effects on air pollution and carbon emissions. Increased train frequency may help to support a modal shift to more sustainable modes; however, it may increase levels of traffic to														

Option Scale/Duration	SA Objectives
	and from the train station. Increased train frequency also has potential to increase delay at level crossings which are key sources of air pollution and carbon emissions. Given that improvements are likely to occur within rail land, with limited ecological, historic or landscape value, no effects have been identified.

5 SUMMARY

5.1 ASSESSMENT OVERVIEW

5.1.1. In general, the majority of the proposed options have resulted in either neutral or positive effects. Options that increase connectivity, particularly via public transport and active travel modes have resulted in significant positive effects on a quality of life (SA6), access to jobs and services, economy (SA8 and SA11) and health and wellbeing (SA13). It is thought that these options will provide residents with opportunities to pursue active lifestyles and improve connections to healthcare services, jobs and recreation.

5.1.2. Options that aim to better manage traffic and reduce delay and congestion on the highway network, have resulted in potential for both positive and negative effects on air quality (SA1), noise pollution (SA15) and carbon emissions (SA3). Easement of congestion will help to reduce levels of noise, air pollution and carbon emissions; however, improvements could result in greater capacity and convenience for car users, which could in turn increase levels of noise, air pollution and carbon emissions.

5.1.3. Given the scale and location of options, in general neutral effects were identified for biodiversity (SA2) water, soils and minerals (SA4), historic environment (SA9) and landscape and townscape (SA14), however, the strategic medium term options to reduce delay and congestion on the strategic road network, which include capacity improvements, resulted in significant negative effects on these four SA topics. Given the proximity of the works to SAC, SSSI, SPA and Ramsar sites, its location within the Norfolk Coast AONB and flood zone 3 there is potential for significant negative effects on these important features. Mitigation will be required as outlined below.

5.2 MITIGATION

5.2.1. Mitigation of significant negative effects of the plan and enhancement of positive effects are a key purpose of SA. The SEA Regulations require that mitigation measures are considered to prevent, reduce or offset any significant adverse effects on the environment of implementing the plan. The measures are known as ‘mitigation’ measures. Mitigation measures include both proactive avoidance of adverse effects and actions taken after potential effects are identified.

5.2.2. Table B11 below outlines proposed mitigation. Additional enhancement measures can be found in Section 6.7 of the main LTP4 SA Report.

Table B11: Proposed Mitigation

SA Topic	Mitigation	Mechanism
Climate Change Soils and Resources and Water Resources and Flooding Noise	Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM. Sustainable design and construction techniques should be promoted, such as low energy lighting and low noise road surfaces	Project level design and assessment
Biodiversity and geodiversity	The incorporation of natural features such as tree planting, hedgerows and floral arrangements along walk/cycleways to enhance connections to nature and reduced stress levels, contributing to mental health and wellbeing benefits. Larger infrastructure schemes should incorporate design measures to lessen the impact on biodiversity and ensure biodiversity net gain.	Project levels biodiversity net gain assessment
Landscape and Townscape Cultural Heritage and the Historic Environment	Transport solutions must seek to maximise sustainability benefits from existing landscape, townscape and heritage assets by valuing them inherently and for the wider services they provide. Promoters and designers should liaise closely with NCC to avoid or minimise negative impacts, such as land take and light pollution, whilst seeking to maximise benefits, such as tranquillity.	Historic Landscape Characterisation Project level design and assessment
Health and Population Community and Access Economy and employment	Ensure the needs and aspirations of groups with protected characteristics are considered in delivering transport solutions, in addition, including those from low income households.	Strategic and project specific EqIA and HIA for projects DDA compliance

5.3 MONITORING

5.3.1. The SEA Regulations require that monitoring is undertaken on a plan so that the significant effects of implementation can be identified, and remedial action imposed. The purpose of the monitoring is to provide an important measure of the sustainability outcome of the final plan, and to measure the performance of the plan against sustainability objectives and targets.

5.3.2. The aim of monitoring is to check whether the plan is having the significant effects that were predicted in the SA, and to deal with any unforeseen problems. Despite mitigation measures some residual negative effects have remained which will require monitoring. These are as follows:

- SA2: The potential loss and fragmentation of habitats

5.3.3. Table B12 below outlines monitoring proposals to deal with these negative effects.

Table B12: Monitoring Proposals

Potential Uncertain effect	What needs to be monitored?
Potential negative effects on biodiversity and geodiversity	The number of biodiversity enhancement schemes implemented through LTP4 schemes

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Appendix C

GREAT YARMOUTH TRANSPORT STRATEGY ASSESSMENT

Norfolk County Council

GREAT YARMOUTH TRANSPORT STRATEGY

Appendix C

70072839
SEPTEMBER 2020

PUBLIC

Norfolk County Council

GREAT YARMOUTH TRANSPORT STRATEGY

Appendix C

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CONTENTS

1 INTRODUCTION AND BACKGROUND

1.1.1. The Great Yarmouth Transport Strategy[1] sets out the vision, objectives and transport infrastructure to support both the existing and future communities in Great Yarmouth.

1.1.2. The overall vision of the Strategy is to: ***'support sustainable economic growth in Great Yarmouth by facilitating journey reliability and travel mode choice for all, whilst contributing to improved air quality and safety'.***

1.1.3. The Transport Strategy has been developed to support the vision, strategic objectives and planned growth set out in the Great Yarmouth Local Plan (2013 to 2030) and the vision and objectives of the Great Yarmouth Town Centre Regeneration Framework & Masterplan and Norfolk's Local Transport Plan for 2026.

1.1.4. The Transport Strategy covers the main urban area of Great Yarmouth, Gorleston-on-Sea, Bradwell and Caister-on-Sea. Whilst the focus for the Transport Strategy is the main urban area of Great Yarmouth, consideration has been given to the wider local and strategic transport network that connects Great Yarmouth with surrounding settlements. This includes consideration of Great Yarmouth's bus and rail service catchment areas and the A47, A143 and A149 corridors.

1.1.5. The main objectives of the Transport Strategy are:

- Manage traffic congestion in Great Yarmouth
- Capitalise on the infrastructure and investment opportunities presented by the Great Yarmouth Third River Crossing
- Support sustainable housing and economic growth
- Provide a safe environment for travel by all modes
- Improve opportunities to use sustainable modes within Great Yarmouth by providing viable alternatives to car use
- Increase active travel mode share for short journeys
- Reduce harmful emissions and air quality impacts

[1] Great Yarmouth Borough Council, Norfolk County Council, WSP (August 2019) Great Yarmouth Transport Strategy. Draft for Consultation https://norfolk.citizenspace.com/consultation/great-yarmouth-transport-strategy/user_uploads/2019-09-16-gyts-draft.pdf

2 SUSTAINABILITY CONTEXT

2.1.1. **Table C-1** below summarises the key sustainability context of Great Yarmouth.

Table C-1: Sustainability Context

SA Topic	Summary of Sustainability Context
Transport	Key transport infrastructure in the Great Yarmouth Borough include: ▪ A47, A12 and A143 ▪ Great Yarmouth Train station (Wherry Line) ▪ Market Yates Bus Station and Beach Coach Station ▪ Norfolk Coast Path, Angles Way ▪ 517 National Cycle Route and Route 30 Sustrans Local Cycle Route
Population	▪ Great Yarmouth borough is home to a population of approximately 99,150, of which about 68,500 live within the study area of this Transport Strategy (Great Yarmouth, Gorleston-on-Sea, Bradwell and Caister-on-Sea). ▪ The population growth in Great Yarmouth has been lower than the average for Norfolk, the East of England and England as a whole. Between 2012 and 2016, the population of the borough grew by 1.6% compared to an average of 3.8% for the East of England. ▪ Great Yarmouth has a population density of 570 people per km2.
Air Quality	▪ The Great Yarmouth Air Quality Annual Status Report 2018[2] reports that there are no exceedances of air quality emissions. The key pollutants of concern locally continue to be Nitrogen Oxides and particulates primarily from traffic and industrial emissions. ▪ There are no Air Quality Management Areas (AQMAs) located in Great Yarmouth.
Biodiversity	▪ There are two Ramsar sites located in Great Yarmouth– Brevdon Water and Broadland (The Broads) ▪ There are two Special Areas of Conservation (SAC) sites in Great Yarmouth - Winterton-Horsey Dunes and The Broads. ▪ There are three Special Protection Areas (SPA) sites located in Great Yarmouth - Brevdon Water, Broadland and Great Yarmouth North Denes. ▪ The Norfolk Coast Area of Outstanding Natural Beauty (AONB) and spans across the coast through Kings Lynn, North Norfolk and Great Yarmouth. ▪ There are 10 Sites of Special Scientific Interest (SSSI) sites located across the Great Yarmouth local authority area.
Climate change	▪ The key challenges for Norfolk include increased flood risk, water scarcity and sea level rise. These challenges are likely to affect human health during increasingly frequent extreme weather events, the ability of

[2] Great Yarmouth Air Quality Annual Status Report 2018. Available at: https://www.great-yarmouth.gov.uk/CHttpHandler.ashx?id=3166&p=0

SA Topic	Summary of Sustainability Context
	Norfolk's infrastructure to cope with changing demand and use and the organisational resilience to climate change and changes to natural systems. ▪ The effects of changes in sea level and climate change will impact greater on the coastline leading to coastal erosion. ▪ In 2016, the total CO^2 emissions from the transport network in Great Yarmouth was 135.5kt, which was an increase on 2015 levels which where 132.8kt[3]. ▪ The A Roads in Great Yarmouth generated 62.1kt of CO^2 emissions, minor roads generated 52.2 kt of CO^2 emissions, railways 0.4kt of CO^2 and other transport generated 20.7kt of CO^2 emissions.
Community and Access	▪ There are key services such as schools, shops, GP surgeries, hospital, and dentists located in Great Yarmouth, Caister-on-Sea and Gorleston-on-Sea. ▪ Great Yarmouth is amongst the top 10% of deprived local authorities nationally. It ranks 24th out of 317 local authorities nationally where a rank of 1 is the most deprived. ▪ 13.2% of the population have no qualifications which is higher than the regional (7.2%) and national (7.7%) averages. ▪ 20% of children are from low income families which is higher than the national average of 14%[4]. ▪ Job growth in Norfolk is targeted to increase by 55,000 for the period 2001-2021.
Cultural Heritage and the Historic Environment	▪ There are 19 conservation areas in the Great Yarmouth Borough Council area. ▪ There are 429 listed buildings, 14 scheduled monuments and 1 listed park/garden in the Great Yarmouth Borough Council area. ▪ Non-statutory and unknown heritage assets may be present around Norfolk which may be of high value. These include, but are not limited to, locally listed buildings. The Norfolk Monuments Management project focuses on historic monuments that have no legal protection.
Economy and Employment	▪ 73.2% of the population in Great Yarmouth are economically active, which is lower than the regional (80.5%) and the national average (79.1%)[5]. ▪ 5.7% of the population are unemployed which is higher than the regional (3.2%) and national average (3.9%)[5]. ▪ Economic activity in males is higher than the regional (85.2%) and national (83.2%) average at 89.6%, whilst economic activity in females is significantly lower than the national (74.9%) and regional (75.9%) averages at 60%[5].

[3] 2005 to 2016 UK local and regional CO2 emissions technical report. https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016

[4] Public Health England, Local Authority Profiles, Great Yarmouth, 2019 Available at: https://fingertips.phe.org.uk/profile/healthprofiles/data#page/1/gid/1938132701/pat/6/par/E12000006/ati/201/are/E07000145/cid/4

[5] Nomis Labour Market Statistics, Great Yarmouth Profile, available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157234/report.aspx?town=great%20yarmouth

SA Topic	Summary of Sustainability Context
	▪ Average gross weekly earnings are lower than the regional (£581) and national (£565.50) average at £536.50[5]. ▪ The Employment Land Update (2012)[6] shows that over the last ten years (2001-2011) the average annual employment land take-up has been 2.3 hectares per year. If this trend were to continue throughout the plan period, then a total of 39.1 hectares would be needed to meet this level of demand.
Health	▪ Life expectancy for both males and females in Great Yarmouth it significantly worse than the national average. Life expectancy for males is 78.2 years compared to 79.6 years nationally and life expectancy for females is 82.6 years compared to 83.2 years nationally[7]. ▪ Under 75 mortality rates from cardiovascular disease and all cancers is significantly worse than the national average[7]. ▪ The number of people killed or seriously injured on the roads is significantly better than national average. ▪ The mortality rate from chronic obstructive pulmonary disease is 63.4 deaths per 100,000, which is significantly worse than the national average[7].
Landscape and Townscape	▪ There are three landscape character areas located in Great Yarmouth – The Broads, North East Norfolk and Flegg and Suffolk Coast and Heaths. ▪ The Norfolk Coast AONB is located within the Great Yarmouth. The key characteristics of the Norfolk Coast AONB are the geomorphology, diversity and integrity of landscape and marsh coastlands. ▪ The Broads is an area of acknowledged national importance as highlighted above for landscape, biodiversity and recreational and navigational value. It is also a major contributor to the economy and quality of life in Great Yarmouth and wider Norwich.
Noise	▪ There are 23 Noise Important Areas (NIA) in Great Yarmouth of which the roads are the key source. ▪ An increase in noise from transport can have an adverse effect on general health, sleep and can be seen as a nuisance.
Soils and Resources	▪ There are 3 waste sites located in Great Yarmouth. ▪ There is a need to provide 163,000 tonnes of new recycling, composting and source-segregated-anaerobic digestion capacity, about 703,000 tonnes of recovery infrastructure and about 2,060,000 m3 of new inert landfill/quarry restoration by 2026[8].

[6] Great Yarmouth Borough New Local Plan, Employment Land Update November 2012. Available at: https://www.great-yarmouth.gov.uk/CHttpHandler.ashx?id=1246&p=0

[7] Public Health England, Local Authority Profiles, Great Yarmouth, 2019 Available at: https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/pat/6/par/E12000006/ati/201/are/E07000145/cid/4

[8] Norfolk Minerals and Waste Development Framework- Waste Site Specific Allocations Development Plan Document 2013

SA Topic	Summary of Sustainability Context
Water Resources and Flooding	▪ The River Bure, The Fleet, the River Yare and Breydon Water are key waterbodies located within the Great Yarmouth Borough. ▪ The Great Yarmouth Strategic Flood Risk Assessment (SFRA)[9] covers the Great Yarmouth Borough Council and parts of the Broads Authority administrative areas. The SFRA has identified that areas of Great Yarmouth borough are at high risk of flooding from tidal, coastal, fluvial and surface water sources.

[9] Great Yarmouth Strategic Flood Risk Assessment. Available at: http://www.broads-authority.gov.uk/__data/assets/pdf_file/0008/1036781/2017s5962-Great-Yarmouth-SFRA-Final-v2.0.pdf

3 GREAT YARMOUTH TRANSPORT STRATEGY PROPOSALS

3.1.1. The Great Yarmouth Transport Strategy is comprised of nine packages of options, which are as follows:

- Options to encourage the use of public transport;
- Options to encourage journeys to be made by bicycle;
- Options to encourage journeys by foot and bicycle;
- Option to better manage traffic on the local and strategic highway network;
- Options to reduce delay and congestion on the strategic road network;
- Option to reduce delay and traffic congestion on the local highway network;
- Options to encourage journeys to be made by rail;
- Options to encourage travel by smarter choices; and
- Options to better manage parking.

3.1.2. These options are set out for the short, medium and long term:

- **Short-term** options are planned for delivery by 2022;
- **Medium-term** options are planned for delivered between 2023 and 2030 (end of the current local plan period); and
- **Long-term** options are planned for delivery beyond 2030.

3.1.3. All options have also been categorised based on geographical scale, which are as follows:

- **Strategic:** These options relate to the core transport corridors and networks that connect Great Yarmouth (such as the A47, Wherry Line and National Cycling Routes).
- **Area Wide:** These options relate to transport schemes or initiatives proposed across the Transport Strategy study area (e.g. transport policies, bus stop improvements etc.).
- **Local:** These options address local transport issues and are considered to have a localised benefit (e.g. local junction capacity improvement scheme or localised pedestrian infrastructure improvement scheme).

4 SUSTAINABILITY APPRAISAL

4.1.1. The sustainability appraisal of the Great Yarmouth Transport Strategy follows the same methodology and SA objectives as set out within the LTP4 SA Report. Each of the nine options have been assessed and broken down by their geographical scale and duration.

4.2 SHORT TERM

STRATEGIC IMPROVEMENTS

Options to Encourage the use of Public Transport

- **SS1:** Work with Greater Anglia to improve patronage numbers on rail services to / from Great Yarmouth
- **SS2:** Improve bus services between Great Yarmouth and Lowestoft

Table C-2: Strategic Short Term Options to Encourage the use of Public Transport

Option	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Strategic Short Term Options to Encourage the use of Public Transport	+	0	+	0	+	++	++	++	0	+	++	++	+	0	?
	Improvements to the reliability and capacity of rail and bus services are likely to bring about improved levels of reliability and safety for users. Better on board convenience, including wheelchair spaces, will help to improve the safety of those on board as well creating a more accessible and inclusive transport network for all users. Improved rail services and increased bus services will help to provide greater connectivity between Great Yarmouth, Norwich and Lowestoft, providing greater access to jobs, services, healthcare and recreation which will also have beneficial effects on health.														

Option	SA Objectives
	The impact on noise is uncertain. Improved efficiency of rail services may reduce levels of noise pollution; however, options may allow for greater capacity on both the rail and bus network, increasing overall levels of noise pollution. The roll out of new rolling stock could include more efficient and quieter trains, which have potential reduce levels of noise pollution.

Options to Encourage Journeys made by Bicycle

- **SS3:** Improve signage of Sustrans National Cycle Route 517 between Great Yarmouth and Lowestoft

Table C-3: Strategic Short Term Options to Encourage Journeys made by Bicycle

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Strategic Short Term Options to Encourage Journeys made by Bicycle	+	0	+	0	+	+	+	+	0	+	+	+	++	0	+
	Improved signage of Sustrans National Cycle Route 517 between Great Yarmouth and Lowestoft could make the route more usable and accessible. This could encourage more residents to cycle, reducing the number of single occupancy journeys, which has additional benefits for air pollution and human health.														

AREA WIDE

Options to Encourage the use of Public Transport

- **SA1**: Bus stop improvements throughout the main urban area of Great Yarmouth, Gorleston-on-Sea and Caister-on-Sea

Table C-4: Area Wide Short Term Options to Encourage the use of Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Area Wide Short Term Options to Encourage the use of Public Transport	+	0	+	0	0	++	0	0	0	0	0	++	+	0	0
	Bus stop improvements throughout the main urban area of Great Yarmouth, Gorleston-on-Sea and Caister-on-Sea, could include the introduction of real time passenger information (RTPI), new and improved bus shelters, new and improved waiting facilities and raised kerbs. These improvements are likely to bring about greater safety for bus users and help to reduce the fear crime particularly at night, which could help to encourage more users to use the bus network. An increase in public transport users has additional positive effects on air quality and carbon emissions.														

- **SA2:** Develop and introduce a signage strategy to inform drivers of car parking availability, congestion and, when implemented, status of the Great Yarmouth Third River Crossing

Table C-5: Area Wide Short Term Options to Better Manage Traffic on the Local and Strategic Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+/-	0	+/-	0	0	++	0	+	?	0	+	++	+	0	+/-
Area Wide Short Term Options to Better Manage Traffic on the Local and Strategic Highway Network	This option aims to improve existing signage and provide of new signage to help drivers make more informed decisions, through the introduction of Variable Message Signs (VMS) to warn drivers of congestion, accidents, roadwork zones, speed limits, car park availability and status of river crossings. Making drivers more informed is likely to result in increased levels of safety and help to reduce levels of congestion and subsequent driver stress. Both positive and negative effects have been identified in relation to air quality, carbon emissions and noise. Reduced levels of congestion will help to reduce levels of noise pollution and alleviate emissions, reducing air levels of air pollution. However, there could be a potential increase in rat-running particular by local drivers with good knowledge of local road. This could lead to increases in noise and air pollution in other areas, which are more susceptible to the negative effects (e.g. residential areas). A new signage strategy may include additional components such as lighting, which if designed inappropriately, could have a major visual impact, detracting from local conservation areas and heritage assets and their unique setting. The impact would be dependent upon the location and design of signage and the additional components required.														

Options to Encourage Journeys by Public Transport

- **SA6**: Work with bus operators to maintain and where possible improve the frequency of rural bus services that serve villages to the north west and south west of Great Yarmouth

Table C-8: Area Wide Short Term Options to Encourage Journeys by Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Area Wide Short Term Options to Encourage Journeys by Public Transport	+/-	0	+/-	0	+	++	++	++	0	+	++	+	++	0	+/-
	Improving the frequency of rural bus services will help to encourage modal shift through improve public transport facilities to rural locations, whilst improving access to key services, jobs and recreation. This has additional benefits for health and wellbeing. Improving the connectivity in rural areas will also improve economic prosperity across the local area and beyond, helping rural communities better reach jobs and services. Increased frequency of rural services has resulted in both positive and negative effects on noise pollution, carbon emissions and air quality. There is potential for levels of noise and air pollution to increase from a more frequent service, however, better connectivity could also help to reduce the number of private vehicles on the road, reducing overall levels of noise and air pollution from the transport network. The impact will depend on the number of people who use the service. The impact of improving the local bus network on reducing carbon emissions will depend on the fuel efficiency and emission levels of the public buses used.														

LOCAL

Options to Reduce Delay and Traffic Congestion on the Local Highway Network

- **SL2:** Capacity improvement at A143 Beccles Road / Church Lane / Long Lane / Mill Lane signalised junction
- **SL3:** Capacity improvement at A143 Beccles Road / Crab Lane priority junction
- **SL4:** Capacity improvement at A143 Beccles Road / Shrublands Way / A147 slip road signalised junction
- **SL5:** Capacity improvement at A143 Beccles Road / William Adam's Way / Southtown Road signalised junction
- **SL6:** Capacity improvement at Fuller's Hill / Northgate street signalised junction
- **SL7:** Capacity improvement at Gapton Hall Road / Hewett Road (Gapton Hall Industrial Estate) priority junction
- **SL9:** Capacity improvement at Lawn Avenue / Tar Works Road / Caister Road signalised junction
- **SL10:** Capacity improvement at A47 Lowestoft Road / High Street / Church Lane / Baker Street signalised junction
- **SL11:** Highway works to improve operation of the Market Gates / Temple Road / South Market Road signalised junction
- **SL12:** Capacity improvement at Priory Plain / St Nicholas Road / Temple Road signalised junction
- **SL13:** Provide 'OUT' movement from Lidl and B&M car parks onto A1243 Pasteur Road
- **SL23:** Capacity improvement at Hall Quay / South Quay / Bridge Road signalised junction

Table C-9: Local Short Term Options to Reduce Delay and Traffic Congestion on the Local Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Local Short Term Options to Reduce Delay and Traffic Congestion on the Local Highway Network	+/-	-	+/-	+/-	+/-	++	+	++	-	++	++	++	+	-	+/-
	This option is likely to bring about both positive and negative effects on air quality, carbon emissions and noise pollution. Easement of congestion will help to reduce levels of noise and air pollution; however, improvements could result in greater capacity and convenience for car users, which could in turn increase levels of noise and air pollution and reduce resilience to climate change.														

Option Scale/Duration	SA Objectives
	Improving the flow of traffic and upgrading junction is likely to result in improvements to safety for road users, including pedestrians and cyclists. Improve connectivity and reliability on the network may provide residents with great access to key services, jobs and recreation. A loss of connectivity of, or a deterioration in biodiversity could occur as a result of capacity improvements and junction upgrades due to their scale and linear nature. This may result in a negative effect on biodiversity through a loss or degradation of ecosystem provision. The improvements could involve small scale loss of habitat. There are likely to be opportunities for mitigation, compensation and net gain, although this would take time to establish. On-line highway works could lead to a cumulative effect on the historic environment, townscape and landscape, both directly and indirectly, although this would be limited to the context of the existing highway. There may be opportunities to improve both landscape and setting of existing roads.

Options to Encourage Journeys by Public Transport

- **SL16:** Improve public transport connectivity of South Denes Peninsula / South Denes Enterprise Zone through introduction of new bus services / extension of existing services
- **SL22:** Improvements to facilities at Beach Coach Station

Table C-10: Local Wide Short Term Options to Encourage Journeys by Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Local Wide Short Term Options to Encourage Journeys by Public Transport	+/-	0	+/-	0	+	++	++	++	0	++	++	+	++	0	+/-
	Improving public transport services to South Denes Peninsula and the South Denes Enterprise Zone, will help to improve economic prosperity across the local area and beyond, helping communities better reach jobs and services. Improved public transport options and the upgrade to Beach Coach Station, could help to encourage more public transport users														

Option Scale/Duration	SA Objectives
	creating a modal shift. There are additional benefits to health and wellbeing through improved access to key services, jobs and recreation. Improvements to Beach Coach Station are also likely to result in significant positive effects on community safety. Real time updates will keep passengers more informed, reduce levels of stress and anxiety. Improvements to bus shelters could help to deter criminals and reduce the fear of crime, particularly at night. Making passengers feel safer could result in more residents opting to travel on the local bus network. Greater connectivity has resulted in both positive and negative effects on noise pollution, carbon emissions and air quality. There is potential for levels of noise and air pollution to increase from a more frequent service, however, better connectivity could also help to reduce the number of private vehicles on the road, reducing overall levels of noise and air pollution from the transport network. The impact will depend on the number of people who use the service. The impact of improving the local bus network on reducing carbon emissions will depend on the fuel efficiency and emission levels of the public buses used.

Options to Encourage Journeys by Foot and Bicycle

- **SL18:** Improve existing pedestrian routes to / from Harfreys Industrial Estate
- **SL21:** Review of existing and provision of new or upgraded cycle parking in Great Yarmouth Town Centre, along the seafront and close to large trip attractors in the wide Transport Strategy study area
- **SL24:** Reallocate carriageway space to increase footway provision for pedestrians within Great Yarmouth Town Centre and along seafront where there is a high footfall / high number of mobility scooter users

Table C-11: Local Short Term Options to Encourage Journeys by Foot and Bicycle

Option Scale/Duration	SA Objectives														
Local Short Term Options to Encourage Journeys by Foot and Bicycle	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+	+	+	0	+	++	++	+	0	+	++	+	++	0	+

Option Scale/Duration	SA Objectives
	New walkways and cycleways would encourage modal shift, leading to reductions in air quality, noise and carbon emissions from the transport network. There could be opportunities to include climate adaptation measures in design relation to flood risk and choice of materials. Reduced carbon emissions would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Allocation of space suitable for mobility scooters will help to make the active transport network more accessible and inclusive for all users. Provision of cycleways and footpaths between will reduce severance, improve accessibility to jobs and amenities in Great Yarmouth as well as the Harfreys Industrial Estate. Options are likely to increase levels of safety for active travel users. The provision of off-road routes for cyclists and pedestrians will reduce the number of collisions involving them. Upgraded cycle parking will allow cyclists to leave their bikes in secure places and could encourage others to use their bikes more often.

4.3 MEDIUM TERM (OPTIONS EXPECTED TO BE DELIVERED BY 2030)

STRATEGIC OPTIONS

Options to Reduce Delay and Congestion on the Strategic Road Network

- **MS1:** A47 Acle Straight Dualling
- **MS2:** Capacity improvements at A47 Harfreys Roundabout
- **MS3:** Investigate the use of land at the rail freight sidings to assist with the optimum configuration of the enlarged Vauxhall Roundabout, the full dualling of the A47 Acle Straight and improved access to Vauxhall Holiday Park.
- **MS4:** Capacity improvements at A47 / James Paget University Hospital signalised junction
- **MS5:** Capacity improvements at A47 Lowestoft Road / Brasenose Avenue / Bridge Road signalised junction

Table C-12: Strategic Medium Term Options to Reduce Delay and Congestion on the Strategic Road Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+/-	- -	+/-	- -	?	+	0	++	- -	+	+	++	+	- -	+/-
Strategic Medium Term Options to Reduce Delay and Congestion on the Strategic Road Network	The proposed options have potential to result in significant negative effects on biodiversity, through habitat loss and severance. Given its proximity to Breydon Water SAC, SPA and Ramsar site, and its location within the Norfolk Broads National Park, the dualling of the A47 Acle Straight has potential to negatively affect habitats and species that make up these protected sites, particularly if land take is required, or indirectly through changes to drainage and emissions to air. The dualling of the A47 also has potential to erode the unique landscape character of the Norfolk Broads National Park. There is also likely to be a negative impact on heritage assets from new roads, particularly on buried archaeology and historic landscapes but also on the setting of other historic assets. The historic environment, landscapes and tranquillity are under pressure from development throughout Norfolk and opportunities to mitigate for new roads should be undertaken at a landscape scale to support wider green infrastructure networks. Options are likely to bring about both positive and negative effects on air quality, carbon emissions and noise pollution. Easement of congestion will help to reduce levels of noise, air pollution and carbon emissions; however, improvements could result in greater capacity and convenience for car users, which could in turn increase levels of noise, air pollution and carbon emissions. Improving the flow of traffic and upgrading junction is likely to result in improvements to safety for road users, including pedestrians and cyclists. Improved connectivity and reliability on the network may provide residents with greater access to key services, jobs and recreation. The vulnerability of the A47 to climate change would depend on whether they were built in areas prone to flooding and are relieving other transport routes in areas of flood risk, in addition to the resilience of materials used in design to withstand higher temperatures and storms. Upgrades to the A47 is likely to result in modifications and discharges to watercourses and given its location within a flood zone 3, there is potential for significant negative effects if this isn't well managed. The A47 currently runs through														

Option Scale/Duration	SA Objectives
	agricultural land graded as good to moderate (grade 3) so development could result in the loss of good and versatile agricultural land which could be vulnerable to contamination and damage soils adjacent to the highway.

Options to Encourage Journeys to be made by Rail

- **MS6:** Work with Network Rail and Greater Anglia to improve Great Yarmouth railway station building
- **MS7:** Work with Network Rail and Greater Anglia to improve the frequency of train services between Great Yarmouth and Norwich

Table C-13: Strategic Medium Term Options to Encourage Journeys to be made by Rail

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Strategic Medium Term Options to Encourage Journeys to be made by Rail	+	0	+	0	+	+	+	++	0	+	++	+	+	++	?
	Upgrades to the Great Yarmouth Railway Station will include mixed-use development of the railway station building, public realm improvements, which will contribute positively to the sense of arrival placemaking and Great Yarmouth's townscape. Development at the railway station may also result in new small scale employment opportunities. Improving the frequency of rail services between Norwich and Great Yarmouth will help to encourage modal shift through improve public transport facilities, whilst improving access to key services, jobs and recreation. This has additional benefits for health and wellbeing. Increased frequency of rail services has resulted in uncertain effects on noise pollution. There is potential for levels of noise to increase from a more frequent service, however, better connectivity could also help to reduce the number of private vehicles on the road, reducing overall levels of noise from the transport network. The impact will depend on the number of people who use the service and the design of rolling stock.														

Options to Encourage Journeys to be made by Bicycle

- **MS8:** Improve existing and establish new segregated cycle routes between Great Yarmouth and Lowestoft

Table C-14: Strategic Medium Term Options to Encourage Journeys to be made by Bicycle

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+	0	+	0	+	+	+	+	0	+	+	++	++	0	+
Strategic Medium Term Options to Encourage Journeys to be made by Bicycle	Improvements to the existing cycle network around Great Yarmouth and the potential establishment of new routes between Great Yarmouth and Lowestoft would encourage modal shift, leading to reductions in air quality, noise and carbon emissions from the transport network. There could be opportunities to include climate adaptation measures in design relation to flood risk and choice of materials. Reduced carbon emissions would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Allocation of space suitable for mobility scooters will help to make the active transport network more accessible and inclusive for all users. Segregated cycle lanes will help to allocate space on roads for cycle use only, improving the safety of cyclists and reducing the number of accidents that involve them. Provision of cycleways and footpaths between will reduce severance, improve accessibility to jobs and amenities in Great Yarmouth and Lowestoft. Options are likely to increase levels of safety for active travel users. The provision of off-road routes for cyclists and pedestrians will reduce the number of collisions involving them. Upgraded cycle parking will allow cyclists to leave their bikes in secure places and could encourage others to use their bikes more often. Opportunities for active travel should, however, ensure those with limited mobility are able to participate, incorporating measures for all levels of mobility in order to be fully inclusive.														

AREA WIDE

Options to Encourage Journeys by Foot and Bicycle

- **MA1:** New signed strategic cycle route between Great Yarmouth Town Centre and Gorleston-on-Sea that utilise Great Yarmouth Third River Crossing
- **MA3:** Work with dock less cycle operators to introduce a cycle hire scheme in Great Yarmouth
- **MA5:** Investigate Accessibility improvements throughout Great Yarmouth for Vulnerable pedestrians.
- **MA6:** Improve sustainable transport connectivity of Holiday Parks in Great Yarmouth.

Table C-15: Area Wide Medium Term Options to Encourage Journeys by Foot and Bicycle

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Area Wide Medium Term Options to Encourage Journeys by Foot and Bicycle	+	+	+	0	+	++	++	+	0	++	++	+	++	+	+
	New walkways and cycleways would encourage modal shift, leading to reductions in air quality, noise and carbon emissions from the transport network. There could be opportunities to include climate adaptation measures in design relation to flood risk and choice of materials. Reduced air and noise pollution would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Provision of cycleways and footpaths between will reduce severance, improve accessibility to jobs and amenities in Great Yarmouth and Gorleston-on-Sea. Options are likely to increase levels of safety for active travel users. The provision of off-road routes for cyclists and pedestrians will reduce the number of collisions involving them. Improvements to accessibility for vulnerable pedestrians will help vulnerable users feel safer and more confident travelling in Great Yarmouth. A more inclusive environment for pedestrians may help all members of the population pursue active travel options, which will have beneficial effects for health and wellbeing.														

Option Scale/Duration	SA Objectives
	The development of a new and improved routes brings with the potential for positive development. Provision of cycling and walking routes can help to make positive contributions to the economy through increase visitor numbers, tourism and the potential development of supporting businesses such as cycle hire. Great connectivity to holiday parks will also make positive contributions to the tourism industry as well as the local economy. Options could present opportunities to generate activity and vitality and help define the character of development distinctive to the surrounding areas.

Options to Encourage Travel by Smarter Choices

- **MA2:** Support and encourage non-residential developments to produce a travel plan

Table C-16: Area Wide Medium Term Options to Encourage Travel by Smarter Choices

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Area Wide Medium Term Options to Encourage Travel by Smarter Choices	?	0	?	0	?	++	+	++	0	+	++	+	++	+	?
	Better travel planning will help to encourage behaviour change which will lead to the use of more sustainable modes of travel. This will help to reduce peak time congestion, reducing levels of air pollution, carbon emissions and noise pollution from the transport network. There are, however, some uncertainties. Non-residential developments may not have the appropriate infrastructure to support a modal shift, and in some instances a reduction in car travel may not be possible. Effects will be dependent upon the uptake and effectiveness of travel planning. Reduced carbon emissions would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Travel plans can help to provide less stressful options for travel to work and school and give opportunities to build healthy exercise into daily life. The adoption of more sustainable travel modes may also result in reduced travel costs, making it more accessible to all income groups.														

Options to Better Manage Parking

- **MA4:** Develop a parking strategy for Great Yarmouth. This should include a review of visitor / residential demand and a review and re-assessment of on-street parking in the Controlled Parking Enforcement (CPE) area, particularly the use of residential permit zones in order to protect the quality of life of residents.

Table C-17: Area Wide Medium Term Options to Better Manage Parking

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
	+/-	?	+/-	0	-	+	+	+	?	0	+	+	+	?	+/-
Area Wide Medium Term Options to Better Manage Parking	The development of a parking strategy in Great Yarmouth could help to better manage car parking during peak periods and help to reduce levels of congestion within the town. Uncertain effects have been identified for air quality, carbon emissions and noise. The strategy could present opportunities to reduce levels of noise and air pollution through reduced congestion and parking restrictions within residential areas. However, this option could make travelling by car to Great Yarmouth a more convenient option, and see the town accommodate more vehicles, which could exacerbate noise and air pollution in other locations. The strategy could present opportunities to incorporate park and rides/park and walks, integrated active travel options and car charging points A review of on street parking and potential introduction of residential parking permits could lessen the impact of air pollution and noise on local residents. It could also allow for greater convenience and reduce stress for local residents, by making easier for them to park closer to their homes. This could be beneficial for those with disabilities, parents with pushchairs and young children and the elderly. Ensuring that there is adequate parking for all, could result in the introduction of more car parks. This is likely to require land take, which has potential for negative effects on biodiversity, geodiversity, soils, landscape and townscape. However, at this stage the outcomes and proposals of this strategy are unknown.														

LOCAL

Options to Reduce Delay and Congestion on the Local Highway Network

- **ML1:** New link road Between Thamesfield Way and Suffolk Road

Table C-18: Local Medium Term Options to Reduce Delay and Congestion on the Local Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Local Medium Term Options to Reduce Delay and Congestion on the Local Highway Network	+/-	0	+/-	+	0	+	0	+	0	0	+	+	+/-	0	+/-
	This option looks to provide a new link road between Thamesfield Way and Suffolk Road to provide an additional access into the Southtown area and to relieve Southtown Road of congestion. Both positive and negative effects have been identified in relation to air quality, carbon emissions and noise. Reduced levels of congestion will help to reduce levels of noise pollution and alleviate emissions, reducing air levels of air pollution. However, there could be a potential increase in rat-running particular by local drivers with good knowledge of local roads. This could lead to increases in noise and air pollution in other areas, which are more susceptible to the negative effects (e.g. residential areas), which could have additional negative effects on health and wellbeing. The proposed link road is located on existing brownfield land within the Southtown Port Industrial Estate, there are very few environmental constraints located here and development on existing brownfield land will help to limit resources and preserve valuable agricultural land elsewhere.														

Options to Encourage Journeys by Foot and Bicycle

- **ML2:** Package of Cycle improvements along A143 Beccles Road
- **ML3:** Package of Cycle infrastructure improvements in Gorleston-on-Sea
- **ML4:** Package of Cycle Infrastructure improvements in Great Yarmouth Town Centre
- **ML5:** Improve east west pedestrian and cycle connectivity between Vauxhall Holiday Park, residential areas to the west of the River Yare and Fullers Hill Roundabout
- **ML6:** Improve facilities for pedestrians and cyclists between Caister-on-Sea and Great Yarmouth Town Centre
- **ML7:** New on-road cycle facilities along South Quay /Southgates Road, to tie-up with Great Yarmouth Third River Crossing
- **ML8:** Package of Cycle infrastructure improvements in North Quay
- **ML9:** Package of Cycle infrastructure improvements in Southtown
- **ML11:** Reallocation of carriageway space to provide cycle route across Haven Bridge between Mill Road and Hall Quay.

Table C-19: Local Medium Term Options to Encourage Journeys by Foot and Bicycle

Option Scale/Duration	**SA Objectives**														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Local Medium Term Options to Encourage Journeys by Foot and Bicycle	+	+	+	++	++	++	++	+	0	+	++	++	++	0	+
	New walkways and cycleways and improvements to the existing active travel network would help to encourage a modal shift, leading to reductions in air quality, noise and carbon emissions from the transport network. There could be opportunities to include climate adaptation measures in design relation to flood risk and choice of materials. Reduced carbon emissions would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Allocation of space suitable for mobility scooters will help to make the active transport network more accessible and inclusive for all users. Provision of cycleways and footpaths between will reduce severance, improve accessibility to jobs and amenities in Great Yarmouth, Caister-on-Sea and Gorleston-on-Sea.														

Option Scale/Duration	SA Objectives
	Options are likely to increase levels of safety for active travel users. The provision of segregated off-road routes for cyclists and pedestrians will reduce the number of collisions involving them. The addition of pedestrian crossings and cycle bridges will provide a safe network for all users. Some options aim to reallocate existing carriageway which will help to limit the resources, prevent unnecessary land take and protect the area's soil and mineral resources. There is potential for new routes could involve small scale loss of habitat or disturbance but could also be designed to enhance the biodiversity value, e.g. through creation of linking corridors, though new habitat would take time to establish. As with all linear infrastructure, habitat fragmentation could occur, but the scale of walking and cycle paths means any fragmentation would be minor due to the width of such paths. Improvements to existing routes create an opportunity to enhance habitats and ecological networks.

Options to Encourage Journeys by Public Transport

- **ML10:** Introduction of new regular shuttle bus service

Table C-20: Local Medium Term Options to Encourage Journeys by Public Transport

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Medium Term Options to Encourage Journeys by Public Transport	+	0	+	0	+	+	+	++	0	0	++	+	+	0	0
	The introduction of a new regular shuttle services between the train station and the town centre, and the possible option to extend to include key employment sites to the south of Great Yarmouth including: James Paget University Hospital, Beacon Park Enterprise Zone and South Denes Enterprise Zone, will help to improve economic prosperity across the local area and beyond, helping communities better reach jobs and services. Improved public transport connectivity could														

Option Scale/Duration	SA Objectives
	help to encourage more public transport users creating a modal shift. There are additional benefits to health and wellbeing through improved access to key services, jobs and recreation. Providing greater connectivity between the train station and the town centre (and potentially beyond), may encourage more people to travel to Great Yarmouth by train. This could help to reduce the number of private vehicles on the road, reducing overall levels of emissions and air pollution from the transport network. The impact will depend on the number of people who use the service. The impact of improving the local bus network on reducing carbon emissions could depend on the fuel efficiency and emission levels of the shuttle buses used.

4.4 LONG TERM OPTIONS (EXPECTED TO BE DELIVERED AFTER 2030)

STRATEGIC

Options to Encourage Journeys by Bicycle

- **LS1:** Comprehensively join up and fill in the gaps in Great Yarmouth's cycling network to create a coherent network that allows uninterrupted journeys across the town by bicycle

Table C-21: Strategic Long Term Options to Encourage Journeys by Bicycle

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Strategic Long Term Options to Encourage Journeys by Bicycle	+	0	+	0	+	+	+	+	0	+	+	+	++	0	+
	Creating a coherent joined up cycle network Great Yarmouth would encourage modal shift, leading to reductions in air quality, noise and carbon emissions from the transport network. There could be opportunities to include climate adaptation measures in design relation to flood risk and choice of materials. Reduced carbon emissions would result in a beneficial impact from improvements to the health of the users, better connected local communities and, if carefully designed, safer communities as a result of more people walking and cycling. Segregated cycle lanes will help to allocate space on roads for cycle use only, improving the safety of cyclists and reducing the number of accidents that involve them. Provision of cycleways will help to reduce severance, improve accessibility to jobs and amenities in Great Yarmouth.														

LOCAL

Options to Better Manage Traffic on the Local Highway Network

- **LL14:** Review and reconsider the arrangement of the town centre one-way system and gyratory to improve traffic flow

Table C-22: Local Long Term Options to Better Manage Traffic on the Local Highway Network

Option Scale/Duration	SA Objectives														
	SA1 (Air Quality)	SA2 (Biodiversity & Geodiversity)	SA3 (Carbon Emissions)	SA4 (Water, Soils and Minerals)	SA5 (Climate Change)	SA6 (Quality of Life and Safety)	SA7 (Inclusion and Equality)	SA8 (Access and Economy)	SA9 (Historic Environment)	SA10 (Investment and Growth)	SA11 (Access to Jobs)	SA12 (Accidents)	SA13 (Health and wellbeing)	SA14 (Landscape and Townscape)	SA15 (Noise)
Local Long Term Options to Better Manage Traffic on the Local Highway Network	+/-	0	+/-	0	+/-	+	+	++	0	+	++	+	+	+	+/-
	This option looks to review and reconsider the arrangement of the one-way system in order to improve traffic flow throughout the town centre. This could include the reallocation of the carriageway within the highway boundary and could accommodate provision for other modes of transport. Improving traffic flow will help to increase connectivity and reliability on the network by improving efficiency and capacity. This will help residents better access jobs, services, facilities and recreation, which will have additional benefits for health and wellbeing. This option has potential to increase the capacity, which could result in more cars on the roads, increasing both noise and air pollution. However, reduced levels of congestion and improved flow, could reduce levels of noise and air pollution. This option could also result in the provision for other modes of transport, such as walking and cycling. This could help to work towards a modal shift and help to reduce overall levels of noise and air pollution from the transport network.														

5 SUMMARY

5.1 ASSESSMENT OVERVIEW

5.1.1. In general, the majority of the proposed options have resulted in either neutral or positive effects. Options that increase connectivity, particularly via public transport and active travel modes have resulted in significant positive effects on a quality of life (SA6), access to jobs and services, economy (SA8 and SA11) and health and wellbeing (SA13). It is thought that these options will provide residents with opportunities to pursue active lifestyles and improve connections to healthcare services, jobs and recreation.

5.1.2. Options that aim to better manage traffic and reduce delay and congestion on the highway network, have resulted in potential for both positive and negative effects on air quality (SA1), noise pollution (SA15) and carbon emissions (SA3). Easement of congestion will help to reduce levels of noise, air pollution and carbon emissions; however, improvements could result in greater capacity and convenience for car users, which could in turn increase levels of noise, air pollution and carbon emissions.

5.1.3. Given the scale and location of options, in general neutral effects were identified for biodiversity (SA2) water, soils and minerals (SA4), historic environment (SA9) and landscape and townscape (SA14), however, the strategic medium term options to reduce delay and congestion on the strategic road network, which include the dualling and capacity improvements to the A47, resulted in significant negative effects on these four SA topics. Given the proximity of the A47 to Breydon Water SAC, SPA and Ramsar sites, its location within the Norfolk Broads National Park, flood zone 3 and grade 3 agricultural land, there is potential for significant negative effects on these important features. Mitigation will be required as outlined below.

5.2 MITIGATION

5.2.1. Mitigation of significant negative effects of the plan and enhancement of positive effects are a key purpose of SA. The SEA Regulations require that mitigation measures are considered to prevent, reduce or offset any significant adverse effects on the environment of implementing the plan. The measures are known as ‘mitigation’ measures. Mitigation measures include both proactive avoidance of adverse effects and actions taken after potential effects are identified.

5.2.2. Table C23 below outlines proposed mitigation. Additional enhancement measures can be found in Section 6.7 of the main LTP4 SA Report.

Table C23: Proposed Mitigation

SA Topic	Mitigation	Mechanism
Soils and Resources and Water Resources and Flooding Climate Change	All development must be protected from effects of flooding, pollution and events exacerbated by climate change. Emissions of GHGs must also be neutral wherever possible to address climate change.	Project level design and assessment
Climate Change Soils and Resources and Water Resources and Flooding Noise	Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM. Sustainable design and construction techniques should be promoted, such as low energy lighting and low noise road surfaces.	Project level design and assessment
Biodiversity and geodiversity	The incorporation of natural features such as tree planting, hedgerows and floral arrangements along walk/cycleways to enhance connections to nature and reduced stress levels, contributing to mental health and wellbeing benefits. Larger infrastructure schemes should incorporate design measures to lessen the impact on biodiversity and ensure biodiversity net gain.	Project level biodiversity net gain assessment
Landscape and Townscape Cultural Heritage and the Historic Environment	Transport solutions must seek to maximise sustainability benefits from existing landscape, townscape and heritage assets by valuing them inherently and for the wider services they provide. Promoters and designers should liaise closely with NCC to avoid or minimise negative impacts, such as land take and light pollution, whilst seeking to maximise benefits, such as tranquillity.	Historic Landscape Characterisation Project level design and assessment
Health and Population Community and Access Economy and employment	Ensure the needs and aspirations of groups with protected characteristics are considered in delivering transport solutions, in addition, including those from low income households.	Strategic and project specific EqIA and HIA for projects DDA compliance

5.3 MONITORING

5.3.1. The SEA Regulations require that monitoring is undertaken on a plan so that the significant effects of implementation can be identified, and remedial action imposed. The purpose of the monitoring is to provide an important measure of the sustainability outcome of the final plan, and to measure the performance of the plan against sustainability objectives and targets.

5.3.2. The aim of monitoring is to check whether the plan is having the significant effects that were predicted in the SA, and to deal with any unforeseen problems. Despite mitigation measures some residual negative effects have remained which will require monitoring. These are as follows:

- SA2: The potential loss and fragmentation of habitats
- SA4: The potential loss of the County's best and most valuable agricultural land

5.3.3. Table C24 below outlines monitoring proposals to deal with these negative effects.

Table C24: Monitoring Proposals

Potential Uncertain effect	What needs to be monitored?
Potential negative effects on biodiversity and geodiversity	The number of biodiversity enhancement schemes implemented through LTP4 schemes
Potential loss of important agricultural land	Total area (ha) of permitted loss of best and most versatile (grades 1-3a) agricultural land

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Appendix D

EQUALITIES IMPACT ASSESSMENT

Norfolk Local Transport Plan Draft Strategy

DRAFT LTP4 EQUALITY IMPACT ASSESSMENT

Appendix D

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TABLES

EXECUTIVE SUMMARY

An Equalities Impact Assessment (EqIA) of proposed transport policies for the Norfolk Local Transport Plan was undertaken in support of the Sustainability Appraisal (SA).

Equality issues considered included both direct and indirect effects from the transport policies upon Norfolk's population and particularly groups that share protected characteristics as defined under the Equality Act 2010.

Baseline data was collected for Norfolk to compile a social profile for the County and includes information on gender, religion, age, disability, race and deprivation. Information was collected primarily from the Office of National Statistics (ONS) using data retrieved during the 2011 Census and Public Health Profiles from Public Health England (PHE). Where appropriate and available, baseline information was updated or supplemented with more recent published data.

An EqIA was undertaken for transport objectives and related policies listed in Section 3 of the SA Report. Objectives comprise embracing the future; delivering a sustainable Norfolk; enhancing connectivity and quality of life; improving accessibility and transport safety; and, a well-managed and maintained transport network.. The transport policies under each Objective were assessed against six protected characteristics including gender, religion, age, disability, race and deprivation and were given a qualitative score of positive (+), neutral (0) or negative (-) based on their likelihood to impact equality.

The assessment has identified that transport policies are likely to result in primarily positive equality impacts with several neutral impacts at a concept level. It is assumed that full EqIA will be undertaken on a scheme by scheme basis to identify any scheme specific impacts.

1 INTRODUCTION

1.1 BACKGROUND AND CONTEXT

1.1.1. Norfolk County Council (NCC) is the Highways Authority and is responsible for maintenance of most public roads in Norfolk (except the A47 and A11 which are the responsibility of Highways England)[1].

1.1.2. The Local Transport Plan (LTP4) shapes how the county council deals with a wide range of transport matters including the programmes and individual schemes that they will deliver to achieve council objectives, as well as how they shape the plans and programmes of other agencies where these are relevant to transport (such as district council growth plans or government programmes of schemes on the trunk road and rail network).

1.1.3. A Sustainability Appraisal (SA) has been undertaken alongside the preparation of Draft LTP4 Strategy. Its role is to promote sustainable development by assessing environmental, social and economic impacts, as well as mitigating any potential adverse effects that LTP4 might otherwise have.

1.1.4. This Equalities Impact Assessment (EqIA) assesses transport objectives and related policies proposed in the LTP4 from an equality perspective and will seek to identify whether such transport policy categories might have an adverse impact on equality of opportunity.

1.1.4.1 This EqIA has been completed at a strategic level for the draft LTP4 Strategy , and there is an assumption that location specific issues and design considerations at a scheme level will be assessed under scheme specific EqIAs, and that design standards will apply. It is also assumed that when transport interventions are considered at a later stage, the impacts of the relevant modes or policies selected will be assessed for disproportionate effects on vulnerable users as a package of measures.

[1] The County Council is not responsible for the bus network, ports, airport or rail services but does work with partners, government and operators to improve these where possible.

2 LEGISLATION

2.1.1. The Equality Act 2010 came into force on 1 October 2010 and brought together over 116 separate pieces of legislation into a single Act. The Act provides a legal framework to protect the rights of individuals that share defined "protected characteristics" and advance equality of opportunity.

2.1.2. Those "protected characteristics" which identify the vulnerable groups who may be disproportionately impacted upon or discriminated against are outlined in **Table 2-1**. Protection extends to those who are perceived to have these characteristics or who suffer discrimination because they are associated with someone who has that characteristic, e.g. cares for someone with a disability.

Table 2-1 - Protected Characteristics covered with and Equality Impact Assessment

Protected Characteristic	People and Aspects Included
Sex / Gender	Men, women, binary, non-binary gender and other gender identities, married and single people; parenting, caring, flexible working and equal pay concerns.
Religion or belief	People who have a religious belief; people who are atheist or agnostic; people who have a philosophical belief which affects their view of the world or the way they live.
Age	Children (0-16), young people (17-25), working age people (15-64) and elderly people (65 and over).
Disability	People with physical, mental, sensory, visible or hidden impairment (e.g. cancer, HIV, dyslexia).
Race	People from various ethnic groups, as for the Census categories, e.g. White British, Chinese, British Asians, Travellers, Gypsies, Roma, those who are of Caribbean origin, people of mixed heritage, White Irish communities, and people of other nationalities who reside in Britain.
Sexual Orientation	Heterosexual and bisexual men and women, gay men and lesbians.
Gender reassignment (transgender/transsexual)	Anyone who is proposing to undergo, are undergoing or have undergone a process for the purpose of reassigning their sex.
Pregnancy and Maternity	Pregnant women and new mothers – protection against maternity discrimination (including as a result of breast feeding). Paternity
Marriage and civil partnership	People who are married or are civil partners

2.1.3. Section 149 of the Act provides for a Public-Sector Equality Duty. This requires that public bodies such as NCC, in the exercise of their functions, give "due regard to the need to":

- Eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Act;

- Advance equality of opportunity between people who share a protected characteristic and those who do not. This includes:
  - Removing or minimising disadvantages suffered by people due to protected characteristics;
  - Taking steps to meet the needs of people with protected characteristics where these are different from the needs of other people; and
  - Encouraging people with protected characteristics to participate in public life or in other activities where their participation is disproportionately low.
- Foster good relations between people who share protected characteristic and those who do not. This includes:
  - Tackling prejudice;
  - Promoting understanding; and
  - Eliminating unlawful discrimination, harassment and victimisation.

2.1.4. The duty also applies to private sector companies when carrying out functions or services on behalf of public sector bodies.

3 EQUALITY IMPACT ASSESSMENT

3.1 WHAT IS EQIA?

3.1.1. An EqIA considers the impact of a project or policy on persons or groups of persons who share characteristics which are protected under section 4 of the Equality Act 2010 ("protected characteristics") and might also include others considered to be vulnerable within society such as low-income groups. It is an information gathering tool which enables decision makers within public bodies to implement their equality duty under the Equality Act 2010.

3.1.2. An EqIA guides decision makers and designers to:

- Consider the effects of existing and proposed policy or practice on people who share a “protected characteristic”; and
- Identify opportunities to improve equality of opportunity and eliminate discrimination.

3.1.3. An EqIA should be carried out before making decisions, to inform and shape the outcomes. They should be updated throughout the decision-making process as necessary, as policy or practices are developed.

3.1.4. There are three stages to an EqIA; screening, full assessment and outcome monitoring. The screening stage determines which protected characteristics are likely to experience disproportionate impacts, and therefore require consideration within the EqIA. This considers the nature of the public function being exercised and available information on users and impacts. This document represents the assessment on those groups identified.

4 SOCIAL PROFILE

4.1 INTRODUCTION

4.1.1. A social profile for Norfolk has been compiled from publicly available data to provide context for the assessment. This comprises information on protected characteristic groups and the local communities likely to be impacted by the policies proposed in Draft LTP4 Strategy.

4.1.2. The social profile is compiled with data for the county of Norfolk as a whole, and also where possible for its seven local authorities of Breckland, Broadland, Great Yarmouth, King's Lynn and West Norfolk, North Norfolk, Norwich and South Norfolk.

4.1.3. It should be noted that the last Census was taken in 2011 and therefore, where possible, data has been substituted with more recent information.

4.2 PROTECTED CHARACTERISTICS PROFILE

4.2.1. Data from the Office of National Statistics (ONS) has been gathered on the following protected characteristics from Section 4 of the Equality Act 2010:

- Sex/Gender;
- Religion;
- Age;
- Disability; and
- Race.

4.2.2. Certain protected characteristics, including sexual orientation, gender reassignment, pregnancy and maternity, and marriage and civil partnerships have not been included in the assessment due to a lack of publicly available data at the time of writing. Although not a protected characteristic under the Equality Act 2010, the social profile also includes data on deprivation as it provides a measure of a combination of social-economic metrics.

4.3 SEX / GENDER

4.3.1. The county of Norfolk was recorded in 2019[2] as having a total population of 907,800 people. Within the county, approximately 49.1% of the population were recorded as male and 50.9% as female, which is comparable with the national male and female percentage of the time at 49.4% and 50.6% respectively.

4.3.2. The breakdown of the sex of the population of Norfolk is outlined in Table 4-1.

[2] https://www.nomisweb.co.uk/reports/lmp/la/1941962835/report.aspx?town=norfolk#tabrespop

Table 4-1 – Sex breakdown for the Population of Norfolk

	Norfolk	King's Lynn and West Norfolk	North Norfolk	South Norfolk	Breckland	Broadland	Great Yarmouth	Norwich
Male	445,700 (49.1%)	74,000 (48.9%)	51,100 (48.8%)	68,700 (48.8%)	69,300 (49.5%)	63,700 (48.7%)	49,100 (49.4%)	69,700 (49.6%)
Female	462,100 (50.9%)	77,400 (51.1%)	53,800 (51.2%)	72,100 (51.2%)	70,700 (50.5%)	67,000 (51.3%)	50,200 (50.6%)	70,900 (50.4%)
Total	907,800	151,400	104,800	140,900	140,000	130,800	99,300	140,600

4.4 RELIGION

4.4.1. As stated in the 2011 Census, of those in the Norfolk region who identify with a religion, they predominantly identify as Christian, and at a higher proportion of the population than the national average. Other minority religions are all identified with in very low numbers, and are mostly lower than the national average, particularly those identifying as Muslim. Norwich has a notably lower proportion of the population who identify as Christian and a higher proportion that do not associate with a religion or faith, when compared to the other local authorities in Norfolk, and the national averages. **Table 4-2** shows the breakdown per religious group out of the total population for the local authorities of Norfolk and for England.

Table 4-2 - Religious Groups within the local authorities of Norfolk and England (2011)

Location	Christian (%)	Muslim (%)	Buddhist (%)	Hindu (%)	Jewish (%)	Sikh (%)	Other religion (%)	No religion (%)	Religion not stated (%)
King's Lynn and West Norfolk	66.4	0.4	0.3	0.2	0.1	0.1	0.4	24.8	7.4
North Norfolk	66.0	0.2	0.3	0.1	0.1	0	0.5	25.2	7.6
South Norfolk	62.3	0.3	0.3	0.2	0.1	0	0.4	28.7	7.7
Breckland	63.8	0.3	0.2	0.1	0.1	0	0.5	27.6	7.4

Location	Christian (%)	Muslim (%)	Buddhist (%)	Hindu (%)	Jewish (%)	Sikh (%)	Other religion (%)	No religion (%)	Religion not stated (%)
Broadland	63.3	0.3	0.3	0.2	0.1	0.1	0.4	30.0	7.4
Great Yarmouth	61.0	0.5	0.2	0.3	0.1	0	0.3	30.3	7.2
Norwich	44.9	2.0	0.7	0.8	0.2	0.1	0.7	42.3	8.2
England	59.4	5	0.5	1.5	0.5	0.8	0.4	24.7	7.2

4.5 DISABILITY

4.5.1. Disability can be assessed in terms of ability to undertake an activity. **Table 4-3** shows the proportion of the population whose day to day activities are limited by a long-term health problem or disability. As shown, the local authorities of the Norfolk region have slightly a higher percentage of the population than the national average who experience some form of limitation and subsequently have a lower percentage of the population without limitations[3].

Table 4-3 - Proportion of those living with limiting health problems or disability for the local authorities of Norfolk and England (2011)

Location	Limited a Lot (%)	Limited a Little (%)	Not Limited (%)
King's Lynn and West Norfolk	9.8	11.5	78.7
North Norfolk	10.3	13.0	76.7
South Norfolk	7.4	10.5	82.1
Breckland	8.8	10.8	80.3
Broadland	8.1	10.6	81.3
Great Yarmouth	10.9	11.6	77.5
Norwich	8.6	9.8	81.6
England	8.3	9.3	82.4

[3] NOMIS (2011). 2011 Census – Health and provision of unpaid care

4.6 RACE

4.6.1. The diversity of different ethnicities is relatively low in the region, where the majority of the population of the region identify as White British, Irish, Traveller or Other White. All other ethnicities are recorded as lower than the national average, as outlined in **Table 4-4**.

Table 4-4 - Ethnicity in the local authorities of Norfolk and England (2011)

Location	White British / Irish / Travellers / Other White (%)	Mixed / multiple ethnic group (%)	Asian / Asian British (%)	Black / African / Caribbean / Black British (%)	Other i.e. Arab (%)
King's Lynn and West Norfolk	97.3	0.9	1.3	0.4	0.2
North Norfolk	98.6	0.6	0.5	0.2	0.1
South Norfolk	97.6	1.0	1.0	0.3	0.1
Breckland	97.4	1.2	0.8	0.5	0.1
Broadland	97.7	0.9	1.0	0.3	0.2
Great Yarmouth	96.7	1.2	1.2	0.5	0.3
Norwich	90.8	2.3	4.4	1.6	0.8
England	85.4	2.3	7.8	3.5	1

4.7 UNEMPLOYMENT AND DEPRIVATION

4.7.1. The proportion of unemployment in the majority of local authorities in Norfolk is lower than the national average for the UK, however it is higher in Great Yarmouth and Norwich. However, the average weekly pay is lower than the UK national average for five out of the seven local authorities in the Norfolk region[4].

[4] Public Health Profiles (2018). Average weekly earnings

Table 4-5 - Economic Profile (Apr 2019 – Mar 2020)

Location	Economically active: Unemployed (%)	Economically Inactive (%)	Average Weekly Pay of Full Time workers (£)
Breckland	3.3	19.6	516.4
Broadland	2.0	11.3	562.5
Great Yarmouth	5.7	26.8	479.2
King's Lynn and West Norfolk	3.3	16.8	549.9
North Norfolk	3.0	25.1	494.9
Norwich	4.4	20.4	504.5
South Norfolk	2.2	14.7	602.2
East	3.2	19.5	610.4
England	3.9	20.9	587.0

4.7.2. The English Indices of Deprivation 2019[5] are a collection of several separate indices (covering Income, Employment, Health Deprivation and Disability, Education Skills and Training, Barriers to Housing and Services, Crime and Living Environment) measuring deprivation within all local authorities in England.

4.7.3. **Table 4-6** below shows the rank of the level of deprivation of neighbourhoods for each LPA according to the Index of Multiple Deprivation 2019 nationally, with 1 being the most deprived and 317 the least deprived. Within the Norfolk region, Great Yarmouth has the highest average levels of deprivation and Broadland has the lowest average levels of deprivation.

Table 4-6 - Indication of Deprivation within the LPAs of the Norfolk region

LPA	Rank of Average Ranking	Category
Breckland	127	40% most deprived
Broadland	257	80% most deprived
Great Yarmouth	24	10% most deprived

[5] Ministry of Housing, Communities and Local Government (2019). English indices of deprivation 2019. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

LPA	Rank of Average Ranking	Category
King's Lynn and West Norfolk	79	20% most deprived
North Norfolk	94	20% most deprived
Norwich	61	20% most deprived
South Norfolk	225	70% most deprived

4.8 PROJECTED POPULATION AND AGE

4.8.1. The population between 2018 and 2043 in the local authorities of Norfolk is set to increase by 12%, with the greatest increases seen in the over 75's. Of the seven local authorities, the largest population increase is projected in South Norfolk, with an increase of 28%. Four of the local authorities (Great Yarmouth, King's Lynn and West Norfolk, Norwich and North Norfolk) will see population numbers decrease in the 0-14 age category, and across all local authorities there is a larger proportion of older people, indicating an aging population. The population increases within King's Lynn and West Norfolk, Great Yarmouth and Norwich are below the national average of 10%[6]. **Table 4-7** below shows the population projections per age group across the relevant local authorities.

Table 4-7 - Population Projections 2018 - 2043

Local Authority	Age Group	2018	2043	% Change
King's Lynn and West Norfolk	0-14	25,016	23,148	-7%
	15-74	108,718	107,548	-1%
	75+	18,077	29,490	63%
	All ages	151,811	160,186	6%
North Norfolk	0-14	13,626	13,081	-4%
	15-74	74,866	77,516	4%
	75+	16,060	27,519	71%
	All ages	104,552	118,116	13%

[6] ONS. 2018. 2018-Based Subnational Population Projections for Local Authorities and Higher Administrative Areas in England

Local Authority	Age Group	2018	2043	% Change
South Norfolk	0-14	23,424	27,429	17%
	15-74	99,403	120,722	4%
	75+	15,190	28,959	91%
	All ages	138,017	177,110	28%
Breckland	0-14	22,856	24,088	5%
	15-74	108,022	110,674	2%
	75+	15,810	29,670	47%
	All ages	139,329	164,432	15%
Broadland	0-14	19,881	21,754	9%
	15-74	94,062	101,902	8%
	75+	15,521	27,225	43%
	All ages	129,464	150,881	14%
Great Yarmouth	0-14	16,690	15,384	-8%
	15-74	71,877	72,450	1%
	75+	10,803	18,953	43%
	All ages	99,370	106,787	7%
Norwich	0-14	22,754	21,492	-6%
	15-74	115,323	115,026	0%
	75+	9,927	15,841	37%
	All ages	141,137	152,358	7%
Norfolk	0-14	144,247	146,376	1%
	16-74	672,271	705,838	5%
	75+	101,388	177,657	75%
	All ages	917,906	1029871	12%
England	0-14	10,144,712	9,990,013	-2%

Local Authority	Age Group	2018	2043	% Change
	16-74	41,200,606	43,601,278	6%
	75+	4,631,860	8,152,807	76%
	All ages	55,977,178	61,744,098	10%

4.9 BASELINE SUMMARY

4.9.1. The relevant local authorities of Norfolk's proportions of the gender split, race and religion are similar to England overall, however there is less diversity in religion and ethnicity. The region is projected to have a growth in population, but also an aging population. The proportion of the population who would state that their day to day activities are limited by a long-term health problem or disability is slightly higher overall than the national average.

4.9.2. Norfolk generally has higher levels of employment than when compared to the national average, but average incomes are lower. There are some pockets of deprivation across Norfolk within Great Yarmouth and Norwich.

4.9.3. As detailed schemes and interventions come forward, these should be assessed in more detail to understand the potential impacts on specific local populations and vulnerable groups.

5 IMPACT ASSESSMENT

5.1 INTRODUCTION

5.1.1. The draft Local Transport Plan states that its key issues are to achieve the policy aim to work towards carbon neutrality by 2030 as agreed in the environmental policy recently adopted; improve air quality in urban areas; meet the challenge of technology and innovation in the transport system and the ways in which people work; and support the economy of the county by ensuring that people can make the connections they need. It aims to improve transport infrastructure in the Norfolk region using the following strategic objectives:

- Embracing the Future
- Delivering a Sustainable Norfolk
- Enhancing Connectivity
- Enhancing Norfolk's Quality of Life
- Increasing Accessibility
- Improving Transport Safety; and
- A Well Managed and Maintained Transport Network;

5.1.2. It is also essential to ensure that no groups with protected characteristics (see **Table 2-1** above) or other vulnerable people are adversely impacted by Draft LTP4 Strategy. Certain equality groups are unlikely to be impacted specifically as a result of Draft LTP4 Strategy and have been scoped out of this assessment. These include:

- Sexual orientation;
- Gender re-assignment;
- Pregnancy and Maternity; and
- Marriage.

5.2 ASSESSMENT METHODOLOGY

5.2.1. The impact assessment assesses the proposed transport policies for each objective outlined in Section 3 of the SA Report from an equality perspective. Impacts on protected characteristic groups are identified as positive, negative or neutral.

5.3 ASSESSMENT SUMMARY

5.3.1. Overall, the transport policies should have a positive impact on the general public that are living, working or visiting the Norfolk region by providing a safer, resilient, sustainable and convenient transport opportunities for the region. Some of the most vulnerable groups (those considered within this EqIA and falling within protected characteristic groups) will particularly benefit, specifically:

- People with limited or no access to cars (affecting those in deprived areas, those with limited mobility such as the young, the old, and some with disabilities);
- People with respiratory illnesses, and those more susceptible to poor air quality (particularly younger and older people); and
- People that require access to employment, education, health and/ or other services.

5.3.2. Although positive, there are still possible adverse impacts that would be felt by those with limited mobility who are unable to participate in active travel (such as older people or people with a mobility limiting disability). Therefore, LTP4 should incorporate measures for all levels of mobility so as not to exclude people who are unable to participate in active travel.

5.3.3. There is also the potential for those in deprived and urban areas to be disproportionately affected by measures to reduce air pollution, achieve carbon neutrality and address the effects of climate change.

5.3.4. The matrix below summarises the policy, equality impacts and recommendations where adverse impacts have been identified. In the following, equality impact refers to the impacts the proposed transport policies are likely to have on one or more of the five protected characteristic groups considered, in addition to deprivation as additional indicator.

Table 5-1 - Transport Policy Categories and Equality Impacts

Symbol	Impact
+	Positive
0	Neutral
-	Negative

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
Embracing the Future	Policy 1: Prepare the county for future changes and challenges to ensure the best for our society, environment and economy.	+	+	+	+	+	+	This policy is likely to benefit all users, as long as the needs of protected characteristic users are considered.	Consideration of protected characteristic groups should be given when considering how to address future changes. Representatives of protected characteristic groups should be engaged with specifically to ensure the needs of these groups are identified.
	Policy 2: The priority for reducing emissions should be to support a shift to more sustainable modes and more efficient vehicles, including lower carbon technology and cleaner fuels; this includes the facilitation of necessary infrastructure.	0	0	+ - -	+ - -	+ - -	+ - -	Supporting proposals which contribute to net-zero carbon, and the encouragement to use electric vehicles and non-motorised forms of transport would encourage the reduction in air pollution, which is of particular benefit to those with underlying respiratory ailments, and the younger and older populations. A shift from higher polluting and diesel private vehicles, to a higher reliance on cleaner private vehicles, private hire vehicles and public transport may require investment from deprived households. Vehicle restriction and scrappage schemes have the potential to disproportionately affect those in deprived areas who may be less able to adapt and accommodate changes, or aspirations of the policy.	Adequate facilities (such as electric car charging points and cycle parking) should be incorporated where necessary to ensure uptake of network improvements by users and future proof proposals. Any vehicle restriction and scrappage schemes should be subject to consultation, and care should be taken not to disadvantage those in deprived areas.
	Policy 3: Innovation and new technologies will be embraced in order to respond to the new targets set by the recently adopted environmental policy.	0	0	-	-	0	-	Technological advancements have the potential to improve the efficiency and accessibility of the transport network and encourage the use of public transport. However, continuously evolving technology makes it more difficult for certain groups, particularly the elderly, those with learning difficulties and those in low income groups, to keep up with changes and experience the benefits.	Consideration needs to be given to those who may not have the same understanding of or access to technology (for example the elderly, those with learning difficulties or in low income groups).
	Policy 4: Behaviour change and interventions that can help to increase the use of sustainable transport will be implemented.	+	+	+	+	+	+	Interventions and encouragement of behaviour change is likely to benefit all user groups. However, improvements to sustainable transport facilities and encouraged uptake is likely to result in better perceptions of safety, better well-being and better health (both mental and physical) and is likely to particularly benefit those in deprived areas, the young and old and those with disabilities and limited physical mobility.	LTP4 states that one challenge to the use of sustainable methods of transport is that they are perceived as unsafe. Methods of combating this perception should be sought in order to encourage modal shift.

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
									Methods of encouraging behaviour change for modal shift from private vehicle to public transport and active travel should be explored and implemented where possible.
Delivering a Sustainable Norfolk	Policy 5: New development should be well located and connected to maximise use of sustainable and active transport options, making them more attractive places to live, thus supporting a strong sense of the public realm.	+	0	+	+	+	+	In prioritising development where connections already exist, there is a reduced risk of isolating or limiting those who do not have access to private vehicles and who may rely on public transport or active modes of travel.	Consideration of protected characteristic groups should be given when considering adverse effects of new development. Representatives of protected characteristic groups should be engaged with specifically to ensure the needs of these groups are identified.
	Policy 6: We will seek to ensure that any adverse effects of new development on the transport network are mitigated through developer contributions.	+	+	+	+	+	+	This policy is likely to benefit all users, as long as the needs of protected characteristic users are considered.	Consideration of protected characteristic groups should be given when considering adverse effects of new development. Representatives of protected characteristic groups should be engaged with specifically to ensure the needs of these groups are identified.
Enhancing Connectivity	Policy 7: In air quality management areas (AQMAs) development will need to demonstrate its positive contribution to tackling the air quality problem.	0	0	+	+	+	+	Effective designation of AQMAs, and any subsequent complimentary traffic measures, would encourage reductions in air pollution, which is of particular benefit to those with underlying respiratory ailments, and the younger and older populations, and those in urban (and therefore possibly deprived) areas where air quality is likely to be lowest.	Monitoring of traffic patterns in Norfolk following any designations and implementation of traffic measures should be undertaken to ensure that effects are not displaced to new areas.
	Policy 8: Our priority will be to improve major road and rail connections between larger places in the county, and to major ports, airports and cities in the rest of the UK.	-	0	+ -	+ -	+	+	<u>Rail provision</u> Improvements in connectivity would benefit people using the rail network to access education, employment and/or health services, particularly for younger and older people, people with disabilities, those without access to a car, as well as people who are unemployed or with low income. Improvements to the rail network would make this option more attractive and reliable, which may encourage rail travel over private vehicles. This would reduce congestion and improve air quality, which is of particular benefit to children, the elderly and/or those with underlying respiratory ailments, and potentially those residing in urban (and potentially deprived) areas. In improving connections with the rest of the UK, care should be taken not to discourage users should difficulties arise in using multiple booking systems or operators. Some rail stock and booking systems can discourage the use of rail travel by cyclists, particularly	Opportunities should be sought to integrate bus, highways, rail and light rail services with other active travel modes such as pedestrian and cycling routes. Adequate provision at public transport stations should be made for bicycle storage, disabled parking, drop-off zones and taxi provision. It is assumed that design standards will be adhered to when designing new public transport stations and facilities and specific consideration will be given of certain types of disability such as wheelchair users, and those with limited mobility (including those with

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
								where prior booking for bike spaces is required, or in the case of women, the elderly and those with disabilities in particular, where vertical storage of bikes is required (and lifting is required), or where limited space is provided for only certain styles of bicycle. Additionally, different train operators have different regulations regarding permitted cycle use, which could discourage use on journeys using multiple train operators. Highways provision Road users, including both private car and public transport users, will benefit from better connectivity, which may result in reduced journey times or greater journey time reliability through more direct journeys and the re-distribution of traffic. Strategic improvements to roads are likely to have a beneficial impact on public transport and will therefore benefit people using these facilities to access education, employment and/or health services, particularly those beyond their local neighbourhood, particularly younger and older people, people with disabilities, as well as the unemployed. Greater resilience in the strategic road network through improvements from better connectivity will help all transport users, including those using private cars, who are likely to experience more reliable journeys, and less likely to be impacted by travel disruption. However, the provision of new roads may incur a reduction in air quality through increased air pollution. This is particularly detrimental to people with respiratory illnesses, younger and older people. Where improved connections are proposed to the highway network, consideration should be given to maximise opportunities for the inclusion or prioritisation of other modes of transport which would benefit those with health and mobility restrictions or disabilities, the young and elderly, women and those living in deprivation.	mobility limiting disabilities, the elderly and carers of young children). Franchise holders and train operators should be encouraged to consider the use of their network by cyclists when designing or selecting rail stock and implementing booking systems.
	Policy 9: Our priority for improved connectivity will be for it to be via clean transport modes.	0	0	+	+	+	+	Supporting proposals for clean forms of transport would encourage the reduction in air pollution, which is of particular benefit to those with underlying respiratory ailments, and the younger and older populations, and those in urban and deprived areas where air quality is lowest.	LTP4 states that one challenge to the use of sustainable methods of transport is that they are perceived as unsafe. Methods of combating this perception should be sought in order to encourage modal shift. Adequate facilities (such as electric car charging points and secure cycle parking) should be incorporated where necessary to ensure uptake of network improvements by users.
	Policy 10: We will seek to improve connectivity between rural areas and services in urban centres.	0	0	+	+	0	+	Improvements in connectivity for those in rural communities would benefit people travelling to access education, employment and/or health services, particularly for younger and older people, people with disabilities and mobility limitations, those without access to a car, as well as people who are unemployed or with low income.	Opportunities should be sought to integrate bus, highways, rail and light rail services with other active travel modes such as pedestrian and cycling routes.
	Policy 11: Action will be taken to improve air quality in urban centres, including	0	0	+ -	+ -	+ -	+ -	Effective designation of AQMAs, and any complimentary traffic measures, would encourage reductions in air pollution, which is of particular benefit to those with underlying	Monitoring of traffic patterns and air pollution in Norfolk following any designations and implementation of traffic measures should be

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
	investigating vehicular restrictions or charging, in order for air quality to fall below the threshold for Air Quality Management Areas.							respiratory ailments, and the younger and older populations, and those in urban (and therefore possibly deprived) areas where air quality is likely to be lowest. Charging and vehicle restriction schemes have the potential to disproportionately affect those in deprived areas who may be less able to adapt and accommodate charges and changes (for example a shift from higher polluting and diesel private vehicles, to a higher reliance on cleaner private vehicles, private hire vehicles and public transport may require investment from deprived households). Care should also be taken to ensure that charges are reasonable for those who may need access in chargeable or restricted areas for small businesses and tradespeople, who are likely to be less able to absorb such costs. Such schemes also have the potential to displace effects to new areas.	undertaken to ensure that effects are not displaced to new areas. Any vehicle restriction and charging schemes should be subject to consultation, and care should be taken not to disadvantage those in deprived areas. Should vehicle restriction schemes be implemented, adequate facilities such as disabled parking should be included to ensure those with limited mobility are not adversely affected.
	Policy 12: We will change our transport network to work towards carbon neutrality by 2030.	0	0	+	+	+	+	Supporting proposals which contribute to carbon neutrality, and the encouragement to use non-motorised and active forms of transport would encourage the reduction in air pollution, which is of particular benefit to those with underlying respiratory ailments, and the younger and older populations, and those in urban and deprived areas where air quality is lowest.	LTP4 states that one challenge to the use of sustainable methods of transport is that they are perceived as unsafe. Methods of combating this perception should be sought in order to encourage modal shift. Adequate facilities (such as electric car charging points and secure cycle parking) should be incorporated where necessary to ensure uptake of network improvements by users.
	Policy 13: Quality of place will be improved through improving the transport network.	+	+	+	+	+	+	This policy is likely to benefit all users, as long as the needs of protected characteristic users are considered. Where an improved quality of place is achieved, this is likely to result in better perceptions of safety, better well-being and better health (both mental and physical).	Methods of encouraging behaviour change for modal shift from private vehicle to public transport and active travel should be explored and implemented where possible.
Increasing Accessibility	Policy 14: Agencies in Norfolk should tackle accessibility problems in partnership, targeting those communities most in need. Accessibility should be planned as part of service delivery.	+	+	+	+	+	+	Working in partnership will allow local administrators to build relationships with communities and encourage positive place making and will allow protected characteristic groups to input to proposals. However, where protected characteristic groups may not be well represented by organisations or agencies, there is potential for the needs of these groups to be overlooked.	Representatives (whether individuals, established organisations or agencies, or specifically sought out target groups) of protected characteristic groups should be engaged with specifically to ensure the needs of these groups are identified.
	Policy 15: Priority on some routes should be given to sustainable and active modes of transport.	+	0	+	+	0	+	Improvements to the transport network to prioritise more sustainable and active modes of transport public transport facilities could improve mobility across the Norfolk region and accessibility to employment, education and/or health services for people who live in more rural areas or do not have access to private vehicles or are not eligible to drive (for example children and the young or those with certain disabilities or mobility limitations).	Plans should consider the needs of people with limited mobility and ensure public transport facilities and non-motorised travel forms are accessible for all users including those with reduced mobility or disability. Representatives of protected characteristic groups should be engaged with specifically to

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
								Integrating travel modes at key interchanges and mobility hubs will benefit all groups and will encourage people to use other forms of transport such as walking or cycling, which is also encouraging health lifestyles.	ensure the needs of these groups are identified.
	Policy 16: We will work towards providing a network where transport and movement provision is accessible to all.	+	0	+	+	+	+	Encouraging accessibility for all will benefit protected characteristic groups, but particularly those people with disabilities and limited mobility, the young and old, and parents with young children.	Representatives (whether individuals, established organisations or agencies, or specifically sought out target groups) of protected characteristic groups should be engaged with specifically to ensure the needs of these groups are identified.
Improving Transport Safety	Policy 17: The number of people killed and serious injured on the road network will be reduced by adopting a safe systems approach and working with partners to achieve this vision.	+	+	+	+	+	+	This policy is likely to benefit all users (in particular, older drivers who are likely to be at higher risk of injury in collisions and young drivers who experience a statistically higher number of casualties), as long as the needs of protected characteristic users are considered.	None
	Policy 18: To bring about an improvement in the condition of Norfolk's highway network, maintaining the current asset should be a key priority for funding. Works should be targeted to ensure A and urban / inter-urban routes are in good condition.	-	0	-	-	-	-	Prioritisation of the maintenance of the existing network has the potential to disproportionately affect those in rural areas not already well served by the existing network. There is also the potential for a slower transition to more sustainable modes of transport, which could benefit those in deprived areas, those who are reliant on public transport and who do not have access to a private vehicle (such as women, the young and elderly), and those who could be adversely affected by poor air quality (such as those in urban areas and areas of deprivation). This policy has the potential to result in disproportionate effects on protected characteristic groups if not delivered in tandem with others under "A Well Managed and Maintained Transport Network".	A balance should be sought when allocating funding to allow for optimisation of opportunities to design for and encourage more sustainable methods of transport within the existing infrastructure, and when considering new assets.
A Well Managed and Maintained Transport Network	Policy 19: In market towns and urban areas, we will focus maintenance on corridors for sustainable transport used by walkers and cyclists.	+	0	+	+	+	+	Focussing on the maintenance of walking and cycling facilities has the potential to benefit users in terms of their user experience, health and wellbeing. It also has the potential to reduce pressures on the highway network as people are encouraged to use alternative means of travel and could reduce the effects of vehicles on air quality.	As outlined in LTP4, there is a lack of data on walking and cycling travel in Norfolk. Therefore, gathering evidence to inform decisions should be encouraged to optimise uptake and effectiveness of active travel modes. Opportunities should be sought to enable users in travelling by walking and cycling, over the use of private vehicles. For example, ensuring good integration with and well located public transport hubs and facilities, so that a combination of modes of transport can be used where necessary. In addition, adequate facilities should be in place for cyclists to lock and leave bicycles. Other considerations for

Transport Policy Categories	Transport Policy	Sex / Gender	Religion	Age	Disability	Race	Deprivation	Reasons	Mitigation Measures / Recommendations
									walkers and cyclists on the existing network could include seating at regular intervals, maintenance of surfaces for comfort of riding, provision of drinking water, lighting on commuter routes and consideration of barriers and placement of street furniture.
	Policy 20: We will focus on measures to improve public transport measures in some urban areas, and elsewhere we will focus on reliable journeys for all users.	+ -	+ -	+ -	+ -	+ -	+ -	Prioritisation of improvement for urban areas has the potential to result in adverse effects (increased isolation, limitation of access) for those in rural areas who do not have access to a private vehicle. However, if this policy is implemented effectively it could benefit those in urban areas, increasing connectivity and access for public transport users in urban areas.	In selecting which areas and public transport facilities to improve, consideration should be given to the local social profile, identifying any specific needs by protected characteristic groups to avoid disproportionate impacts.
	Policy 21: The likely impacts of climate change on the highway network should be addressed, with a risk-based approach taken to determining the priority for action.	0	0	+ -	0	+ -	+ -	The basis of any risk assessment should consider the risk to the environment and humans (both human health and social cost) in addition to overall cost benefit, to ensure that risk is not solely measured on a cost benefit basis. Where a suitable risk based approach in determining priority for action is implemented, benefits are possible for those in protected characteristic groups who could be affected by the effects of more extreme temperatures, changes in air quality and flooding.	The risk-based approach should adequately consider the costs to the environment and humans and apportion appropriate weighting to impacts on these when deciding priority for action.
	Policy 22: New and innovative technology to collect data about the network, inform decisions, assess where to target funding on the network and share information with the public will be embraced.	0	0	-	-	0	-	Technological advancements have the potential to improve the decision making over improvements of the transport network and encourage the use of public transport. However, where data collection or public consultation may involve the use of innovative technology, this may disproportionately disadvantage some user groups and limit participation, and therefore datasets may not be representative of these vulnerable groups. Continuously evolving technology makes it more difficult for certain groups, particularly the elderly, those with learning difficulties and those in low income groups, to keep up with changes and experience the benefits.	Consideration needs to be given to those who may not have the same understanding of or access to technology (for example the elderly, those with learning difficulties or in low income groups). Where necessary, training or other mitigatory actions should be considered alongside implementation.

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Norfolk County Council

DRAFT LTP4 HEALTH IMPACT ASSESSMENT

Appendix E

Norfolk County Council

DRAFT LTP4 HEALTH IMPACT ASSESSMENT

Appendix E

TYPE OF DOCUMENT (VERSION) PUBLIC

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WSP

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FIGURES

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EXECUTIVE SUMMARY

1.1.1. A Health Impact Assessment (HIA) of the proposed transport objectives within the Norfolk County Council Local Transport Plan 4 Strategy was undertaken in support of the Sustainability Appraisal (SA) to further consider the relationship between health and transport in Norfolk.

1.1.2. Community baseline data was applied to establish the demographic, social and health profiles for the population within the geographical scope of the HIA. Several baseline data sources were used ranging from Public Health England Key Indicators to 2011 Census Data. Where appropriate and available, the baseline information was updated with more recent published data.

1.1.3. An assessment of health, population, environment and deprivation was undertaken for the proposed transport polices listed in Section 3.1 of the SA, ranging from maintaining the transport network, enhancing quality of life and improving connectivity, accessibility and transport safety. These objectives were assessed against the following determinants of health: air quality, noise, physical activity, road safety, economy and employment and access and accessibility.

1.1.4. The assessment has identified that the proposed transport objectives are all likely to result in positive health outcomes due to their focus on encouraging active and sustainable transport modes. However, through enhancing connectivity and increasing accessibility this could result in negative outcomes, particularly for air quality, noise and road safety, due a potential increase in the number of vehicles on the road. Overall, the Norfolk County Council Local Transport Plan 4 Strategy is likely to contribute to improved connectivity and accessibility to jobs, services and health care.

1 INTRODUCTION

1.1.1. Norfolk County Council has commissioned WSP to undertake a Sustainability Appraisal (SA) of the Draft Local Transport Plan 4 Strategy (LTP4). Norfolk County Council is currently in the progress of drafting LTP4, which will supersede the existing LTP3 agreed in 2011 and set out the strategy and policy framework for transport up to 2026.

1.1.2. One of the topics assessed within the SA is Health and Population, with objectives for LTP4 to reduce death and injury on the transport network, in addition to encouraging healthy lifestyles and wellbeing.

1.1.3. In considering the effects on health, a Health Impact Assessment (HIA) has been undertaken to further consider the relationship between health and transport in Norfolk, and the likely significant effects of the LTP4 on human health.

1.1.4. The outcomes of this HIA have informed the SA.

2 SCOPE AND METHODOLOGY

2.1 INTRODUCTION

2.1.1. A rapid desktop HIA was undertaken in August 2020. The key tasks for this HIA were to:

- Develop a summary health and wellbeing baseline and profile of Norfolk;
- Identify relevant evidence from literature;
- Assess the potential health and wellbeing impacts of the LTP4, and the nature and likelihood of such impacts;
- Develop recommendations for minimising potential negative, and maximising potential positive, health and wellbeing impacts; and
- Suggest health and wellbeing indicators that can be used to monitor the LTP4.

2.2 SCOPE

STUDY AREA

2.2.1. This is a rapid desk-based HIA of the direct and in-direct effects on local communities resulting from the proposed objectives of the LTP4. The geographic scope of this HIA is therefore the local authorities which comprise Norfolk.

STUDY POPULATION

2.2.2. The population scope of this HIA includes the residents within the local authorities of:

- Norwich;
- South Norfolk;
- Great Yarmouth;
- Broadland;
- North Norfolk;
- King's Lynn and West Norfolk; and
- Breckland.

2.2.3. The main vulnerable groups within the population that have been considered are:

- Children and young people;
- Older people;
- People with disabilities and mobility impairment;
- People with existing health conditions;
- Unemployed and low-income groups; and
- Socially excluded or isolated groups.

DETERMINANTS OF HEALTH

2.2.4. The key determinants of health and wellbeing that have been considered are:

- Air quality;
- Noise;
- Physical activity;
- Road safety;
- Economy and employment; and

- Access and accessibility.

BASELINE AND HEALTH PROFILE

2.2.5. The baseline and health profile have been compiled using existing, publicly available data including:

- Public Health England (PHE) Local Authority Health Profiles;
- Office for National Statistics Labour Market Profiles (Nomis); and
- PHE “Local Health” datasets.

APPRAISAL

2.2.6. The proposed transport objectives were assessed against each of the determinants of health, looking first at the baseline conditions of the determinant category within the study area, followed by evidence of how each determinant impacts human health, and then the effect that the objectives are likely to have on the health of the study area population as presented in **Table 5-8**.

RECOMMENDATIONS

2.2.7. A set of mitigation and enhancement measures have been identified to reduce the potential negative, and enhance the potential positive, health and wellbeing impacts of the LTP4.

2.3 ASSUMPTIONS AND LIMITATIONS

2.3.1. At this stage it is difficult to assess the specific localised populations (e.g. at Ward level) who are more or less likely to be impacted by the proposed transport objectives. It has been assumed that specific projects that arise as a result of this LTP4 will be appropriately assessed to identify project-specific impacts on local populations.

2.3.2. Specific mitigation measures relating to health for each general transport policy have been made within the SA and were informed by this HIA. Indicators to monitor the LTP4 are reported in the SA.

2.3.3. It is acknowledged that the 2011 Census data used in this assessment is currently out of date, with an update to the Census expected in 2021. At the time of writing this was the best available data and no significant changes or limitations in these datasets have been identified that would affect the robustness of the HIA.

2.3.4. This HIA has been drafted based on the LTP4 that was drafted prior to the Covid-19 pandemic, therefore professional judgement using previous experience has been used to assess how the LTP4 objectives will impact human health. Although it is acknowledged the Covid-19 has resulted in changes to travel modes i.e. significant decrease in public transport use and increase in cycling, there is currently not enough information to determine the long term effects on transport modes and how the population will behave as restrictions continue to ease.

3 HEALTH IMPACT ASSESSMENT

3.1.1. HIA is a systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of projects, plans or strategies.

3.1.2. HIA uses both qualitative and quantitative evidence, including public and other stakeholders' perceptions and experiences, as well as public health knowledge. It is particularly concerned with the distribution of effects within a population, as different groups are likely to be affected in different ways, and therefore looks at how health and social inequalities might be reduced or increased by a proposed project or plan.

3.1.3. The aim of a HIA is to support and add value to the decision-making process by providing a systematic analysis of the potential impacts, as well as recommending opportunities, where appropriate, to enhance positive impacts, mitigate negative impacts and reduce health inequalities.

3.1.4. HIA has been defined as:

"…a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population"[1].

3.1.5. In this context, 'health' is defined by the World Health Organisation as:

"…a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"[2].

3.1.6. Health determinants are the personal, social, cultural, economic and environmental factors that influence the health of individuals or populations. These include a range of factors such as income, employment, education and social support.

3.1.7. Health inequality can be defined as the difference in either health status, or the distribution of health determinants, between different population groups. Some health inequalities are unavoidable, others are not so and are unjust and unfair.

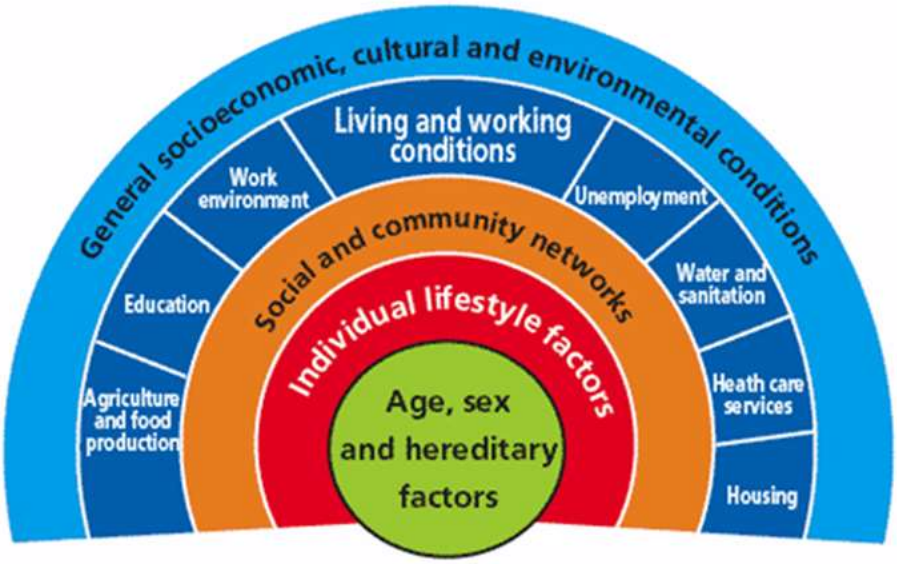
3.1.8. HIAs apply a socio-environmental model of health and wellbeing (

[1] World Health Organisation, (n/a). Definition of health assessment (HIA). Available online at: http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/definition-of-health-impact-assessment-hia (Accessed 17 August 2020).

[2] World Health Organisation (n/a). Constitution. Available online at: https://www.who.int/about/who-we-are/constitution (Accessed 17 August 2020)

3.1.9. Figure 3-1). The Socio-Environmental Model of Wellbeing considers that health and wellbeing are a result of external influences, where an individual or population experiences a combination of adverse external factors which could result in health inequality.

Figure 3-1 – Socio-Environmental Model of Health and Wellbeing[3]



3.1.10. The overall aim of this HIA will be to identify the aspects of the proposed transport objectives which have the potential to affect people's health, both directly and indirectly. Some effects may be positive, others could be negative. This HIA will include recommendations which will remove or mitigate as far as possible any potential negative impacts on people's health. It will also identify opportunities to maximise the potential benefits to people's health.

[3] Dahlgren, G. and Whitehead, M. (1991) *Policies and Strategies to Promote Social Equity in Health*. Stockholm, Sweden: Institute for Futures Studies.

4 COMMUNITY PROFILE

4.1.1. Publicly available community profile data has been used to express the status of vulnerable groups with respect to their vulnerable health status and/or deprivation (see Table 4-1). In some cases, Health Profile Indicators are implicit rather than explicit, where direct Health Profile Indicators were not available.

Table 4-1 – Public Health Profile for Norfolk

Health Indicator	Baseline Evidence
Lifestyle	The average proportion of the adult population that are physically fit in Norfolk (65.2%) is lower than the national average (66.4%). King's Lynn and West Norfolk has the lowest proportion of physically fit adults (55.5%) with North Norfolk having the highest proportion (71.8%)[4]. The average percentage of adults classified as overweight or obese in Norfolk (61.4%) is slightly lower than the national average (62%). Norwich has the lowest proportion of obese adults (56.7%) and Breckland has the highest proportion (64.7%)[5]. Admission rates for alcohol related conditions in in Norfolk (689.8 per 100,000) is worse than the national average (663.7 per 100,000)[6]. Smoking prevalence in adults across Norfolk (14.2%) is in line with the national average (14.4%)[7]. Between 2018 and 2019 there were 75 hospital admissions for episodes of drug related misuse in Norfolk, were 7,376 admissions were recorded for England[8]. Violent crime offences in Norfolk (21.9) are much lower than the national average (44.9)[9].
Unemployment/ Economy	According to the 2011 Census, the average unemployment rate across Norfolk was 3.8% for those aged 16-64, with Great Yarmouth having the highest unemployment rate (6.1%) and Broadland having the lowest unemployment rate (2.6%). In the same period, the average employment rate for Norfolk was 67.9%, which is lower than the national average of 69.9%[10].
Health	Census data shows that on average 42.6% of the population of Norfolk consider themselves in 'Very Good' health, 36.6% in 'Good' health, 15.2% in 'Fair' health, 4.4% in 'Bad' health and 1.2% in 'Very Bad' health. This varies compared to the national

[4] Public Health England (2019). Local Authority Health Profiles – 16 Percentage of physically active adults.

[5] Public Health England (2019). Local Authority Health Profiles – 17 Percentage of adults classified as overweight or obese.

[6] Public Health England (2019). Local Authority Health Profiles – 14 Hospital admission rate for alcohol-related conditions.

[7] Public Health England (2019). Local Authority Health Profiles – 15 Smoking prevalence in adults.

[8] NHS (2019). Drug Related Hospital Admissions: data tables. Available at: https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-drug-misuse/2019/drug-admissions-data-tables (Accessed 17 August 2020).

[9] Public Health England (2019). Local Authority Health Profiles – 29 Violent crime – hospital admission rate for violence (including sexual violence)/

[10] NOMIS (2011). 2011 Census – Economic Activity.

Health Indicator	Baseline Evidence
	statistics where 47.2% in 'Very Good' health, 34.2% in 'Good' health, 13.1% in 'Fair' health, 4.4% in 'Bad' health and 1.2% in 'Very Bad' health[11]. 9.1% of the population of the Norfolk state in the 2011 Census that their day to day activities were limited a lot by long-term health conditions or disabilities, 11.1% had their day to day activities limited a little and 79.8% of the population's day to day activities were not limited. The national average was lower than the Norfolk average with 8.3% experiencing a lot of daily limitations, 9.3% experiencing some limitations and 82.4% experiencing no limitations[11].
Income	In 2018 the average Gross Disposable Household Income across Norfolk was £18,695 per head, which is lower than the national average of £21,609[12].
Education	In 2011, an average of 26.5% of the population of Norfolk (aged 16-74) had no academic or professional qualifications, which was higher than the national average (22.5%) at that time[13]. Between 2018 and 2019, the average attainment 8 scores (scores of pupils at the end of key stage 4 (GCSE)) was 45.3 across Norfolk, which was lower when compared to the national average of 46.9[14].
Deprivation	Within Norfolk there five local authorities within the 40% and 50% most deprived authorities. The remaining two local authorities, namely South Norfolk and Broadland, are within the 40% least deprived category[15] (see **Appendix A-1** of this HIA for further details). In 2016, an average of 15% of Norfolk's children were in low income families, which is lower than the national average of 17%[16]. Between 2017 and 2018 statutory homelessness across Norfolk was 1.5 (no data was available for South Norfolk and Broadland), which was higher than the national average of 0.79. Great Yarmouth was significantly higher than the national average at 4.92[17].
Transport/ Accessibility	Norfolk contains a series of key infrastructure including airports, strategically important roads (including roads on the Highways England Strategic Road Network and Major Road Network) and rail links. Despite these travel links, significant numbers of people have to travel relatively long distances to access daily facilities, often with the added

[11] NOMIS (2011). 2011 Census – Health and provision of unpaid care.

[12] ONS (2019). Regional gross disposable household income. Available at: https://www.ons.gov.uk/economy/regionalaccounts/grossdisposablehouseholdincome/datasets/regionalgrossdisposablehouseholdincomegdhi (Accessed 17 August 2020).

[13] NOMIS (2011). 2011 Census – Qualifications and students.

[14] Public Health England (2019). Local Authority Health Profiles – 26 Average GCSE attainment (average attainment 9 score).

[15] Ministry of Housing, Communities & Local Government (2019). English indices of deprivation 2019 – File 10: local authority district summaries. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019 (Accessed 17 August 2020).

[16] Public Health England (2019). Local Authority Health Profiles – 25 Percentage of children in low income families.

[17] Public Health England (2019). Local Authority Health Profiles – 28 Statutory homelessness rate – eligible homeless people not in priority need.

Health Indicator	Baseline Evidence
	challenge of variable public transport quality. Norfolk's road network is also largely rural, restricting journey times and leading to congestion on some corridors[18].
Collisions	Between 2016 and 2018, an average of 46.9 people per 100,000 were killed or seriously injured on roads in Norfolk; which is higher than the national average of 42.6 per 100,000[19].

[18] Norfolk Country Council (2010. Draft Local Transport Plan 4 Strategy 2020 – 2036.

[19] Public Health England (2019). Local Authority Health Profiles – 7 Killed or seriously injured (KSI) rate on England's roads.

5 ASSESSMENT OF EFFECTS

5.1 INTRODUCTION

5.1.1. The analysis of health impacts has focussed on the determinants identified above in section 3.2 which fall into the following categories:

- Air quality;
- Noise;
- Physical activity;
- Road safety;
- Economy and employment; and
- Access and accessibility.

5.2 AIR QUALITY

EVIDENCE

5.2.1. The association between health effects and exposure to air pollutants is now well established, with distinct health risks associated with exposure to particulates available at a local level[20] [21] [22].

5.2.2. The impact of long-term human exposure to particulate matter (PM) pollution is estimated to have an effect on mortality equivalent to nearly 29,000 deaths in the UK[20]. There is no known threshold concentration below which NO_2 or PM_{10} have no effect on human health.

5.2.3. Many of the sources of PM are also sources of NO_2. Links between the occurrence of NO_2 and health effects have strengthened substantially in recent years, though some of these are co-incidental with PM, as noted by the Committee on the Medical Effects of Air Pollutants[21]; some could be attributed to other co-existing pollutants such as Poly Aromatic Hydrocarbons and Volatile Organic Compounds.

5.2.4. Defra have estimated that the effect of NO_2 on mortality is equivalent to 23,500 deaths in the UK annually, though this estimate has not been endorsed by COMEAP[23]. Any increases in mortality are likely to be either because of cardiovascular and/or respiratory mortality, particularly with regards to an elevated short-term exposure to NO_2[24].

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[20] COMEAP (2010). The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. A report prepared by the Committee on the Medical Effects of Air Pollutants. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf (Accessed 17 August 2020).

[21] COMEAP (2012). Statement on Estimating the Mortality Burden of Particulate Air pollution at a Local Level. Available at: https://webarchive.nationalarchives.gov.uk/20140505111634/http://www.comeap.org.uk/documents/statements/39-page/linking/46-mortality-burden-of-particulate-air-pollution (Accessed 17 August 2020).

[22] Public Health England (2018). Health matters: air pollution. Available at: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution#:~:text=Poor%20air%20quality%20is%20the,leading%20to%20reduced%20life%20expectancy. (Accessed 03 September 2020).

[23] Defra analysis using interim recommendations from COMEAP's working group on NO_2.

[24] Mills et al. (2015). Quantitative systematic review of the associations between short-term exposure to nitrogen dioxide and mortality and hospital admissions. *BMJ Open 2015;5: e006946. doi: 10.1136/bmjopen-2014-006946.*

5.2.5. Due to the correlation between differing airborne pollutants and similar health effects, one pollutant can often mask the effects of another, and it is not always possible to discreetly isolate the health effects of a single pollutant. The causal mechanism, primarily cardiovascular and respiratory, leading to increased mortality with increased exposure to particulate matter is well-founded, though the processes behind NO_2 contributing to cardiovascular damage, respiratory diseases or cancer are less understood.

5.2.6. Studies have shown that long-term exposure to air pollution reduces life expectancy, mainly due to cardiovascular disease and lung cancer. In addition, short-term exposure can affect lung function, exacerbation off asthma and increases in respiratory or cardiovascular hospital admissions. It is estimated that a 1µg/m^3 reduction in $PM_{2.5}$ could prevent 50,900 cases of coronary heart disease; 16,500 strokes; 9,300 cases of asthma and 4,200 cases of lung cancer over an 18 year period[22].

BASELINE

5.2.7. Air pollution has been estimated to affect local health and ultimately, in some cases, being a cause of death. Between 2017 and 2018 the fraction of deaths attributed to particulate air pollution has risen for all local authorities within Norfolk and at a national level.

Table 5-1 – Percentage of mortality attributable to particulate air pollution[25]

Area	2016	2017	2018
National	**5.4**	**5.1**	**5.2**
Norwich	5.7	5.2	5.6
South Norfolk	5.3	5.0	5.2
Great Yarmouth	5.4	5.0	5.3
Broadland	5.4	5.0	5.2
North Norfolk	5.1	4.6	4.9
King's Lynn and West Norfolk	5.3	4.9	5.2
Breckland	5.3	4.9	5.2
Average	5.4	4.9	5.2

5.2.8. As shown in **Table 5-2**, there are three Air Quality Management Areas (AQMA) within Norfolk. All three have been declared due to NO_2 levels exceeding the annual mean of 30µh/m^3 as stated under the National Air Quality Objectives[26].

[25] Public Health England (2019). Public Health Outcomes Framework: Fraction of mortality attributable to particulate air pollution. Available at: https://fingertips.phe.org.uk/search/air%20pollution#page/0/gid/1/pat/6/par/E12000006/ati/101/are/E07000066/cid/4/tbm/1/page-options/cin-ci-4_ovw-tdo-1 (Accessed 17 August 2020).

[26] Department for Environment, Food & Rural Affairs (2007). Available at: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf (Accessed 19 August 2020).

Table 5-2 – Air Quality Management Areas in Norfolk[27]

Local Authority	AQMA Name	Date Declared	Pollutants
Norwich	Central Norwich	1st November 2012	NO_2
King's Lynn and West Norfolk	Railway Road	1st November 2003	NO_2
King's Lynn and West Norfolk	Gaywood Clock	1st April 2009	NO_2

5.3 NOISE

EVIDENCE

5.3.1. The health impacts of environmental noise are widely acknowledged. Several reviews of impacts have been published (for example, WHO 2011[28]) which highlight potential impacts on cardio-vascular disease, cognitive impairment, and sleep disturbance and annoyance.

5.3.2. The World Health Organisation (WHO) consider the health burden of environmental noise in terms of Disability-Adjusted Life Years (DALYs). One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

5.3.3. Therefore, any noise impacts resulting in one DALY lost can be thought of as one lost year of 'healthy life'. DALYs considers life expectancy and the incidence of disease, weighted by the severity of the disease (from zero to 1, where 0 is perfect health and 1 is year of life lost).

5.3.4. WHO estimate that, in EU Member States and other western European countries, DALYs lost are 61,000 years for ischaemic heart disease, 45,000 years for cognitive impairment of children, 903,000 years for sleep disturbance, and 654,000 years for annoyance.

[27] Department for Environment, Food & Rural Affairs (2020). UK AIR – Air Information Resource. Available at: https://uk-air.defra.gov.uk/aqma/maps/ (Accessed 19 August 2020).

[28] WHO (2011) Burden of disease from environmental noise: Quantification of healthy life years lost in Europe. Available at: http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf (Accessed 18 August 2020).

5.3.5. Swift[29] provided a review of impacts (specifically relating to airports) focussing on sleep disturbance and stress as pathways leading to poor cardiovascular health and the potential mis-attribution of certain conditions, e.g. obesity and diabetes, as confounding factors whereas these conditions themselves may have resulted from sleep disturbance. From a review of effects of transport policy on wellbeing, Reardon and Abdallah[30] identified that traffic noise can cause annoyance and/or stress as well as hypertension, cardiovascular disease and sleep disturbance. Annoyance and sleep disturbance emerge as key themes in other research on wellbeing impacts from traffic noise[31] [32] [33].

5.3.6. Children are vulnerable to a range of health outcomes associated with environmental noise, including road traffic noise[34]. This includes demonstrating annoyance responses to noise as well as stress, along with increased levels of adrenaline and noradrenaline. Though noise does not cause more serious mental health problems, there is growing evidence for an association with increased hyperactivity symptoms. Increased levels of noise have been associated with changes in cardiovascular functioning, as well as an effect on low birth weight[35] [36]. Clear evidence exists on the links between the effect of school noise exposure on children's cognitive skills such as reading and memory[37] [38] [39] as well as test scores[40] [41].

5.3.7. Long term noise exposure is believed to have an influence on psychological health, although, except for annoyance, there is not as strong a link as for other health outcomes.

5.3.8. Studies from adults suggest that repeated elevation of blood pressure in relation to noise exposure might have pathological effects on health in the long term[42].

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[29] A Review of the Literature Related to Potential Health Effects of Aircraft Noise, Hales Swift, Purdue University, 2010.

[30] Reardon, L., & Abdallah, S. (2013). Wellbeing and transport: Taking stock and looking forward. Transport Reviews, 33(6), 634-657.

[31] Mindell, J. S., Cohen, J. M., Watkins, S., & Tyler, N. (2011). Synergies between low-carbon and healthy transport policies. In Proceedings of the Institution of Civil Engineers-Transport (Vol. 164, No. 3, pp. 127-139). Thomas Telford Ltd.

[32] Mindell, J., Rutter, H., & Watkins, S. (2011). Urban transportation and human health.

[33] Cohen, J. M., Boniface, S., & Watkins, S. (2014). Health implications of transport planning, development and operations. Journal of Transport & Health, 1(1), 63-72.

[34] Van Kamp I, Davies H. Noise and health invulnerable groups: a review. Noise Health. 2013; 15:153–9.

[35] Ristovska G, Laszlo HE, Hansell AL. Reproductive outcomes associated with noise exposure—a systematic review of the literature. Int J Environ Res Public Health. 2014;11(8):7931–52.

[36] Hohmann C, Grabenhenrich L, de Kluizenaar Y, et al. Health effects of chronic noise exposure in pregnancy and childhood: a systematic review initiated by ENRIECO. Int J Hyg Environ Health.2013;216:217–29.

[37] Evans GW, Hyge S, Bullinger M. Chronic noise and psychological stress. Psychol Sci. 1995; 6:333–8.

[38] Evans GW, Bullinger M, Hygge S. Chronic noise exposure and physiological response: a prospective study of children living under environmental stress. Psychol Sci. 1998; 9:75–7

[39] Hygge S, Evans GW, Bullinger M. A prospective study of some effects of aircraft noise on cognitive performance in schoolchildren. Psychol Sci. 2002; 13:469–74.

[40] Stansfeld, S., Clark, C. 'Health Effects of Noise Exposure in Children'. Curr Envir Health Rpt (2015) 2:171–178.

[41] Kuh D, Ben-Shlomo Y. A lifecourse approach to chronic disease epidemiology. Oxford: Oxford University Press; 2004.

[42] Munzel T, Gori T, Babisch W, et al. Cardiovascular effects of environmental noise exposure. Eur Heart J. 2014; 356:829–36.

BASELINE

5.3.9. The noise effects of motorised traffic may be particularly acute in the more urban areas of Norwich, King's Lynn and Great Yarmouth and in proximity to major transport networks including the A11, A47, A140, A1064 and A146.

5.3.10. The tranquillity of areas such as the Norfolk Coast Area of Outstanding Natural Beauty and several Ramsar sites, Sites of Special Scientific Interest, Special Protection Areas and Special Ares of Conservation scattered throughout Norfolk are affected by traffic noise (such as areas around North Norfolk and Great Yarmouth).

5.3.11. Areas within proximity to and beneath the flight paths of Norfolk International Airport and Hardwick Airport will experience increased levels of noise. In addition to noise resulting from major roads and aviation, other sources in Norfolk including rail services operated by Great Anglia, North Norfolk Railway and Thames Link Great Northern.

5.3.12. **Table 5-2** shows that between 2018 and 2019 the average rate of noise related complaints was 4.3 per 1000 across Norfolk. Although this is lower than the national average, Norwich was significantly higher with 11.2 complaints per 1000.

Table 5-3 – Rate of noise related complaints per 1000 between 2018 and 2019[43]

Area	Rate of complaints about noise (per 1000)
National	**6.8**
Norwich	11.2
South Norfolk	1.8
Great Yarmouth	5.4
Broadland	3.3
North Norfolk	3.8
King's Lynn and West Norfolk	3.4
Breckland	1.0
Average	4.3

[43] Public Health England (2019). Public Health Outcomes Framework. Available at: https://fingertips.phe.org.uk/search/noise#page/0/gid/1/pat/6/par/E12000006/ati/101/are/E07000200/cid/4/page-options/ovw-tdo-0_ovw-do-0 (Accessed 18 April 2020).

5.4 PHYSICAL ACTIVITY

EVIDENCE

5.4.1. Being physically active plays an essential role in ensuring health and wellbeing. It is known that physical activity benefits many parts of the body: the heart, skeletal muscles, bones, blood (for example, cholesterol levels), the immune system and the nervous system. Exercise and physical activity can reduce some of the risk factors for non-communicable diseases, including reducing blood pressure, improving blood cholesterol levels, and lowering body mass index (BMI)[44].

5.4.2. Physical activity plays an important part in a number of diseases, such as type 2 diabetes, heart disease and some cancers. The WHO estimates that physical inactivity is the fourth leading risk factor for global mortality[44] and physical inactivity is responsible for 6% of deaths globally – around 3.2 million deaths per year, including 2.6 million in low and middle-income countries, and 670,000 of these deaths are premature[45]. Symptoms of depression in adolescents have also been linked to higher BMI and low levels of physical activity[46], particularly among young women[47].

5.4.3. It has been stated that the impact of physical inactivity on mortality could even rival tobacco use as a cause of death[48].

5.4.4. Walkable environments assist a population to achieve their physical activity targets, compared with less walkable areas. Populations meet physical activity targets where safe places to walk exist within ten minutes of home. The presence or absence of walkable streets is related to longevity, even after adjustment for demographic and socioeconomic factors and baseline health status[49].

5.4.5. Switching journeys from cars to walking, cycling and public transport not only has a large beneficial impact on the individual's health, but a wider benefit to the population health as there are corresponding decreases in overall air pollution.

BASELINE

5.4.6. As shown in **Table 4-1** above, the proportion of physically fit adults in Norfolk is lower than the national average.

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[44] 'Global Health Risks: Selected figures and tables' www.who.int/entity/healthinfo/global_burden_disease/global_health_risks_report_figures.ppt' (Accessed 18 August 2020).

[45] World Health Organization, Global Recommendations on Physical Activity for Health (WHO, 2011). Available at: http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf (Accessed 18 August 2020).

[46] Hill AJ, Draper E, Stack J. A weight on children's minds: body shape dissatisfactions at 9-years old. International Journal of Obesity 1994;18:383-389.

[47] Ball K, Burton NW, Brown WJ. A prospective study of overweight, physical activity, and depressive symptoms in young women. Obesity 2009;1791:66-71.

[48] I.-M. Lee et al., 'Effect of physical activity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy', The Lancet (2012) 380: 219: http://press.thelancet.com/physicalactivity.pdf, p. 227.

[49] Takano T, Nakamura H, Watanabe N. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. J Epidem Community Health. 2002;56(12):913–918. doi: 10.1136/jech.56.12.913.

5.4.7. **Table 5-4** below shows the proportion of adults who walk or cycle at least three times a week for travel. Norwich had a significantly higher proportion of adults walking or cycling at least three times a week compared to the average for Norfolk and the national average. However, the figures for the remaining local authorities were lower than the national average.

Table 5-4 – Percentage of adults that walk or cycle for travel at least three days per week between 2017 and 2018[50]

Area	Percentage of adults cycling for travel at least three days per week	Percentage of adults walking for travel at least three days per week
National	**3.2**	**23.1**
Norwich	11.2	31.7
South Norfolk	2.6	16.4
Great Yarmouth	2.9	18.0
Broadland	0.3	18.1
North Norfolk	1.7	13.2
King's Lynn and West Norfolk	2.0	18.9
Breckland	1.4	15.5
Average	3.2	18.2

[50] Public Health England (2019). Physical Activity Key Indicators. Available at: https://fingertips.phe.org.uk/search/travel#page/0/gid/1/pat/6/par/E12000006/ati/201/cid/4/page-options/ovw-do-0 (Accessed 18 August 2020).

5.5 ROAD SAFETY

EVIDENCE

5.5.1. Traffic collision casualty rates tend to decline as public transit travel increases in an area. Residents of public transport-oriented communities have only about a fifth of the per capita traffic fatality rate as residents of sprawled, private car-dependent communities[51].

5.5.2. British roads are now among the safest in the world, but cyclists and pedestrians remain particularly vulnerable road users. Aside from the effect that casualties have on individuals and their families, pedestrian and cyclist casualties are a significant burden on local health services. Furthermore, safety concerns are often cited as a reason why people do not cycle or, for example, allow children to walk to school meaning that they are missing the opportunity to do more physical activity and improve their health[52].

5.5.3. Whether children actively commute to school may be determined by parents' perception of safety of the mode of transport, lack of time in the morning and social factors such as no other children to walk with[53].

5.5.4. The most common cause of death for children aged 5-14 years is being hit by a vehicle, and 35% of all pedestrian fatalities are people over the age of 70[54].

BASELINE

5.5.5. As shown in **Table 4-1** above, the average number of people killed or seriously injured per 100,000 on roads in Norfolk was higher than the national average.

5.5.6.

5.5.7. **Table** 5-5 below shows the number of pedestrians and cyclists aged 0 - 24 and motorcyclists aged 15 – 24 killed or seriously killed in road traffic collisions in Norfolk was lower than the national average. These figures suggest that there is a higher proportion of people killed or seriously injured over the age of 24 when compared to the average number of people killed or seriously injured of all ages as shown in **Table 4-1.**

[51] American Public Transportation Association (2016). The Hidden Traffic Safety Solution: Public Transportation. Available at: https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Hidden-Traffic-Safety-Solution-Public-Transportation.pdf (Accessed 18 August 2020).

[52] Cambridgeshire County Council (2015). Transport and Health JSNA – Active Travel. Accessed online:

https://cambridgeshireinsight.org.uk/wp-content/uploads/2017/08/Transport-and-Health-JSNA-2015-Active-Transport.pdf (Accessed 18 August 2020).

[53] J Salmon, Salmon L., Crawford D., Hume C., and A Timperio, 2007. Associations Among Individual, Social, and Environmental Barriers and Children's Walking or Cycling to School. American Journal of Health Promotion, November/December 2007, Vol. 22, No. 2, pp. 107-113.

[54] Sustainable Development Commission (2011). Fairness in a Car Dependant Society. Accessed online: http://www.sd-commission.org.uk/data/files/publications/fairness_car_dependant.pdf (Accessed 18 August 2020).

Table 5-5 – Number of pedestrians, cyclists and motorcyclists killed or seriously injured in road traffic collisions between 2014 and2018[55]

Area	Pedestrians killed or seriously injured in road traffic collisions aged 0 – 24 (per 100,000)	Cyclists killed or seriously injured in road traffic collisions aged 0 – 24 (per 100,000)	Motorcyclists killed or seriously injured in road traffic collisions aged 15 – 24 (per 100,000)
National	**11**	**4.3**	**23.9**
Norfolk*	9	4.0	31.5

* Information not available at a local authority level.

5.6 ECONOMY AND EMPLOYMENT

EVIDENCE

5.6.1. In general, motorised road transport better serves those who are already more advantaged, with the richest 10% of the population receiving almost four times as much public spending on their transport needs as the poorest 10%, due to their overall higher level of travelling and greater use of cars and trains instead of buses[56].

5.6.2. Employment is an important determinant of health; having a job or an occupation provides a vital link between an individual and society and enables people to contribute to society and achieve personal fulfilment[56] [57].

5.6.3. The WHO identifies several ways in which employment benefits mental health[58]. These include the provision of structured time, social contact and satisfaction arising from involvement in a collective effort. Therefore, the loss of a job or the threat of losing a job is considered detrimental to health[59].

[55] Public Health England (2018). Road Traffic Accident Key Indicators. Available at: https://fingertips.phe.org.uk/search/killed%20or%20seriously%20injured#page/0/gid/1/pat/6/par/E12000006/ati/202/are/E06000055/cid/4/page-options/ovw-tdo-0_ovw-do-0 (Accessed 18 August 2020).

[56] Sustainable Development Commission, 2011. Fairness in a Car Dependant Society. Accessed online: http://www.sd-commission.org.uk/data/files/publications/fairness_car_dependant.pdf (Accessed 18 August 2020).

[57] Doyle C, Kavanagh P, Metcalfe O, and T Lavin. 2005. Health Impacts of Employment: A Review. The Institute of Public Health in Ireland. Accessed online: http://www.publichealth.ie/sites/default/files/documents/files/IPH_Employment_Health_24pp.pdf (Accessed 18 August 2020).

[58] World Health Organisation. Mental Health. Available at: https://www.who.int/mental_health/en/ (Accessed 18 August 2020).

[59] Marmot M, Wilkinson R, editors. The solid facts. 2nd ed. Geneva: World Health Organisation; 2003.

5.6.4. Income is a key factor through which employment status affects health and wellbeing. The Department of Work and Pensions study found that "*employment is generally the most important means of obtaining adequate economic resources, which are essential for material wellbeing and full participation in today's society … employment and socio-economic status are the main drivers of social gradients in physical and mental health and mortality*"[60].

5.6.5. Children, particularly from low-income families, are more sensitive than adults to air pollution, noise and other environmental factors. Pregnant women in poverty and deprivation can lead to adverse health effects on unborn babies[61].

5.6.6. The Marmot Review was commissioned by the Department of Health to consider health inequalities in England[62]. The Review identifies six policy objectives for reducing health inequalities, one of which is to 'Create fair employment and good work for all'. The Review identifies the importance of work for health stating '*being in good employment is protective of health*'. However, the Marmot Review 10 years on states that '*being in work is not an automatic step towards good health and wellbeing; employment can also be detrimental to health and wellbeing and a poor quality or stressful job can be more detrimental to health than being unemployed*'[63].

5.6.7. The London Health Commission's Report Health in London: Review of the London Health Strategy High Level Indicators describes unemployment as '*a significant risk factor for poor physical and mental health and a major determinant of health inequalities. It is associated with morbidity, injuries and premature mortality, especially through increased risk of coronary heart disease. It is also related to depression, anxiety, self-harm and suicide*'[64].

5.6.8. The type of job a person has and the working conditions he or she is exposed to will also affect health. It is also important to consider the impact that employment has on other aspects of people's lives that are important for health, for example family life, social life and caring responsibilities for family members.

BASELINE

5.6.9.

5.6.10. **Table** 5-6 below shows the average percentage of the Norfolk population economically inactive is lower when compared to the national average. Subsequently, the percentage of the population economically active is higher than the national average.

[60] Waddell, G., Burton, A. K., 2007. Is work good for your health and wellbeing? The Stationery Office.

[61] Xu Xiaohui; Sharma Ravi K.; Talbott Evelyn O.; et al. (2011) PM10 air pollution exposure during pregnancy and term low birth weight in Allegheny County, PA, 1994-2000 INTERNATIONAL ARCHIVES OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH Volume: 84 Issue: 3 Pages: 251-257.

[62] Marmot, M., Allen, J., Goldblatt, P., Boyce, T., McNeish D., Grady, M. and Geddes, I., 2010, Fair society, healthy lives: Strategic review of health inequalities in England post-2010.

[63] Marmot, M., Allen, J., Goldblatt, P., Boyce, T., Goldblatt, P., an Morrision, J. 2020. Health Equality in England: The Marmot Review 10 Years On. Page 26, para 1.

[64] Greater London Authority, 2005, Health in London: Review of the London Health Strategy High Level Indicators, London Health Commission.

Table 5-6 – Percentage of the Population Economically Active and Inactive in 2018 – 2019[65]

Area	Economically Inactive (%)	Economically Active (%)
National	**21.1**	**78.9**
Norwich	19.2	80.8
South Norfolk	15.5	84.5
Great Yarmouth	26.5	73.5
Broadland	17.1	82.9
North Norfolk	21.2	78.9
King's Lynn and West Norfolk	23.4	76.6
Breckland	19.0	81.0
Average	20.3	79.7

5.7 ACCESS AND ACCESSIBILITY

EVIDENCE

5.7.1. Transportation and access are known to promote social inclusion, as social exclusion can occur because of a community not being able to easily access transport options, amongst other things.

5.7.2. The Social Exclusion Unit states that "*participation in social, cultural and leisure activities is very important to people's quality of life and can play a major part in meeting policy goals like improving health, reducing crime and building cohesive communities*". Problems with transport and the location and delivery of services contribute to social exclusion by preventing people from participating in work or learning and from accessing healthcare, food shopping and other local activities[66].

5.7.3. According to the Department for Transport, "*over the course of a year over 1.4 million people miss, turn down or simply choose not to seek healthcare because of transport problems*"[66]. Capacity to reach healthcare services is affected by the accessibility of transport modes, availability of financial support for those on low incomes and the location of healthcare services[67]. Groups impacted by disability and of certain ages may experience even greater barriers to health and social care services[68].

[65] NOMIS (2019). Key Statistics: Economic inactivity rate

[66] Social Exclusion Unit, 2003. Making the connections: Final report of Transport and Social Exclusion.

[67] Randall, C., 2012, Measuring National Wellbeing - Where We Live – 2012, Office for National Statistics.

[68] Hamer, L., 2004, Improving patient access to health services: a national review and case studies of current approaches, Health Development Agency.

5.7.4. Community severance is the separation of different areas within a community by the flow of traffic[69]. Social networks are susceptible to severance by physical barriers, such as roads and traffic, which can create both real and perceived barriers to social contact. For example, children may not be allowed to visit friends unaccompanied because of parental concern over road traffic collisions.

5.7.5. A study illustrating the effect of traffic on social contacts in three streets was performed in San Francisco[70]. It was found that people living on the street with lightest traffic had twice as many acquaintances and three times as many friends as those people who lived on the street with the heaviest traffic.

5.7.6. Social capital was measured across different neighbourhoods and it was found that people in "car-dependent" localities were less likely to know and trust their neighbours and to participate in local organizations than people who lived in "walkable", pedestrian orientated localities with less traffic and congestion[71].

5.7.7. A similar study in Bristol also demonstrated that the volume and speed of motorised traffic can reduce opportunities for positive interactions between residents in a neighbourhood and can contribute to increased social isolation[72].

BASELINE

5.7.8. As mentioned in **Table 4-1**, the number of people in Norfolk who had their day to day activities limited a lot (9.1%) or a little (11.1%) was higher than the national average of 8.3% and 9.3% respectively.

5.7.9. Table 5-7 below shows that the proportion of households with no access to a car or van is significantly lower than the national average. However, the proportion of households in Norfolk with access to one or more cars is higher than the national average.

Table 5-7 – Percentage of household with access to a car or van (2011)[73]

Area	No cars or vans in household	1 car or van in household	2 cars or vans in household	3 cars or vans in household	4 or more cars or vans in household
National	**25.6**	**42.2**	**24.7**	**5.5**	**1.9**
Norwich	33.4	47.6	15.8	2.5	0.7
South Norfolk	11.7	42.4	34.3	8.4	3.3

[69] McCarthy M. Transport and health. In: Marmot M, Wilkinson RG, editors. Social determinants of health. Oxford; New York: Oxford University Press; 1999.

[70] Appleyard D, Lintell M. The environmental quality of city streets: the resident's viewpoint. Am Instit Planners J 1972; 38:84-101.

[71] Leyden KM. Social capital and the built environment: the importance of walkable neighbourhoods. Am J Public Health 2003; 93:1546-51.

[72] Hart, J & Parkhurst, G (2011) Driven to excess: Impacts of motor vehicles on the quality of life of residents of three streets in Bristol UK. World Transport Policy & Practice, 17 (2). pp 12-30.

[73] NOMIS (2011). Local Area Report – Car or van availability.

Area	No cars or vans in household	1 car or van in household	2 cars or vans in household	3 cars or vans in household	4 or more cars or vans in household
Great Yarmouth	27.2	44.8	21.2	5.0	1.8
Broadland	11.4	44.4	33.5	7.8	2.9
North Norfolk	16.2	46.1	28.1	6.9	2.7
King's Lynn and West Norfolk	16.4	44.6	29.0	7.1	3.0
Breckland	15.5	43.8	30.3	7.5	2.9
Average	18.8	44.8	27.4	6.5	2.5

5.8 ASSESSMENT

The findings of the assessment are presented in **Table 5-8** below.

Table 5-8 – Transport Objectives and Policies and Health Effects

Symbol	Health Effect
✓	Likely positive health outcome
×	Likely negative health outcome
?	Uncertain effect
0	No effect

Transport Strategy Objective and Policies	Impact						Reasons	Mitigation measures / recommendations
	Air Quality	Noise	Physical Activity	Road Safety	Economy and Employment	Access and Accessibility		
Embracing the future We will plan and prepare the county for future changes and challenges to ensure the best for our society, environment and economy. The priority for reducing emissions should be to support a shift to more sustainable modes and more efficient vehicles, including lower carbon technology and cleaner fuels; this includes the facilitation of necessary infrastructure. Innovation and new technologies will be embraces in order to respond to the new targets set by the recently adopted environmental policy. Behavioural change and interventions that can help to increase the use of sustainable transport will be implemented.	✓	✓	✓	✓	✓	✓	By encouraging the shift to more active modes of transport i.e. walking and cycling, this would encourage the population to take up a more active lifestyle resulting in positive health impacts. The use of more sustainable modes of transport could reduce the number of vehicles on the roads thereby reducing congestion and therefore the level air and noise pollution. Through the implementation of lower carbon technology and cleaner fuels, this would have a positive health outcome as both air and noise pollution would be improved. Technological advancements such as traffic management measures (i.e. speed cameras and smart phone apps to alert road users of traffic or accidents) has the potential to reduce congestion on the network, reducing the number of idling cars and therefore air and noise pollution. Younger people are becoming increasingly aware of climate change, this awareness is only expected to grow as the issues become more prevalent. Therefore, by ensuring that walking and cycling infrastructure and reliable public transport is implemented then their use is likely to increase. Norfolk's population is aging, with this comes transportation problems (including lack of sufficient transport links in rural locations and health care and other vital services, transport being inconvenient or uncomfortable and lack of encouragement to use active modes of transport) and increasing risk of isolation[18]. Elderly people are more likely to rely on public transport, therefore improvements to public transport would ensure reliable journeys will improve connectivity to services, healthcare and amenities. An increase in public transport usage could have beneficial effects on air quality and noise pollution as well as road safety, as a result of a potential reduction in the number of vehicles on the road.	Pedestrian routes should be improved, to enable access for all users, including those with reduced mobility or disabilities to ensure active travel modes are available to all. By providing infrastructure to support alternative fuels, such as electric vehicle plug-in points, this is likely to encourage people to switch to electric transport modes thus reducing air pollution. Using sustainable modes of transport may not always be possible for those living in rural areas, therefore more consideration may have to be given to these groups to ensure they can benefit from low-carbon movement.
Delivering a sustainable Norfolk New development should be well located and connected to maximise use of sustainable and active transport options, making them more attractive places to live,	✓	✓	✓	✓	✓	✓	By ensuring that any new developments are well connected to sustainable and active travel modes, people are more likely to choose an active lifestyle. Provisions for foot/cycle ways between new developments will reduce severance and will improve accessibility to jobs, services, healthcare and amenities promoting better health and wellbeing overall. Through the incorporation of sustainable and active travel modes in new developments, this could prevent significant increases in traffic volumes and	Pedestrian routes should be improved, to enable access for all users, including those with reduced mobility or disabilities to ensure active travel modes are available to all. Off-road routes for pedestrians and cyclists should be considered in the design

Transport Strategy Objective and Policies	Impact						Reasons	Mitigation measures / recommendations
	Air Quality	Noise	Physical Activity	Road Safety	Economy and Employment	Access and Accessibility		
thus supporting a strong sense of the public realm. We will seek to ensure that any adverse effects of new development on the transport network are mitigated through developer contributions. In air quality management areas development will need to demonstrate its positive contribution to tackling the air quality problem.							congestion on the highways network. This has the potential to improve road safety and air and noise pollution. As mentioned in **Table 5-2,** there are three AQMAs in Norfolk. By ensuring that any developments within these areas make a positive contribution to improving air quality, this will result in a beneficial impact to health, particularly for the more vulnerable members of the population i.e. children, the elderly and those with underlying respiratory ailments.	of new developments to improve safety and reduce the risk of collisions.
Enhancing connectivity Our priority will be to improve major road and rail connections between larger places in the county, and to major ports, airports and cities in the rest of the UK. Our priority for improved connectivity will be for it to be via clean transport modes. We will seek to improve connectivity between rural areas and services in urban centres.	✓ ×	✓ ×	✓	✓ ×	✓	✓	By providing greater connectivity to major ports, airports and cities, this would enable greater economic opportunities for Norfolk, providing business with the opportunity to grow nationally and internationally. In addition, this could attract businesses and tourists to Norfolk, providing employment opportunities and a strong local economy. This has the opportunity result in an increased number of vehicles on the roads which could reduce road safety and increase air and noise pollution, however any new infrastructure should be well designed to improve safety wherever practical. The promotion of clean transport modes could encourage people to switch from petrol/diesel cars to electric cars. Although this may not necessarily reduce the number of vehicles on the road, it could potentially lead to improved air and noise pollution. However, more walking and cycling options and/or the introduction of modern public transport could lead to reduced traffic volumes and congestion on the highways network which has the potential to improve the number of people using active modes of transport, road safety and air and noise pollution. Improving connectivity between rural areas and urban centres would reduce severance, improve accessibility to jobs, services, healthcare and amenities and would open up access to the countryside. Nationally there are more deaths on rural roads each year, therefore by ensuring better rural connectivity, this could lead to improved safety and a reduced number of incidents as a result of better provisions for pedestrians and cyclists (i.e. segregated foot/cycle ways) road improvements for vehicles drivers.	Pedestrian routes should be improved, to enable access for all users, including those with reduced mobility or disabilities to ensure active travel modes are available to all. The use of electric transportation options should be prioritised over non-renewable options where possible, to improve air quality. By providing infrastructure to support alternative fuels, such as electric vehicle plug-in points, this is likely to encourage people to switch to electric transport modes thus reducing air and noise pollution.
Enhancing Norfolk's quality of life Action will be taken to improve air quality in urban centres, including investigating vehicular restrictions or charging, in order for air quality to fall below the threshold for air quality management areas. We will change our transport network to work towards carbon neutrality by 2030.	✓	✓	✓	✓	✓	✓	As mentioned in **Table 5-2,** there are three AQMAs in urban centres in Norfolk. Efforts to improve air quality in these areas through vehicular restrictions and/or charging would discourage the use of private vehicles and would result in a modal shift to walking or cycling. Not only would this encourage a more active lifestyle but would also reduce air and noise pollution which would contribute to Norwich City Council's aim of having a carbon neutral network by 2030. Improvements to public transport to ensure reliable journeys will improve connectivity and has the potential to increase the attractiveness and reliability of travelling by public transport. An increase in public transport usage could have beneficial effects on air quality and noise pollution as well as road safety, as a result of a potential reduction in the number of vehicles on the road.	Pedestrian routes should be improved, to enable access for all users, including those with reduced mobility or disabilities to ensure active travel modes are available to all. By providing infrastructure to support alternative fuels, such as electric vehicle plug-in points, this is likely to encourage people to switch to electric transport modes thus reducing air and noise pollution.

Transport Strategy Objective and Policies	Impact						Reasons	Mitigation measures / recommendations
	Air Quality	Noise	Physical Activity	Road Safety	Economy and Employment	Access and Accessibility		
Quality of place will be improved through improving the transport network.							There is evidence that shows improvements to public transport may increase its use, particularly for those who live nearby to stops and stations. Some studies have also suggested that public transport interventions increase the total physical activity levels of study participants[75] which may have benefits to health, access to services and physical activity.	Opportunities should be sought to integrate public transport with other active travel modes. This could include the provision of rail and bus timetables, secure cycle parking, signposted pedestrian and cyclist routes in the local area and cycle hire hubs. Secure cycle storage should be included in any station upgrade to encourage active travel.
Increasing accessibility Agencies in Norfolk should tackle accessibility problems in partnership, targeting those communities most in need. Accessibility should be planned as part of service delivery. Priority on some routes should be given to sustainable and active modes of transport. We will work towards providing a network where transport and movement provision is accessible to all.	✓ ×	✓ ×	✓	✓ ×	✓	✓	Improvements to public transport to ensure reliable journeys will improve accessibility to jobs, services, healthcare and amenities. It also has the potential to increase the attractiveness of travelling by public transport, which may encourage people to switch from private vehicles. An increase in public transport usage could have beneficial effects on air quality and noise pollution as well as road safety, as a result of a potential reduction in the number of vehicles on the road. However, by prioritising active modes of transport i.e. walking and cycling along some routes, this would encourage the population to take up a more active lifestyle resulting in positive health impacts. Through careful design, segregated/off-road foot/cycle paths could be included, which would reduce collision risk and improve the safety for pedestrians and cyclists. The use of more sustainable modes of transport could reduce the number of vehicles on the roads this reducing congestion and therefore the level air and noise pollution.	Pedestrian routes should be improved, and designed, to enable access for all users, including those with reduced mobility or disabilities such as appropriate slope gradients, space for mobility vehicles and seating provisions. In addition, further consideration needs to be given for those with invisible disabilities, for example simplifying the journey by providing clear information and providing support during journeys[74]. Consideration to the use of electric buses, trams and trains supplied by renewable energy sources should be given, as this has the potential to reduce air and noise pollution further.
Improving transport safety The number of people killed and serious injured on the road network will be reduced by adopting a safe systems approach and working with partners to achieve this vision.	✓	✓	✓	✓	0	✓	As shown in **Table** 5-5, Norfolk has a much higher rate of motorcyclists killed or seriously injured in road traffic collisions compared to the national average, whereas the number of pedestrians and cyclists killed or seriously injured in traffic collisions is slightly lower than the national average. Through the introduction of reduced speeds and road analysis this has the potential to reduce congestion, driver stress and ultimately improve driver wellbeing and safety. Reduced congestion could also lead to a reduction in air and noise pollution. By ensuring a safer network i.e. segregated/off-road foot/cycle paths, this could encourage users to take up more sustainable travel modes. This could reduce the number of vehicles on the roads thereby reducing congestion and air and noise pollution but would have a beneficial health impact on the population.	It is important that all network users feel safe when using routes. This can be done by ensuring that all shared user routes are suitable for all users, particularly those that are more vulnerable i.e. my limiting cyclists speeds to prevent collisions if those with reduced mobility are using the same route.
A well-managed and maintained transport network	✓	✓	✓	✓	✓	✓	Maintenance of the existing highways network may encourage an increase in capacity; this could result in an increase in air and noise pollution due to an	Pedestrian routes should be improved, to enable access for all users, including

[74] The Chartered Institute of Logistics and Transport (2017). Understanding and meeting the needs of travellers with hidden disabilities. Available at: https://ciltuk.org.uk/LinkClick.aspx?fileticket=rmsmac-7NHg%3D&portalid=0&timestamp=1512121645759 (Accessed 24 August 2020).

Transport Strategy Objective and Policies	Impact						Reasons	Mitigation measures / recommendations
	Air Quality	Noise	Physical Activity	Road Safety	Economy and Employment	Access and Accessibility		
To bring about an improvement in the condition of Norfolk's highway network, maintaining the current asset should be a key priority for funding. Works should be targeted to ensure A and urban / inter-urban routes are in good condition. In market towns and urban areas, we will focus maintenance on corridors for sustainable transport used by walkers and cyclists. We will focus on measures to improve public transport in urban areas, and elsewhere we will focus on reliable journeys for all users. The likely impacts of climate change on the highway network should be addressed, with a risk-based approach taken to determining the priority for action. New and innovative technology to collect data about the network, inform decisions, assess where to target funding on the network and share information with the public will be embraced.							increase in number of vehicles using the network. Poor road surfaces are linked to higher levels of particulate emissions and noise, therefore by using a less abrasive road surface material for repairs, a reduction in particulate emissions and noise pollution could be expected. Better maintenance of the highways is also likely to improve safety, stress levels and overall driver experience. By focusing maintenance on routes used for sustainable transport, this could help reduce the number of road vehicles and encourage a modal shift to walking or cycling. Reduced traffic volumes and congestion on the highways network could improve road safety and air and noise pollution. Improvements to existing cycle/footpaths within urban areas would reduce severance, improve accessibility to jobs, services, healthcare and amenities. Improvements to public transport to ensure reliable journeys will improve connectivity and has the potential to increase the attractiveness and practicality of travelling by public transport. An increase in public transport usage could have beneficial effects on air quality and noise pollution as well as road safety, as a result of a potential reduction in the number of vehicles on the road. There is evidence that shows improvements to public transport may increase its use, particularly for those who live nearby. Some studies have also suggested that public transport interventions increase the total physical activity levels of study participants[75] which may have benefits to health, access to services and physical activity. Due to a large number of cost communities, communities close to rivers and its relatively flat and low-lying topography, Norfolk is very vulnerable to flooding. The identification of a 'resilient network' will give priority to key routes during extreme weather events to ensure economic activity and access to key services is maintained. A more resilient network across Norfolk will result in greater journey reliability. Technological advancements in traffic data, such as informing network users of collisions and delays could reduce congestion and stress levels. This would result in less distractions to the driver which has the potential to improve road safety and overall wellbeing. Other technological advancements could include Connected and Autonomous Vehicles, e-bikes and an electric vehicle charging network.	those with reduced mobility or disabilities to ensure active travel modes are available to all. The increased use of technology may not benefit everyone. Although e-bikes, for example, will contribute to tackling climate change, this is unlikely to result in any health benefits to the elderly and disabled. Therefore, to enable widespread implementation of robust and reliable innovative solutions, further consideration must be given to ensure inclusivity. Opportunities should be sought to integrate public transport with other active travel modes. This could include the provision of rail and bus timetables, secure cycle parking, signposted pedestrian and cyclist routes in the local area and cycle hire hubs. Secure cycle storage should be included in any station upgrade to encourage active travel.

[75] National Institute for Health and Care Excellence (2018) NICE Guideline: Physical activity and the environment.

Appendix A-1

DEPRIVATION MAPS

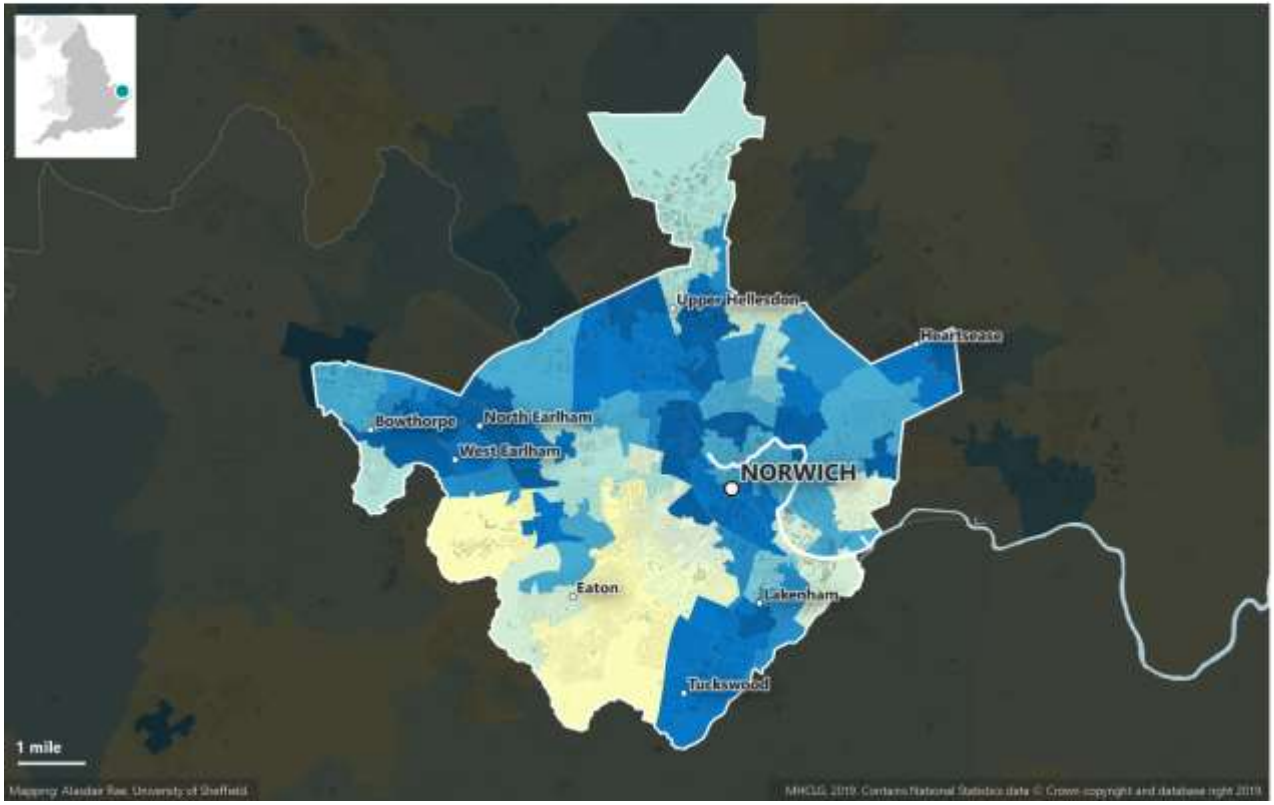
Figure A-1 – Norwich Deprivation Profile, 2019[76]

[76] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). Norwich. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

English Indices of Deprivation 2019

Ministry of Housing, Communities & Local Government

NORWICH



Local deprivation profile

% of LSOAs in each national deprivation decile

MORE DEPRIVED

1	20.5%
2	19.3%
3	9.6%
4	18.1%
5	2.4%
6	7.2%
7	3.6%
8	7.2%
9	3.6%
10	8.4%

LESS DEPRIVED

What this map shows

This is a map of Indices of Deprivation 2019 data for **Norwich**. The colours on the map indicate the deprivation decile of each Lower Layer Super Output Area (LSOA) for England as a whole, and the coloured bars above indicate the proportion of LSOAs in each national deprivation decile. The most deprived areas (decile 1) are shown in blue. It is important to keep in mind that the Indices of Deprivation relate to small areas and do not tell us how deprived, or wealthy, individual people are. LSOAs have an average population of just under 1,700 (as of 2017).

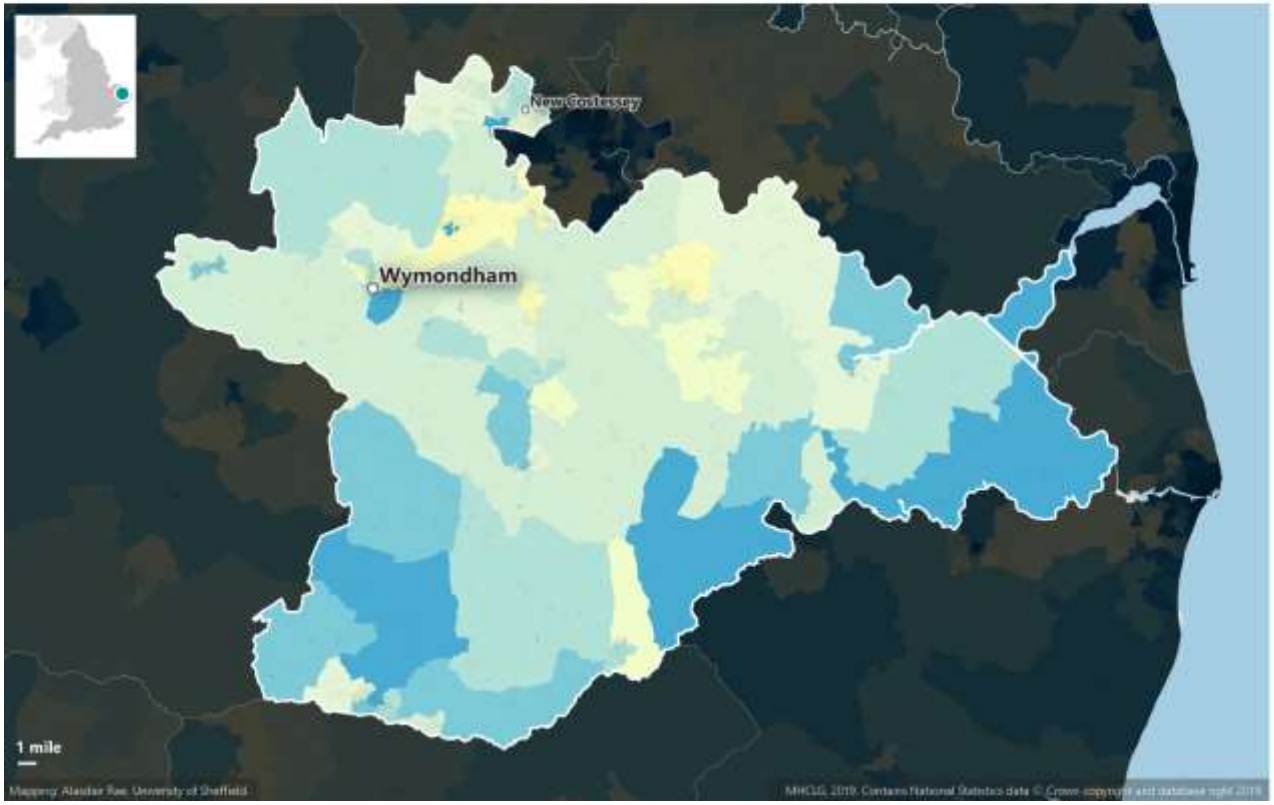
More deprived — Less deprived

Relative level of deprivation

English Indices of Deprivation 2019

Ministry of Housing, Communities & Local Government

SOUTH NORFOLK



Local deprivation profile

% of LSOAs in each national deprivation decile

MORE DEPRIVED

1	0.0%
2	0.0%
3	0.0%
4	9.9%
5	12.3%
6	18.5%
7	23.5%
8	16.0%
9	9.9%
10	9.9%

LESS DEPRIVED

What this map shows

This is a map of Indices of Deprivation 2019 data for **South Norfolk**. The colours on the map indicate the deprivation decile of each Lower Layer Super Output Area (LSOA) for England as a whole, and the coloured bars above indicate the proportion of LSOAs in each national deprivation decile. The most deprived areas (decile 1) are shown in blue. It is important to keep in mind that the Indices of Deprivation relate to small areas and do not tell us how deprived, or wealthy, individual people are. LSOAs have an average population of just under 1,700 (as of 2017).

More deprived — Less deprived

Relative level of deprivation

Figure A-2 – South Norfolk Deprivation Profile, 2019[77]

[77] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). South Norfolk. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

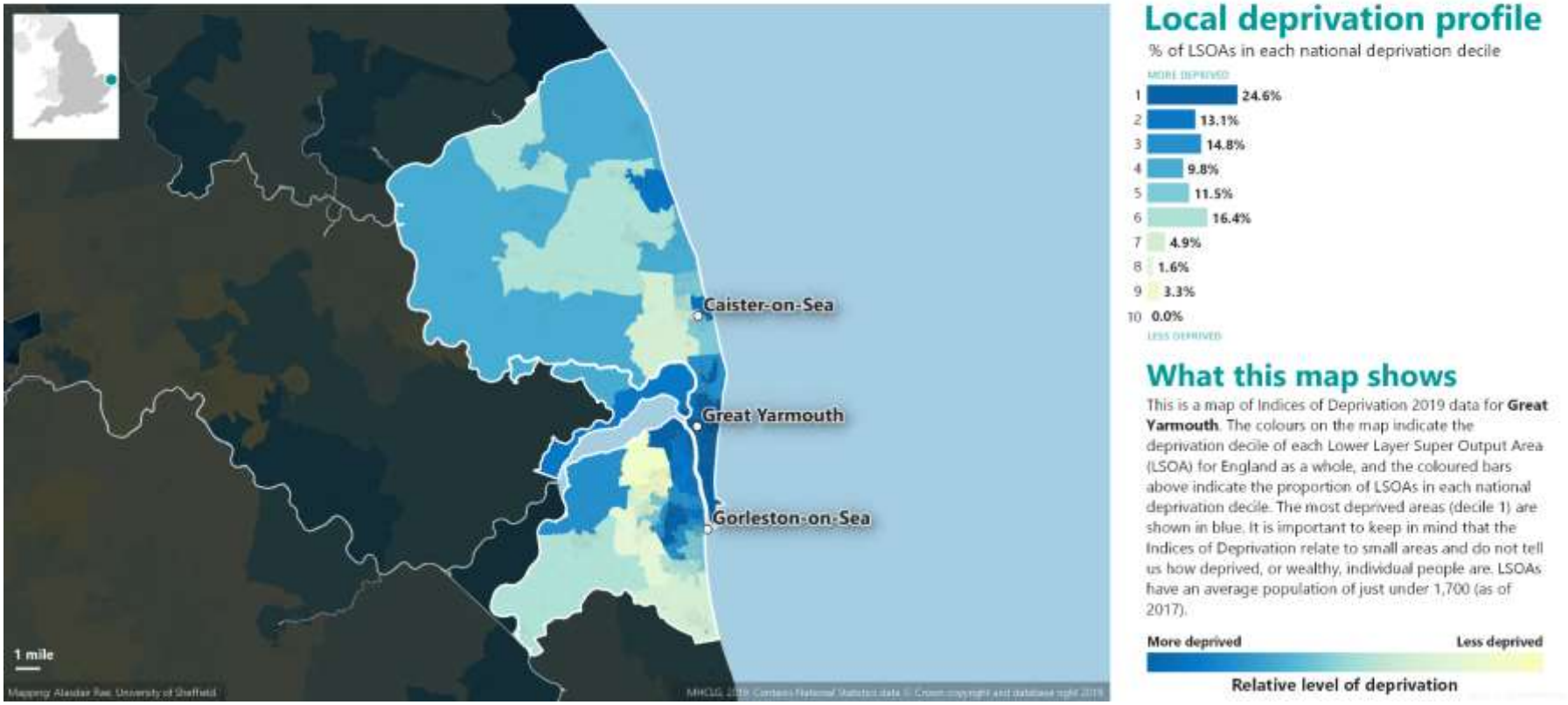


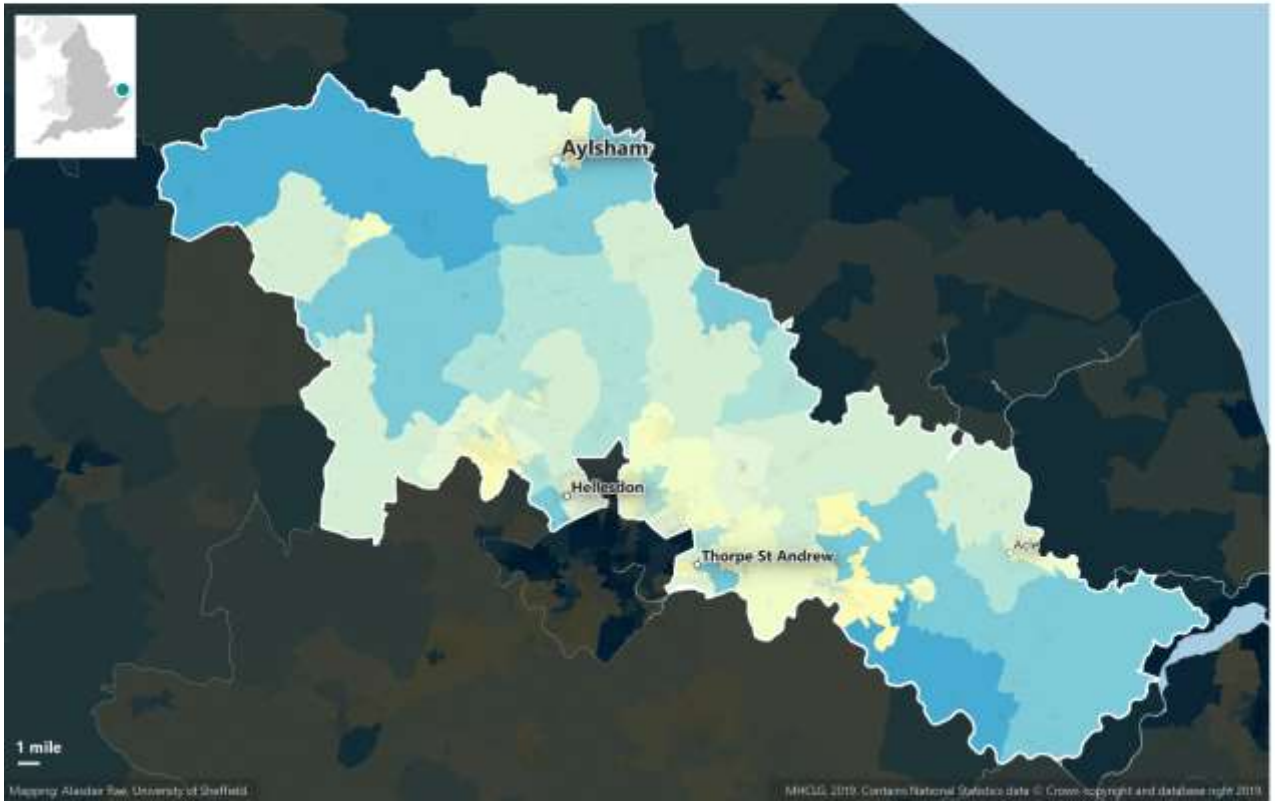
Figure A-3 – Great Yarmouth Deprivation Profile, 2019[78]

[78] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). Great Yarmouth. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

English Indices of Deprivation 2019

Ministry of Housing, Communities & Local Government

BROADLAND



Local deprivation profile

% of LSOAs in each national deprivation decile

MORE DEPRIVED

1	0.0%
2	0.0%
3	0.0%
4	4.8%
5	11.9%
6	14.3%
7	16.7%
8	17.9%
9	21.4%
10	13.1%

LESS DEPRIVED

What this map shows

This is a map of Indices of Deprivation 2019 data for **Broadland**. The colours on the map indicate the deprivation decile of each Lower Layer Super Output Area (LSOA) for England as a whole, and the coloured bars above indicate the proportion of LSOAs in each national deprivation decile. The most deprived areas (decile 1) are shown in blue. It is important to keep in mind that the Indices of Deprivation relate to small areas and do not tell us how deprived, or wealthy, individual people are. LSOAs have an average population of just under 1,700 (as of 2017).

More deprived — Less deprived

Relative level of deprivation

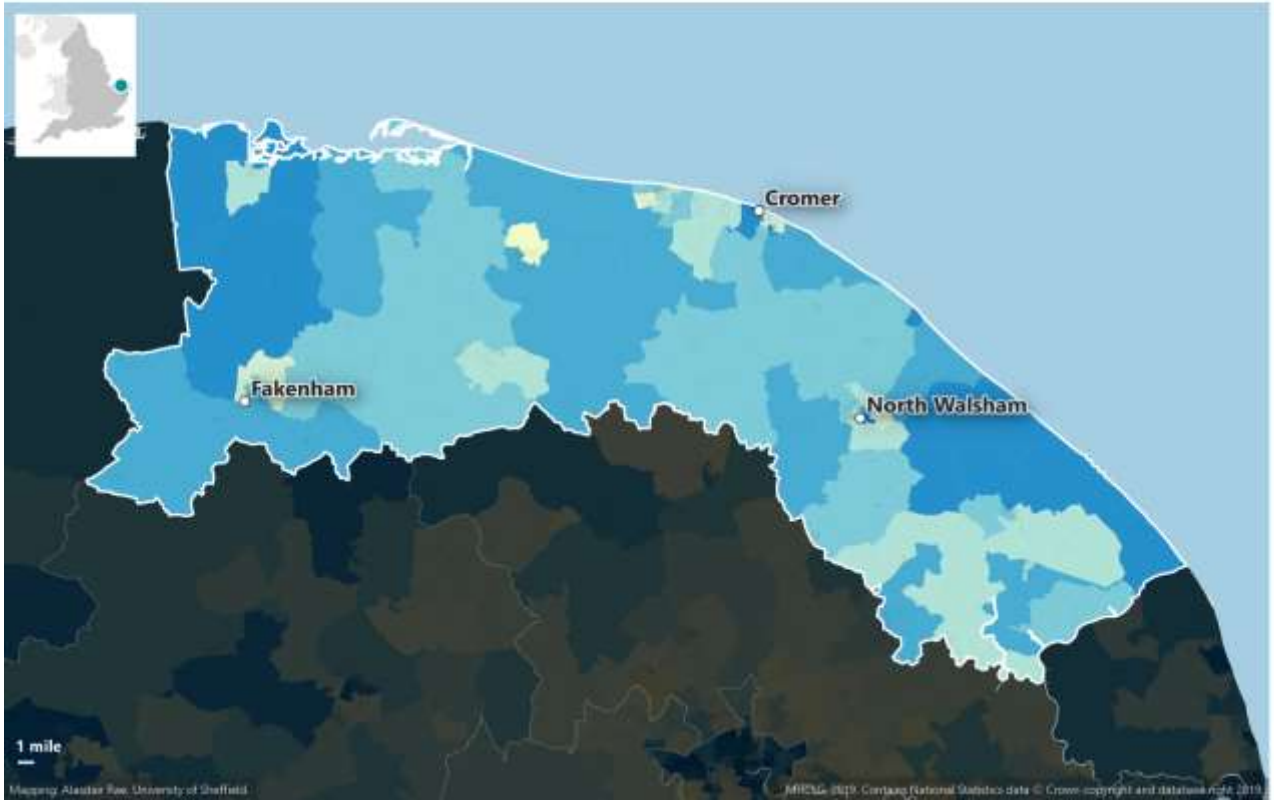
Figure A-4 – Broadland Deprivation Profile, 2019[79]

[79] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). Broadland. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

English Indices of Deprivation 2019

Ministry of Housing, Communities & Local Government

NORTH NORFOLK



Local deprivation profile

% of LSOAs in each national deprivation decile

MORE DEPRIVED

1	0.0%
2	3.2%
3	14.5%
4	25.8%
5	25.8%
6	21.0%
7	6.5%
8	1.6%
9	1.6%
10	0.0%

LESS DEPRIVED

What this map shows

This is a map of Indices of Deprivation 2019 data for **North Norfolk**. The colours on the map indicate the deprivation decile of each Lower Layer Super Output Area (LSOA) for England as a whole, and the coloured bars above indicate the proportion of LSOAs in each national deprivation decile. The most deprived areas (decile 1) are shown in blue. It is important to keep in mind that the Indices of Deprivation relate to small areas and do not tell us how deprived, or wealthy, individual people are. LSOAs have an average population of just under 1,700 (as of 2017).

More deprived — Less deprived

Relative level of deprivation

Figure A-5 – North Norfolk Deprivation Profile, 2019[80]

[80] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). North Norfolk. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

Figure A-6 – King's Lynn and West Norfolk Deprivation Profile, 2019[81]

Figure A-7 – Breckland Deprivation Profile, 2019[82]

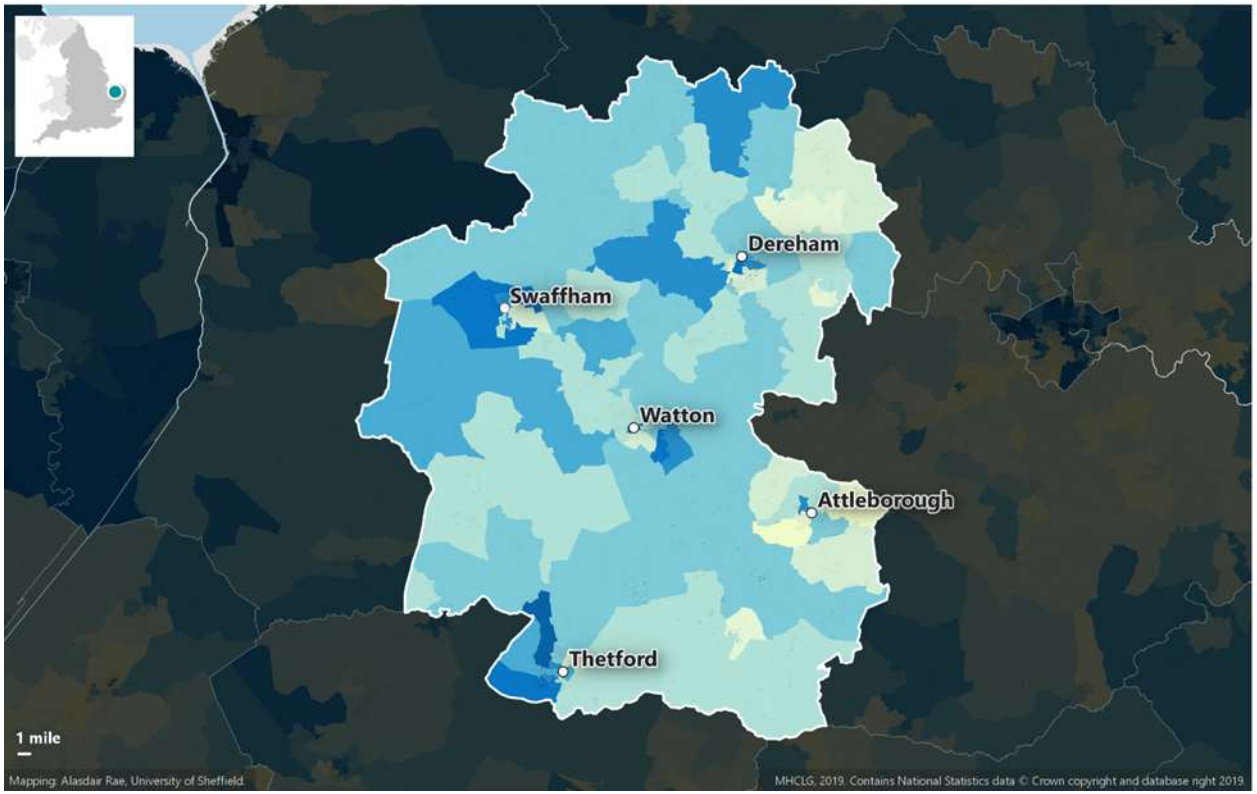
[81] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). King's Lynn and West Norfolk. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020

[82] University of Sheffield (in collaboration with the Ministry of Housing, Communities & Local Government), English Indices of Deprivation (2019). Breckland. Available at: https://imd2019.group.shef.ac.uk/ Accessed 17 August 2020.

English Indices of Deprivation 2019

Ministry of Housing, Communities & Local Government

BRECKLAND



Local deprivation profile

% of LSOAs in each national deprivation decile

MORE DEPRIVED

1	1.3%
2	7.7%
3	11.5%
4	6.4%
5	24.4%
6	23.1%
7	11.5%
8	10.3%
9	3.8%
10	0.0%

LESS DEPRIVED

What this map shows

This is a map of Indices of Deprivation 2019 data for **Breckland**. The colours on the map indicate the deprivation decile of each Lower Layer Super Output Area (LSOA) for England as a whole, and the coloured bars above indicate the proportion of LSOAs in each national deprivation decile. The most deprived areas (decile 1) are shown in blue. It is important to keep in mind that the Indices of Deprivation relate to small areas and do not tell us how deprived, or wealthy, individual people are. LSOAs have an average population of just under 1,700 (as of 2017).

More deprived — **Less deprived**

Relative level of deprivation

Appendix F

POLICY CONTEXT AND BASELINE – EXTRACT FROM SCOPING REPORT

3 IDENTIFYING THE SUSTAINABILITY ISSUES

3.1 INTRODUCTION

3.1.1. This section sets out the sustainability policy context, baseline and any future trends regardless of the implementation of the four transport plans/strategies for Norfolk, Norwich, Great Yarmouth and King's Lynn. It identifies key issues for sustainability in relation to the transport strategies, so that the effects of the plans/strategies can be compared to the evolution of the baseline in the absence of those plans/strategies. This information can then be used to develop the appraisal framework in Section 4.

3.2 OVERARCHING POLICY AND LEGISLATION

LOCAL, REGIONAL AND NATIONAL

- Norfolk County Council's Environmental Policy[11]
- Broads Authority Local Plan
- Breckland District Council- Core Strategy and Development Control Policies Development Plan Document 2001-2026
- Environmental Strategy for Broadland 2014
- Environmental Strategy for Broadland Action Plan 2014
- Great Yarmouth Local Plan: Core Strategy 2013-2030
- Great Yarmouth The Plan: 2015-2020
- King's Lynn & West Norfolk Borough Council Local Development Framework - Core Strategy 2011
- North Norfolk Local Development Framework- Core Strategy 2008-2021
- Norwich City Council Sustainable Community Strategy 2008-2020
- Norwich City Council Environmental Strategy 2015-2018
- Norwich Local Plan: Development Management policies plan (adopted 2014)
- New Anglia Local Enterprise Partnership's (LEP) Norfolk and Suffolk Economic Strategy
- Joint Core Strategy for Broadland, Norwich and South Norfolk 2011-2026 (adopted 2014)
- Norfolk County Council: A vision for Norfolk in 2021
- East of England Plan 2008
- 25 Year Environment Plan: A Green Future: Our 25 Year Plan to Improve the Environment (DEFRA 2018)
- Major Road Network and Large Local Majors programmes investment planning 2018
- National Planning Policy Framework (NPPF) 2019
- National Networks National Policy Statement (NN NPS) 2014

[11] https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/natural-environment-policies/environmental-policy

3.3 TRANSPORT

LOCAL, REGIONAL AND NATIONAL POLICY AND LEGISLATION

- Great Yarmouth Local Plan: Core Strategy 2013-2030 (Policy CS16: Improving accessibility and transport)
- King's Lynn Area Transportation and Land Use Study Stage 1 Final Report (2009)
- Govia Thameslink Railway King's Lynn Station Norfolk Station Travel Plan (2017)
- Connecting Norfolk Implementation Plan for 2015-2021 (2015).
- North Norfolk Local Development Framework- Core Strategy 2008-2021 (Development Control Policies CT5 to CT7)
- Joint Core Strategy for Broadland, Norwich and South Norfolk 2011-2026 (adopted 2014) (Policy 6: Access and transportation)
- Norwich Local Plan: Development Management policies plan (adopted 2014) (Policies DM27 to DM32)
- South Norfolk Council (SNC) Development Management policies (Adoption version October 2015)
- Broadland District Council Development Management DPD (2015)
- Integrated Transport Strategy for Norfolk and Suffolk 2018
- East of England Plan 2008 (Policies T1 to T15)
- Norfolk's 3rd Local Transport Plan 2011-2026
- The Road to Zero 2018
- Road Safety Act 2006

SUMMARY OF CURRENT BASELINE

3.3.1. Norfolk has one of the largest highway networks in the country with over 6,000 miles and an overall asset base valued at approximately £6.5 billion. The County Council is responsible for managing all aspects of this network including road maintenance, water drainage arising from the roads and street lighting[12]. The County Council is also responsible for managing other aspects of the transport network which includes cycleways and bus infrastructure that is not a part of the highways network. The County Council however, is not responsible for the A11 and A47 strategic roads and the rail network within the county.

[12] Connecting Norfolk, Norfolk Transport Plan for 2026. Available at: https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/local-transport-plan (Accessed March 2019)

3.3.2. The traffic counts for Norfolk[13], East of England[14] and Great Britain[15] for 2017 are shown in Table 3-1 below.

Table 3-1 - Traffic counts for Norfolk, East of England and Great Britain

	Norfolk (Thousand Miles)	East of England (Million Miles)	Great Britain (Billion Miles)
Pedal Cycles	5,276	43,113	3.3 bn
Motorcycles	21,735	143,568	2.8 bn
Cars	2,283,064	18,086,190	254.4 bn
Buses and Coaches	19,671	99,188	2.4 bn
Light Goods Vehicles	484,102	3,774,974	50.5 bn
HGV's	175,245	1,976,610	17 bn
Total	2,983,817	48,247,286	327.1 bn

3.3.3. It is apparent that the predominant mode of transport in the county is the car with Light Goods Vehicles being the second popular mode of transport. This can be attributed to long journey distances due to Norfolk being a mainly rural county. The key transport challenges that Norfolk is facing include: accessibility issues which has led to individuals, especially the older population to be isolated in their homes and have a lack of access to services. There has also been a lack of investment in the road network in the past which has potentially affected Norfolk's economic performance. However, currently there are multiple major road projects and improvement schemes being undertaken around Norfolk to address the existing transport issues.

Strategic Road Network

Trunk Roads

3.3.4. The A11 and A47 are two trunk roads within Norfolk that are manage by the Highways England. The A11 trunk road runs from London to Norwich passing Thetford, Attleborough and Wymondham. The A47 trunk road runs from the West Midlands thorough Norfolk and ending in Suffolk.

[13] Department for Transport-Traffic Counts Norfolk. Available at: https://www.dft.gov.uk/traffic-counts/area.php?region=East+of+England&la=Norfolk (Accessed January 2019)
[14] Department for Transport- Traffic Counts East of England. Available at: https://www.dft.gov.uk/traffic-counts/area.php?region=East+of+England (Accessed March 2019)
[15] Department for Transport- Summary Statistics Great Britain. Available at: https://roadtraffic.dft.gov.uk/summary (Accessed March 2019)

Major Road Network

3.3.5. The Major Road Network (MRN) within Norfolk includes: the A140, A1042, A146, A134, A10 and A17. The A140 runs from Cromer to Norwich from where it connects with the A1042 which forms part of the Norwich outer ring road. The A146 runs from Norwich to Lowestoft. The A134 runs from Colchester to King's Lynn. The A10 runs from Southwark through to Kings Lynn. The A17 runs from Newark-on-Trent to Kings Lynn.

Corridors of Movement

3.3.6. Other corridors of movement within Norfolk include: the A143 running from Great Yarmouth to Haverhill in Suffolk; the A148 running from Great Yarmouth to Kings Lynn via Holt and Fakenham but also serving Sheringham; the A149 running from Cromer to Great Yarmouth – via North Walsham and Stalham; the A1075 running from Thetford to East Dereham; the A1065 running from Mildenhall to Fakenham; the A1066 running from Thetford to Diss; the A1067 running from Norwich to Fakenham; A1122 running from Outwell to Swaffham and A1151 linking the A149 at Smallburgh to Norwich via Hoveton)[16].

Rail

3.3.7. There are 5 railway lines that run through Norfolk, these are: the Breckland line, the Wherry line, the Fen line, the Bitten line and the Great Eastern Main Line.

3.3.8. The Breckland line which connects Thetford and Attleborough to the national rail network with regular services to Norwich and Cambridge and beyond to the Midlands and north of England.

3.3.9. The Wherry line runs through Broadland connecting to Norwich on the west and Great Yarmouth on the east. The line passes through the towns of Brundall, Buckenham, Lingwood, Cantley, Acle and Reedham within Broadland

3.3.10. The Fen line connects Kings Lynn with King's Cross Station in London.

3.3.11. The Bitten Line is the only public rail service within north Norfolk. It is operated by National Express, linking Sheringham with Norwich. This is part of the regional rail network and includes stations at Cromer, North Walsham and Hoveton as well as several rural halts. The 'Poppyline' provides a tourist attraction rail link from Sheringham to Holt.

3.3.12. The Great Eastern Main Line connects Norwich with Liverpool Street Station in London. The Great Eastern main line also runs through South Norfolk. The main station within South Norfolk is Diss railway station, which is connects to Norwich to the North and Stowmarket to the south.

[16] North Norfolk Local Development Framework- Core Strategy, Incorporating Development Control Policies. Available at: https://www.north-norfolk.gov.uk/media/1370/3-_core_strategy_-incorporating_development_control_policies-_adopted_2008_-updated_2012.pdf#page=2 (Accessed March 2019)

Airport

3.3.13. There is one public airport in Norfolk which is situated in Norwich. There are 1.5 million people within a 90-minute drive of Norwich International Airport, which covers Norfolk, Suffolk and North Cambridgeshire. Between 2015 and 2016 it was estimated that airport had a total of 473,484 passengers[17].

Buses

Services

3.3.14. The bus services in Norfolk are run by external bus operators; these include:

- BorderBus;
- Coach Services;
- Feline Travel;
- First;
- Konectbus;
- Lynx;
- National Express;
- Our Hire;
- Sanders Coaches;
- Semmence;
- Simonds; and
- West Norfolk Community Transport.

Routes

3.3.15. Public transport services in Breckland are principally provided by bus and focus on linking the district's market towns with shopping and employment destinations at Norwich, King's Lynn and Bury St. Edmunds. There are more infrequent services in the rural areas linking villages with their local town, principally on market days[18].

3.3.16. The Market Gates bus station is the major hub in Great Yarmouth. It is located within the centre of Great Yarmouth and is a short walk from the seafront. It has bus route links between Peterborough and Lowestoft via Norwich and Kings Lynn.

3.3.17. King's Lynn bus station is located within the centre of King's Lynn close to the Vancouver shopping centre and is a short walk from King's Lynn rail station. It provides bus routes between Peterborough and Norwich and routes to local towns including Cromer, Wells-next-the-sea and Fakenham.

[17] Norwich Airport- About Norwich Airport. Available at: https://www.norwichairport.co.uk/about-norwich-airport/. (Accessed March 2019)
[18] Breckland Adopted Core Strategy and Development Control Policies Development Plan Document. Available at: https://www.breckland.gov.uk/media/1574/Core-Strat-Final-20-03-2012/pdf/Core_Strat_Final_20_03_2012.pdf?m=635948423729470000 (Accessed March 2019)

3.3.18. There are multiple bus routes throughout Norfolk. North Norfolk's villages are served only by very limited public bus services and two of the seven towns (Holt and Stalham) are deemed by the County Council not to benefit from the desired level of service for their respective populations. The 'Coast Hopper' bus service runs from Hunstanton to Cromer providing an increasingly popular regular service for locals and visitors along the coast[19].

3.3.19. Norwich bus station is situated off Surrey Street and Queens Road, in Norwich city centre. It provides bus routes between Peterborough and Norwich and local routes within Norwich.

3.3.20. The main bus station within South Norfolk is located within the town of Diss. There are some local routes that are provided within the district.

Issues

3.3.21. Norfolk is a rural county which is characterised by a large number of smaller, dispersed settlements. Outside of these settlements' trips tend to be lengthy due to the county's rural nature and dispersed geography of the settlements. Without a car, travel can be difficult: there are relatively few bus or rail services and journeys are generally too lengthy to be undertaken on foot or bicycle. Also, as the bus network in the county is largely a commercial network, the market is not regulated and operators are able to put on new or cease existing services at short notices.[20]

Ports

3.3.22. There are two ports that are present within Norfolk. The Port of King's Lynn is operated by Association British Port (ABP) and is located on the Wash on the UK's east coast. Trunk roads connect the port to Cambridge, where the M11 leads down to the M25 and east to Leicester and the M1[21]. The second port is the port of Great Yarmouth which comprises a deep water outer harbour along with commercial quays on both sides of the river Yare. The river port on the River Yare runs through the centre of Great Yarmouth[22].

Maintenance

3.3.23. As the Highway Authority, Norfolk County Council maintains most of the 6,000 miles of roads in Norfolk. These do not include:

- Trunk roads (the A11 and A47) that are managed by Highways England;

[19] North Norfolk Local Development Framework- Core Strategy, Incorporating Development Control Policies. Available at: https://www.north-norfolk.gov.uk/media/1370/3-_core_strategy_-incorporating_development_control_policies-_adopted_2008_-updated_2012.pdf#page=2 (Accessed March 2019)
[20] Norfolk Strategic Framework: Transport Constraints. Available at: https://norfolk.citizenspace.com/consultation/norfolk-strategic-framework/supporting_documents/NSFTTransport_OutputV4.docx (Accessed May 2019)
[21] Associated British Ports- Kings Lynn. Available at: http://www.abports.co.uk/Our_Locations/Short_Sea_Ports/Kings_Lynn/ (Accessed March 2019)
[22] The port of Great Yarmouth. Available at: https://www.great-yarmouth.co.uk/business/port-of-great-yarmouth.aspx (Accessed March 2019)

- Private roads that are maintained by their owners; and
- Roads within Norwich which are covered by Norwich City Council.

3.3.24. There are issues in carrying out maintenance, operation and improvement of highway assets as Highway Authorities are under increasing pressure including limited budgets and resources, mature networks with significant backlogs of maintenance, accountability to funding providers and increasing public expectations.[23]

Public Rights of Way

3.3.25. There is a national trail in Norfolk, the Peddars Way and Norfolk Coast Path. Pedders Way starts in the Brecks, a unique area of forest, heath and low river valleys, running north from Knettishall Heath in Suffolk, for 46 miles through changing countryside to the north Norfolk coast near Hunstanton and then combines with the Norfolk Coast path[24].

3.3.26. The council has responsibility for maintaining 2,400 miles of public footpaths and other rights of way, which can serve important links to village centres and services as well as having an important health and leisure role. There are also multiple cycle routes in the county including:

- Marriot's Way;
- Pedder's Way;
- Weavers' Way;
- Bure Valley Path;
- North Norfolk Coast Cycleway;
- Norfolk Broads;
- Brecks;
- Yare Valley;
- South Norfolk;
- Broadland; and
- Three Rivers Way.

FUTURE TRENDS

3.3.27. The rural nature of Norfolk's population, combined with lack of services, regular scheduled public transport and a growing population, could lead to an increase in demand for private travel. The increase of online shopping can also contribute to the number of vehicles on the road network. However, there are many instances across Norfolk where car travel is used for short journeys, which can be replaced by sustainable transport modes and through the introduction of an integrated

[23] Transport Asset Management Plan. Available at: https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/transport-asset-management-plan (Accessed May 2019)
[24] Peddars Way (Knettishall Heath to Holme-next-the-Sea). Available at: https://www.norfolk.gov.uk/out-and-about-in-norfolk/norfolk-trails/long-distance-trails/peddars-way (Accessed January 2019)

transport strategy. The Integrated Transport Strategy for Norfolk and Suffolk[25] looks ahead to the 2040s and sets out how the transport network can help continue to make Norfolk and Suffolk a great place to trade, live, work, visit and learn. Raising awareness of infrastructure to support sustainable transport modes by working with developers, businesses and schools to promote transport alternatives will enable people to make sustainable transport choices.

Strategic Infrastructure Delivery Plan 2019

3.3.28. The Strategic Infrastructure Delivery Plan (SIDP) 2019[26] sets out Norfolk's high-level infrastructure priorities for the next 10 years that will help to deliver economic growth in the county. The SIDP helps NCC and partners co-ordinate implementation, prioritise activity and respond to funding opportunities.

3.3.29. The SIDP includes the most strategic projects on which the county council alongside its partners are actively working to progress and which have a recognised route towards delivery. Some projects are further forward than others, so they have robust investment figures and implementation timelines; others are in the early stages of design and are less well known.

3.3.30. SIDP projects led by the local authorities which are well progressed and are likely to proceed irrespectively of LTP4, are to be treated as part of the future baseline in the SA/SEA process. SIDP projects include:

- Great Yarmouth Third River Crossing
- Broadland Growth Triangle Link Road
- Attleborough Link Road
- Norwich Western Link
- West Winch Housing Access Road
- Long Stratton Bypass
- Broadland Business Park Rail Station
- Weavers Way
- The Green Loop
- North West Woodland Country Park.

SUSTAINABILITY ISSUES

3.3.31. Sustainability issues relating to transport are as follows:

- Public transport plays an essential role for those who do not have use of a car, allowing them to access a wide range of services. There is a need for reliable, affordable and safe transport in the county.

[25] The East. Integrated Transport Strategy for Norfolk and Suffolk- A strategy for growth and opportunity. Available at: https://newanglia.co.uk/wp-content/uploads/2018/07/ITS-FINAL-280618.pdf
[26] Norfolk County Council and Partners (October 2019) Norfolk Strategic Infrastructure Delivery Plan 2019. Available at: https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/business-policies/norfolk-infrastructure-delivery-plan

- Norfolk's population is predicted to increase, there will be increased demand for public transport services. An aging population will require improved access to transport infrastructure.
- The number of motor vehicles in the county is increasing with an increase in 285,244 thousand miles travelled from 2007 to 2017. There is a need for increased sustainable methods of transport to reduce carbon emissions and improve air quality.

3.4 POPULATION

RELEVANCE TO TRANSPORT STRATEGIES

3.4.1. The transport strategies will need to consider the needs of the existing and future population of Norfolk. Transport management decisions may have potential impacts on the local economy.

POLICY AND LEGISLATION

3.4.2. Local, regional, national and international policy and legislation relevant to population is included in the overarching legislation set out above.

SUMMARY OF CURRENT BASELINE

Population Structure and Statistics

3.4.3. Data released from the Office of National Statistics (ONS) 2017 mid-year population estimates (based on the 2011 census of population for England and Wales) is presented below in Table 3-2.

Table 3-2 - Mid-2017 year Norfolk Population

Local Authority	Mid-2017 Estimate	Mid-2007 Estimate	Change 2007-2017	Area Sq km	Density Persons per Sq km, 2017
Breckland	138,602	128,100	10,502 (8.2%)	1,305	106
Broadland	128,535	122,500	6,035 (4.9%)	552	233
Great Yarmouth	99,417	95,500	3,917 (4.1%)	174	570
King's Lynn and West Norfolk	151,945	141,900	10,045 (7.1%)	1,439	106
North Norfolk	104,067	100,800	3,267 (3.2%)	962	108
Norwich	140,353	132,600	7,753 (5.8%)	39	3,597
South Norfolk	135,471	116,500	18,971 (16.3%)	908	149
Norfolk County Council	898,390	838,000	60,390 (7.2%)	5,380	167

3.4.4. The 2017 mid-year population estimates released by ONS show a continued increase in Norfolk's population. They show the county's total population increased by 60,390 people in ten years, to approximately 898,390 in 2017. This is a 7.2% rise and is lower than the percentage increase of 8.9% for England over the same period.

3.4.5. Across the districts, borough and city councils, North Norfolk has shown the least rate of population growth at 3.2%, whereas South Norfolk has the highest rate of population growth at 16.3% between the period off 2007 and 2017.

3.4.6. A breakdown of the population data by age group and ethnicity shows that Norfolk has an ageing population and is less ethnically diverse in comparison to national figures.

Rural Population

3.4.7. Norfolk is by nature a rural county which, except for Norwich, has no town or city larger than 50,000 people. The county is large (550,000 hectares) and with 41% of its population in 4 urban areas: Norwich, Great Yarmouth, King's Lynn and Thetford, the remaining 95% of the County land area is rural, being the sixth least densely populated county in England[27].

Market Town Population

3.4.8. Norfolk market towns have a number of different functions they act as; service centres, employment centres, commuter towns, retirement centres and shopping destinations. Functions aside, many market towns retain a historic core and are generally supported by seasonal tourism. Table 3-3 lists the large market towns which are town centres and significant service centres in the district councils[28].

Table 3-3 - Market town populations

Local Authority	Market Town	Parish Population
Breckland	Attleborough	11,297
	Dereham	19,099
	Swaffham	7,809
	Thetford	26,582
	Watton	7,782
Broadland	Aylsham	6,515

[27] Norfolk Rural Development Strategy Data on Rural Norfolk 2013. Available at: https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/business/rural-development-strategy-dataset.pdf?la=en&hash=0F618593EE992D48274F190B64FE807F1C49088B (Accessed March 2019)

[28] Norfolk Market Town Centre Report 2018. Available at: https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/monitoring-land-use/market-towns-report.pdf?la=en&hash=13580A3CD3A8960710335F92E4923E5066FC58BA (Accessed March 2019)

Local Authority	Market Town	Parish Population
	Wroxham and Hoveton	3,451
North Norfolk	Cromer	7,704
	Fakenham	7,743
	Holt	3,988
	North Walsham	12,647
	Sheringham	7,395
	Stalham	3,276
	Wells-next-the-sea	2,174
South Norfolk	Diss	8,279
	Harleston	4,206
	Loddon	2,860
	Long Stratton	4,490
	Wymondham	15,875
Kings Lynn and West Norfolk	Downham Market	10,962
	Hunstanton	5,277

FUTURE TRENDS

3.4.9. The 2016 based subnational population projections for England provide an indication of the possible size and structure of the future population, based on the continuation of recent demographic trends and are produced on a consistent basis across all local authorities in England. Table 3-4 outlines the population projections for Norfolk.

Table 3-4 - 2016 based subnational population projections for Norfolk[29]

Local Authority	All persons all ages (2016)	All persons all ages (2021)	All persons all ages (2026)	All persons all ages (2031)	All persons all ages (2036)
Breckland	137100	142700	147900	152200	156000
Broadland	127400	130100	133100	135800	138100

[29] Office for National Statistics. Subnational population projections for local authorities in England: Table 2. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandtable2 (Accessed January 2019)

Local Authority	All persons all ages (2016)	All persons all ages (2021)	All persons all ages (2026)	All persons all ages (2031)	All persons all ages (2036)
Great Yarmouth	99000	100300	101600	102800	103800
King's Lynn and West Norfolk	151800	155500	159000	161900	164400
North Norfolk	103600	105600	107900	110100	112100
Norwich	139900	144100	147400	151100	154000
South Norfolk	133000	140400	147200	152400	156800
Norfolk	891700	918800	944100	966400	985200

3.4.10. The majority of districts in Norfolk have a higher proportion of people over the age of 65, compared to the England average. Future projections to 2036 continue these trends as seen in Table 3-5 below.

Table 3-5 - Percentage of population over the age of 65 trends for each district[30]

	Over 65 (2016)	Over 65 (2036)
Breckland	24.3%	31.9%
Broadland	25.3%	31.2%
Great Yarmouth	23.6%	30.5%
King's Lynn and West Norfolk	25.3%	31.9%
North Norfolk	32.1%	39.9%
Norwich	14.8%	17.6%
South Norfolk	23.9%	29.7%
Norfolk	23.9%	30%

[30] Office for National Statistics. Subnational population projections for local authorities in England: Table 2. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandtable2 (Accessed January 2019)

	Over 65 (2016)	Over 65 (2036)
East of England	19.3%	25.2%
England	17.9%	23.5%

SUSTAINABILITY ISSUES

- The population of Norfolk is increasing and there will be additional movement associated with this growth.
- The ageing population structure is likely to increase demand for access to services.

3.5 AIR QUALITY

RELEVANCE TO TRANSPORT STRATEGIES

3.5.1. Potential transport strategies that promote the increase in capacity of the transport network may increase vehicle emissions.

POLICY AND LEGISLATION

Local, Regional and National

- Breckland District Council Draft Air Quality Action Plan
- Borough Council of King's Lynn & West Norfolk Air Quality Action Plan
- Norwich City Council Local Air Quality Management Air Quality Action Plan
- Air Quality Strategy for England, Wales, Scotland and Northern Ireland (DEFRA, 2007)
- Air Quality Plan for Nitrogen Dioxide in the UK (Defra, 2017)
- Air Quality Standards Regulations 2010
- Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations (2019)
- Air Pollution: Action in a Changing Climate (2010)
- Clean Air Strategy, Defra (2019)
- Clean Air Zone Framework - Principles for setting up Clean Air Zones in England (2017)
- National Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2011)

International

- Air Quality Framework Directive 96/62/EC
- Ambient Air Quality Directive 2008/50/EC

SUMMARY OF CURRENT BASELINE

Air Quality Management

3.5.2. As part of the National Air Quality Strategy (NAQS), all local authorities are obliged to establish air quality levels in their area that meet national air quality objectives. These are set by concentrations of airborne pollutants considered to be acceptable for health and the environment. If an area does not meet these objectives Air Quality Management Areas (AQMA) are declared. The authority must then draw up an Air Quality Action Plan to set objectives for improving air quality.

3.5.3. Air quality across the county is generally considered to be good. There are 4 AQMAs in Norfolk, declared primarily as a result of pollution caused by road transport. Breckland District Council has 1 AQMA, Borough Council of King's Lynn and West Norfolk has 2 AQMAs and Norwich City Council has 1 AQMA. These are detailed in Table 3-6 below.

Table 3-6 - Norfolk AQMAs

Local Authority	Pollutants Declared	Description
Breckland District Council	Breckland District Council AQMA Number 2 Order 2017- Nitrogen dioxide (NO2)	An area to the north and south of Swaffham town centre alongside the A1065
Borough Council of King's Lynn & West Norfolk	Railway Road AQMA - Nitrogen dioxide (NO2)	The properties to the east side of Railway Road between the junctions Blackfriars Road/Street and Stanley Street, and the properties to the west side between Blackfriars Street and up to but not including number 26a.
	Gaywood Clock AQMA - Nitrogen dioxide (NO2)	An area encompassing Lynn Road from number 43 to Wootton Road up to number 25
Norwich City Council	Central Norwich AQMA - Nitrogen dioxide (NO2)	The centre of Norwich.

3.5.4. The Breckland Air Quality Annual Status Report 2018[31] reported that across the entire diffusion tube network, over the last five years, NO2 concentrations have decreased and no exceedances were reported in 2017.

3.5.5. The Broadland Air Quality Annual Status Report 2018[32] reported that air quality in Broadland is generally good, mainly because it is not intensively built up or industrialised area but it is a district that includes large rural areas. Air pollution in Broadland is mainly associated with road traffic and in particular with queueing traffic on busy roads mostly in the suburbs of Norwich.

[31] Breckland Air Quality Annual Status Report 2018. Available at: https://www.breckland.gov.uk/media/10207/2018-Air-Quality-Annual-Status-Report-ASR-/pdf/Breckland_ASR_2018_Final.pdf?m=636719202589770000 (Accessed March 2019)
[32] Broadland Air Quality Annual Status Report 2018. Available at: https://www.broadland.gov.uk/downloads/file/4461/air_quality_annual_status_report_2018 (Accessed March 2019)

3.5.6. The Great Yarmouth Air Quality Annual Status Report 2018[33] reports that there are no exceedances of air quality emissions. The key pollutants of concern locally continue to be Nitrogen Oxides and particulates primarily from traffic and industrial emissions.

3.5.7. The Kings' Lynn and West Norfolk Air Quality Annual Status Report 2018[34] reported one exceedance of the annual mean NO2 air quality objective, this was at the Railway Road 4 location. No exceedances of the PM10 annual mean objective at any of the monitoring sites, nor was the PM10 24-hour mean objective (50µg/m3 not to be exceeded more than 35 times a year) exceeded.

3.5.8. The latest North Norfolk Air Quality Annual Status Report 2017[35] reports that North Norfolk does not suffer from significant air quality impacts; previous NO2 monitoring undertaken between 1997 and 2013 in local urban towns successfully demonstrated that Nitrogen dioxide levels were well below the national objective. Particulate matter (PM) was not previously deemed to be a problem due to the absence of locations that meet the emission scenarios publicised in technical guidance.

3.5.9. The Norwich Air Quality Annual Status Report 2018[36] reported that NO2 concentrations within the central AQMA are falling. In 2012, ten of the diffusion tube monitoring locations exceeded the annual mean objective of 40mg/m3, by 2017 the number of sites has dropped to six.

3.5.10. The South Norfolk Air Quality Annual Status Report 2018[37] reported Air Quality in South Norfolk is generally good with no recorded exceedance of air quality objectives. The main pollutant of local concern is NO2 arising from road traffic and stationary combustion sources. This is typical of a primarily rural area such as South Norfolk. Monitoring for NO2 takes place at 29 locations across the district.

Particulate Matter (PM2.5)

3.5.11. Air pollution can have harmful effects on health, the environment and the economy. Air pollution particularity affects the most vulnerable in society: children and older people, and those with heart and lung conditions.

3.5.12. Data for the annual concentration of human-made fine particulate matter at an area level, adjusted to account for population exposure can be observed for Norfolk. Figure 3-1 indicates that in 2016 the mean was 9.1 µg/m3, lower than both the East of England (9.6 µg/m3) and England (9.3 µg/m3).

[33] Great Yarmouth Air Quality Annual Status Report 2018. Available at: https://www.great-yarmouth.gov.uk/CHttpHandler.ashx?id=3166&p=0 (Accessed March 2019)
[34] Kings Lynn and West Norfolk Air Quality Annual Status Report 2018. Available at: https://www.west-norfolk.gov.uk/info/20137/air_quality/169/air_quality_information (Accessed March 2019)
[35] North Norfolk Air Quality Annual Status Report 2017. Available at: https://www.north-norfolk.gov.uk/media/3445/asr-2017.pdf (Accessed March 2017)
[36] Norwich Annual Status Report 2018. Available at: https://www.norwich.gov.uk/downloads/file/4715/2018_air_quality_annual_status_report
[37] South Norfolk Annual Status Report 2018. Available at: https://www.south-norfolk.gov.uk/sites/default/files/downloads/south_norfolk_asr_2018.pdf (Accessed March 2019)

Trend data indicated that levels have increased in Norfolk since 2011 when the mean was 8.5 µg/m3.[38]

Air pollution: fine particulate matter 2016 — Mean - µg/m3

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	-	9.3	-	-
East of England region	–	-	9.6	-	-
Bedford	–	-	9.7	-	-
Cambridgeshire	–	-	9.4	-	-
Central Bedfordshire	–	-	9.5	-	-
Essex	–	-	9.6	-	-
Hertfordshire	–	-	9.8	-	-
Luton	–	-	10.5	-	-
Norfolk	–	-	9.1	-	-
Peterborough	–	-	9.8	-	-
Southend-on-Sea	–	-	9.8	-	-
Suffolk	–	-	9.4	-	-
Thurrock	–	-	10.4	-	-

Source: Defra: various instruments used to derive estimates including Polution Climate Mapping model, Automatic Urban and Rural Network and National Atmospheric Emissions Inventory. Also makes use of census population estimates (ONS). See https://uk-air.defra.gov.uk/data/pcm-data#population_weighted_annual_mean_pm25_data for more detail.

Figure 3-1 - Annual concentration of human made fine particulate matter (PM2.5) as an area level across the East of England, adjusted to account for population exposure

3.5.13. As shown in Figure 3-2 below, within Norfolk, the more urban local authorities have higher mean concentrations of fine particulates matter, especially Norwich (9.7 µg/m3) and Great Yarmouth (9.2 µg/m3)[39].

Figure 3-2 - Annual concentration of human made fine particulate matter (PM2.5) at district level across Norfolk, adjusted to account for population exposure

[38] Public Health England, 2016. Air pollution: fine particulate matter (East of England). Available at: https://fingertips.phe.org.uk/profile/wider-determinants/data#page/4/gid/1938133043/pat/6/par/E12000006/ati/102/are/E10000020/iid/92924/age/-1/sex/-1 (Accessed January 2019)

[39] Public Health England, 2016. Air pollution: fine particulate matter (Norfolk). Available at: https://fingertips.phe.org.uk/profile/wider-determinants/data#page/3/gid/1938133043/pat/102/par/E10000020/ati/101/are/E07000143/iid/92924/age/-1/sex/-1 (Accessed January 2019)

Air pollution: fine particulate matter 2016

Mean - µg/m3

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	-	9.3	-	-
Norfolk	–	-	9.1	-	-
Breckland	–	-	8.8	-	-
Broadland	–	-	9.1	-	-
Great Yarmouth	–	-	9.2	-	-
King's Lynn and West Norf...	–	-	8.9	-	-
North Norfolk	–	-	8.6	-	-
Norwich	–	-	9.7	-	-
South Norfolk	–	-	9.0	-	-

Source: Defra: various instruments used to derive estimates including Polution Climate Mapping model, Automatic Urban and Rural Network and National Atmospheric Emissions Inventory. Also makes use of census population estimates (ONS). See https://uk-air.defra.gov.uk/data/pcm-data#population_weighted_annual_mean_pm25_data for more detail.

FUTURE TRENDS

3.5.14. The use of cleaner vehicles has the potential to improve air quality in the future. However, the number of vehicles is also increasing. Future air quality across Norfolk could be addressed via a modal shift towards less polluting methods of transport, inclusive of active transport (e.g. cycling, walking etc.) thereby leading to a higher standard of air quality.

SUSTAINABILITY ISSUES

- There are a number of AQMAs around Norfolk that are designated as a result of air pollution from transport.
- The number of vehicles on county roads is expected to increase, which can affect air quality.

3.6 BIODIVERSITY

RELEVANCE TO TRANSPORT STRATEGIES

3.6.1. The transport strategies are less likely to directly affect areas that are of high landscape and biodiversity value, due to there being development policies in place to ensure the protection of these types of sites. However, the transport strategies may have potential to cause indirect impacts that may adversely affect these sites, in addition to having impacts on Norfolk's biodiversity outside these designated sites.

POLICY AND LEGISLATION

Local, Regional and National

- Biodiversity Supplementary Planning Guidance for Norfolk 2004
- Norfolk Biodiversity Action Plan 1999 (Norfolk Habitat & Species Action Plans)
- Wildlife and Countryside Act 1981
- UK Biodiversity Action Plan
- Biodiversity 2020: A strategy for England's wildlife
- Government Forestry and Woodland Policy Statement (2013)
- UK Post 2010 Biodiversity Framework (2012)
- Marine and Coastal Access Act 2009
- Wildlife and Countryside Act 1981
- The Conservation of Habitats and Species Regulations 2017

International

- Directive 79/409/ EEC on the Conservation of Wild Birds
- Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
- Ramsar convention on the Conservation on Wetlands of International Importance especially as waterfowl habitat 1971

SUMMARY OF CURRENT BASELINE

International Designations

3.6.2. The international designations that are located within Norfolk include RAMSAR Sites, Special Areas of Conservations (SACs) and Special Protection Areas (SPAs).

3.6.3. There are eight RAMSAR Sites within Norfolk; Table 3-7 below shows the number of RAMSAR Sites present within each district and borough council.

Table 3-7 - Norfolk RAMSAR Sites

Local Authority	No of RAMSAR Sites	Name of RAMSAR Sites	Description[40]
Breckland District Council	1	Redgrave & South Lopham Fens	Site straddles the Norfolk /Suffolk border
Great Yarmouth Borough Council	2	Breydon Water	Adjacent to and west of Great Yarmouth on the east coast of Norfolk
		Broadland (The Broads)	Located in eastern Norfolk, nearest town is Great Yarmouth
Kings Lynn and West Norfolk Borough Council	5	Ouse Washes	Lies in the counties of Cambridgeshire and west Norfolk
		North Norfolk Coast	Covers 40 km length of coast between Hunstanton and Weybour, nearest town is King's Lynn
		Dersingham Bog	Located in north-west Norfolk, nearest town is King's Lynn
		Roydon Common	Located in west Norfolk, nearest town is King's Lynn
		The Wash	Located on the east coast of England, nearest town is King's Lynn

3.6.4. There are 12 SACs within Norfolk; Table 3-8 below shows the number of SACs present within each district, borough and city council. Some of these sites are present in more than one district, borough and city council.

[40]Spreadsheet of UK Ramsar information. Available at: http://jncc.defra.gov.uk/page-2392 (Accessed January 2019)

Table 3-8 - Norfolk SAC Sites

Local Authority	No of SAC Sites*	Name of SAC Sites
Breckland District Council	4	Breckland
		Waveney & Little Ouse Valley Fens
		River Wensum
		Norfolk Valley Fens
Broadland District Council	3	The Broads
		River Wensum
		Norfolk Valley Fens
Great Yarmouth Borough Council	2	Winterton-Horsey Dunes
		The Broads
King's Lynn and West Norfolk Borough Council	4	Ouse Washes
		Roydon Common & Dersingham Bog
		The Wash & North Norfolk Coast
		Norfolk Valley Fens
North Norfolk District Council	7	Paston Great Barn
		Overstrand Cliffs
		North Norfolk Coast
		The Broads
		River Wensum
		The Wash & North Norfolk Coast
		Norfolk Valley Fens
Norwich City Council	1	River Wensum
South Norfolk District Council	3	The Broads
		River Wensum
		Norfolk Valley Fens

*Some of these sites are present in more than one district, borough or city council.

3.6.5. There are seven SPAs within Norfolk; Table 3-9 below shows the number of SPAs present within each district, borough and city council.

Table 3-9 - Norfolk SPA Sites

Local Authority	No of SPA Sites*	Name of SPA Sites
Breckland District Council	1	Breckland
Broadland District Council	2	Breydon Water
		Broadland
Great Yarmouth Borough Council	3	Breydon Water
		Broadland
		Great Yarmouth North Denes
King's Lynn and West Norfolk Borough Council	4	Ouse Washes
		North Norfolk Coast
		The Wash
		Breckland
North Norfolk District Council	3	North Norfolk Coast
		Broadland
		Great Yarmouth North Denes

*Some of these sites are present in more than one district, borough or city council.

National Designations

3.6.6. The national designations that are located within Norfolk include Areas of Outstanding Natural Beauty (AONB), Marine Conservation Zones (MCZ), Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR).

3.6.7. There is one AONB within Norfolk. This is the Norfolk Coast AONB and spans across the coast through Kings Lynn, North Norfolk and Great Yarmouth.

3.6.8. There is one MCZ within Norfolk. This is the Cromer Shoal Chalk Beds that is on the coast of North Norfolk District.

3.6.9. There are 163 SSSIs within Norfolk; Table 3-10 below shows the number of SSSIs present within each district, borough and city council.

Table 3-10 - Norfolk SPA Sites

Local Authority	No of SSSIs*
Breckland District Council	49
Broadland District Council	19
Great Yarmouth Borough Council	10
King's Lynn & West Norfolk Borough Council	30
North Norfolk District Council	48

Local Authority	No of SSSIs*
Norwich City Council	11
South Norfolk District Council	31

*Some of these sites are present in more than one district, borough or city council.

3.6.10. There are 22 NNRs within Norfolk; Table 3-11 below shows the number of NNRs present within each of the district and borough councils.

Table 3-11 - Norfolk NNR Sites

Local Authority	No of NNRs	Name of NNR
Breckland District Council	3	Brettenham Heath
		Foxley Wood
		Weeting Heath
Broadland District Council	1	Mid-Yare
Great Yarmouth Borough Council	5	Ant Broads and Marshes
		Bure Marshes
		Ludham and Potter Heigham Marshes
		Martham Broad
		Winterton Dunes
Kings Lynn and West Norfolk Borough Council	5	Dersingham Bog
		Holme Dunes
		Roydon Common
		Scolt Head Island
		The Wash
North Norfolk District Council	7	Blakeney
		Calthorpe Broad
		Hickling Broad
		Holkham
		How Hill
		Paston Great Barn
		Swanton Novers
South Norfolk District Council	1	Redgrave and Lopham Fen

Local Designations

3.6.11. The local designations that are located within Norfolk include Local Nature Reserves (LNR). There are 27 LNR's within Norfolk; Table 3-12 below shows the number of LNR's present within each district, borough and city councils.

Table 3-12 - Norfolk LNR Sites

Local Authority	No of LNRs	Name of LNR
Breckland District Council	3	Litcham Common LNR
		Barnham Cross Common LNR
		Great Eastern Pingo Trail LNR
Broadland District Council	2	Brundall Church Fen LNR
		South Walsham Fen LNR
Great Yarmouth Borough Council	1	Breydon Water LNR
North Norfolk District Council	6	Pigney's Wood LNR
		Felmingham Cutting LNR
		Hindringham Meadows LNR
		Knapton Cutting LNR
		Southrepps Common LNR
		Wiveton Down LNR
Norwich City Council	7	Mousehold Heath LNR
		Bowthorpe Marsh LNR
		Danby Wood LNR
		Earlham Park Woods LNR
		Lion Wood LNR
		Marston Marshes LNR
		Wensum Valley LNR
South Norfolk District Council	8	Roydon Fen LNR
		Smockmill Common LNR
		Bath Hills LNR
		Broome Heath LNR
		Dunston Common LNR
		Eaton Common LNR
		Toll's Meadow, Wymondham LNR
		Whitlingham Marsh LNR

The Broads

3.6.12. The Broads Authority is a local planning authority and a harbour and navigation authority. It is responsible for[41]:

- Conserving and enhancing the natural beauty, wildlife and cultural heritage of the Broads;
- Promoting opportunities for understanding and enjoyment of the special qualities of the Broads by the public; and
- Protecting the interests of navigation.

3.6.13. The Broads is an area of acknowledged national importance as highlighted above for landscape, biodiversity and recreational and navigational value. It is also a major contributor to the economy and quality of life in the Broadland, Norwich and South Norfolk areas. Policy 18 of the Joint core strategy for Broadland, Norwich and South Norfolk highlights that opportunities will be taken to make better use of the benefits of the Broads, and to support its protection and enhancement while ensuring no detrimental impact on the Broadland SPA, Broadland Ramsar and Broads SAC[42].

Biodiversity

3.6.14. Norfolk is an area of high biodiversity value and contains a variety of habitats and species which range from international and national status, to those of local importance. The County Council plays an important role in caring for Norfolk's biodiversity, through:

- hosting the Norfolk Biodiversity Partnership and Norfolk Non-native Species Initiative and supporting the Norfolk Biodiversity Information Service (Norfolk's Environmental Records Centre);
- developing the Norfolk Trails network to encourage people to explore and benefit from their local biodiversity;
- teaming up with Wild Anglia, the local nature partnership for Norfolk and Suffolk;
- managing NCC land carefully (such as the County Farms; Burlingham Woods; disused railway lines) to care for its wildlife interest; and
- being lead partner for a European project (RINSE) sharing expertise on the management of invasive alien species.

FUTURE TRENDS

3.6.15. Studies such as the 'State of Nature UK' report have shown that nationally biodiversity has been declining despite the prevalence of conservation efforts; approximately 12% of all species across the UK are at threat of extinction[43].

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[41] Broads Authority. Available at: https://www.broads-authority.gov.uk/about-us/how-we-work/legislation (Accessed May 2019)
[42] Joint Core Strategy for Broadland, Norwich and South Norfolk Adopted Document 2014. Available at: https://www.broadland.gov.uk/downloads/file/1310/joint_core_strategy_adopted_document_2014 (Accessed March 2019)
[43] Royal Society for the Protection of Birds (2016) The State of Nature report [online] Available at: http://www.rspb.org.uk/Images/StateOfNature2016_England_updated%2020%20Sept%20pages_tcm9-424986.pdf (Accessed January 2019)

3.6.16. Avoiding overall decline in biodiversity will be increasingly important as population grows and development gives rise to habitat loss, severance and other impacts.

SUSTAINABILITY ISSUES

- There are a wide range of statutory local, national and international sites designated for nature conservation in Norfolk, which may be affected by any increase in transport infrastructure development, particularly through indirect effects.
- The construction and operation of potential new transport infrastructure may have an effect on biodiversity including priority habitats, species and protected species.

3.7 CLIMATE CHANGE

RELEVANCE TO TRANSPORT STRATEGIES

3.7.1. The East of England and Norfolk contain a number of important national transport links which could be affected by climate change. Built structures such as bridges, promenades, pylons, roads and railway lines will become more vulnerable to higher winds, flooding, storm events and changes in soil moisture.

POLICY AND LEGISLATION

Local, Regional and National

- Tomorrow's Norfolk Today's Challenge- A Climate Change Strategy for Norfolk 2020
- The National Adaptation Programme- making the country more resilient to climate change 2013
- UK Renewable Energy Strategy 2009 and the National Renewable Energy Action Plan 2010
- Climate Change and Sustainable Energy Act 2006
- UK Low Carbon Industry Strategy 2009
- Low Carbon Transport- A Greener Future 2009
- UK Low Carbon Transition Plan 2009
- Climate Change Act 2008
- UK Climate Change Risk Assessment (2017)
- Climate Change – The UK Programme, House of Commons Environmental Audit Committee (2006)
- Norfolk County Council's Environmental Policy

International

- UN Framework Convention on Climate Change (1992)
- The Paris Agreement 2015

SUMMARY OF CURRENT BASELINE

3.7.2. The UK Climate Change Risk Assessment has highlighted three areas that are particularly pertinent to the East of England. These are water scarcity, sea level rise and flooding[44]. Currently, the East of England is the driest region in the Country, with an annual rainfall of 600mm (70% of the national average and less than 20% of the amount that falls in the Lake District). The East is a low-lying area with one-fifth of the region below sea level. There is also some of the fastest eroding coastline in Europe in Norfolk and Suffolk. An estimated 250,000 properties are at risk of flooding in the East of England which is around 8% of the total properties in the region; and an estimated 37,000 properties in Norfolk may be at risk of flooding during a rainfall event with a 1 in 200 annual chance of occurring[45].

Greenhouse Gas (GHG) Emission Levels

3.7.3. According to statistics[46] released by the Department for Business, Energy and Industrial Strategy, in 2017, UK emissions of the six GHGs covered by the Kyoto Protocol were estimated to be 460.2 million tonnes (Mt) carbon dioxide equivalent (MtCO2e). This represents a 2.7% decrease on the 2016 figure of 473.1 MtCO2e.

3.7.4. The most abundant GHG is carbon dioxide (CO2), which accounted for about 81% of the total UK greenhouse gas emissions in 2017, the latest year for which final results are available. In 2017, UK net emissions of CO2 were estimated to be 373.2 Mt. This was 3.3% lower than the 2016 figure of 385.8 Mt. Figure 3-3 shows UK emissions of GHGs and CO2 since 1990. Overall levels of the six Kyoto Protocol GHGs have decreased from 1990 levels.

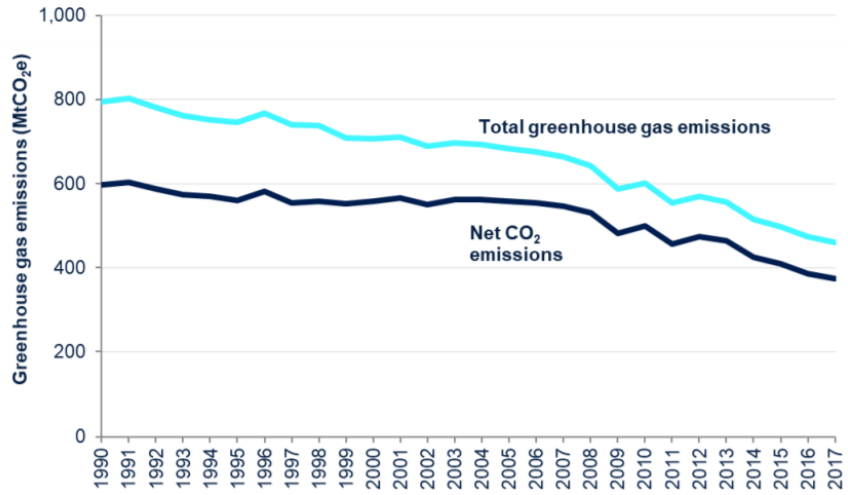
3.7.5. The decrease in emissions was mainly caused by reductions in the energy supply sector of 7.6% (9.2 MtCO2e) driven by the continued decrease in power station emissions due to change in the fuel mix for electricity generation, in particular a reduction in the use of coal. A decrease of 4.2% (2.9 MtCO2e) from the residential sector driven by a reduction in the use of natural gas for heating due to warmer weather in the first half of 2017. There was no change in emissions related to transport between 2016 and 2017 which remained at 27% (125.9 MtCO2e).

[44] A summary of climate changes risks for the East of England; to coincide with the publication of the UK Climate Risk Assessment 2012. Available at: http://www.greensuffolk.org/assets/Greenest-County/Adaptation/General/Summary-of-climate-change-risks-to-East-of-England.pdf (Accessed Jan 2019)

[45] Norfolk Local Flood Risk Management Strategy, Norfolk County Council 2015. Available at: https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/flood-and-water-management-policies/local-flood-risk-management-strategy (Accessed March 2019)

[46] 2017 UK Greenhouse Gas Emissions, Final Figures

Figure 3-3 - Total UK Greenhouse Gas emissions, 1990-2017 (MtCO2e)



Source: Table 1, Final UK greenhouse gas emissions national statistics 1990-2017 Excel data tables

3.7.6. On a regional scale, the latest available data released for 2016 shows that total end user CO2 emissions in the East of England region is 33.0 MtCO2, with 5.4 tCO2 per capita[47]. This represents a significant decrease in the region when compared to figures produced in 2005, which showed 45 MtCO2 total emissions and 8.1 tCO2 per capita.

3.7.7. In comparison with regional figures, Norfolk's CO2 emission levels are 5052.8 kilo ton (kt) CO2 total emissions at 5.7 tCO2 per capita in 2016. In line with regional figures, CO2 emission levels have reduced from 2005 levels of 6877.5 kt CO2 total emissions and 8.4 tCO2 per capita[48].

[47] Local Authority CO2 Emissions Estimates 2016. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/719182/Local_Authority_CO2_Emissions_Statistical_Release_2016.pdf (Accessed December 2018)

[48] 2005 to 2016 UK local and regional CO2 emissions technical report. https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016 (Accessed December 2018)

Norfolk's Capabilities to Reduce Emissions

3.7.8. In Norfolk there are a number of initiatives that promote the reduction of carbon emissions. Reepham in Norfolk was one of the first winners of the governments Low Carbon Communities Challenge (LCCC). The LCCC was a two-year programme to provide financial and advisory support to 22 test bed communities. Its aim was to fund, and learn from, community-scale approaches to the delivery of low carbon technologies and engagement activities[49]. Reepham in Norfolk is the only community in the East of England to be chosen as a winner of the LCCC[50].

3.7.9. Norfolk County Council is a member of the CIVITAS European Project, which is a network of cities for cities dedicated to cleaner, better transport in Europe and beyond[51]. Norfolk has a Sustainable School Travel Strategy and 100% of schools within Norfolk have an active travel plan[52].

3.7.10. In 2016, 5,052.8 kilo tonnes (5.1 Mt) of CO2 emissions were released in Norfolk, which represented approximately a 9% decrease since 2015. In 2016, the total emissions in kt CO2 per sector were as follows[53] :

- 1,442.6kt from domestic sources;
- 1,728.7kt from industrial and commercial sources; and
- 1,973.2kt from road transport.

Table 3-13 shows transport emissions for each local authority in Norfolk between 2015 and 2016.

Table 3-13 - Transport CO_2 Emissions for Local Authorities in Norfolk

Local Authority	Year	Road Transport (A Roads) kt CO_2	Road Transport (Motorways) kt CO_2	Road Transport (Minor Roads) kt CO_2	Diesel Railways kt CO_2	Transport (Other) kt CO_2	Total Transport kt CO_2
Breckland District Council	2015	233.5	-	141.7	3.2	2.1	380.5
	2016	241.7	-	144.8	3.2	2.00	391.8
Broadland District Council	2015		-	94.6	1.7	26.6	
	2016		-	97.9	1.6	27.8	

[49] Low Carbon Communities Challenge Evaluation Report. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48458/5788-low-carbon-communities-challenge-evaluation-report.pdf (Accessed January, 2019)
[50] Reepham Low Carbon Communities Challenge. Available at: https://www.reephamchallenge.org/decc (Accessed January 2019)
[51] CIVITAS Cleaner and better transport in cities. Available at: https://civitas.eu/hr (Accessed January 2019)
[52] Norfolk's Transport Plan for 2026. Available at: https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/local-transport-plan (Accessed January, 2019)
[53] Department for Business, Energy and Industrial Strategy (2018) 2005 to 2016 UK local and regional CO2 emissions – data tables

Local Authority	Year	Road Transport (A Roads) kt CO_2	Road Transport (Motorways) kt CO_2	Road Transport (Minor Roads) kt CO_2	Diesel Railways kt CO_2	Transport (Other) kt CO_2	Total Transport kt CO_2
Great Yarmouth Borough Council	2015 2016		- -	51.6 52.2	0.4 0.4	19.8 20.7	
Borough Council of King's Lynn & West Norfolk	2015 2016		- -	153.5 156.9	0.1 0.1	10.8 11.2	
North Norfolk District Council	2015 2016		- -	120.0 122.7	1.1 1.1	24.8 25.9	
Norwich City Council	2015 2016		- -	53.5 54.0	3.5 3.5	9.4 9.6	
South Norfolk District Council	2015 2016		- -	134.1 139.	5.0 5.0	27.1 28.3	

3.7.11. Total CO_2 emissions from transport were highest in South Norfolk District Council, which accounted for 424.6 kt CO_2 in 2016, and the lowest emissions were in Norwich City Council with 132.3 kt CO_2. Although total CO_2 is falling it is starting to rise from vehicular sources; besides Norwich City Council all local authorities showed an increase in their total emissions related to transport between 2015 and 2016.

3.7.12. There are emissions related to industrial sources around Norfolk. These are listed in Table 3-14.

Table 3-14 - Emissions related to industrial sources

Local Authority	Source[54]	CO_2 emissions (tonnes) in 2016
Broadland District Council	British Sugar plc plant in Cantley	99,990
Borough Council of Kings Lynn and West Norfolk	Phil Membranes Ltd manufacturer in Kings Lynn	10,464
	Palm Paper Ltd at Saddlebow Paper Mill	15
	National Grid Gas Plc in Kings Lynn	24
	Ministry of Defence at RAF Marham	2,159
	British Sugar Plc in Wissington	10,016
North Norfolk District Council	Bacton Interconnector (UK) Ltd	1
Norwich City Council	Briar Chemicals Ltd	296
	Norwich District Heating and CHP University of East Anglia	38
South Norfolk District Council	Norfolk and Norwich University Hospital, Serco Services	165

FUTURE TRENDS

3.7.13. The key challenges for Norfolk include increased flood risk, water scarcity and sea level rise. These challenges are likely to affect human, health during increasingly frequent extreme weather events, the ability of Norfolk's infrastructure to cope with changing demand and use and the organisational resilience to climate change and changes to natural systems.

3.7.14. The UKCP18 national climate projections[55] for the United Kingdom, predict that by 2080:

- All areas of the UK are projected to experience warming;
- Warming is greater in the summer than the winter;
- Future rise depends on the amount of greenhouse gases the world emits;
- The lowest scenario is compatible with aims to limit global warming since pre-industrial levels to below 2°C; and
- The highest scenario will likely require significant further adaptation.

3.7.15. There are a number of future implications for these climate projections including:

[54] National Atmospheric Emissions Inventory. CO2 interactive maps. Available at: http://naei.beis.gov.uk/laco2app/ (Accessed March 2019)
[55] UKCP18 National Climate Projections. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-overview-slidepack.ff-compressed.pdf (Accessed April 2019)

- increases in heat-related deaths and admissions with acute heat stress in summer months and other sun exposure disorders (e.g. skin cancer);
- increased coastal and flood-plain flood events leading to damage to property and disruption
- to economic activity;
- water shortages;
- permanent coastal land loss leading to relocation of coastal communities inland;
- higher incidence of damage to transportation, utilities and communications infrastructure caused by an increase in the number of extreme weather events (e.g. heat, high winds and flooding);
- decrease in crop yields; and
- increase in tourism to Norfolk.

3.7.16. The future trends for transport could see the introduction of new technologies and Electronic Vehicles that may contribute to a reduction of CO_2 emissions.

3.7.17. Potential new transport schemes such as improvements to bus services through introduction of bus lanes, priority over other traffic and high frequency of services and improvements to the current road network can also benefit Norfolk in terms of reducing CO_2 emissions.

SUSTAINABILITY ISSUES

- Climate change could have potential impacts on transport infrastructure, particularly in Norfolk's coastal areas.
- Transport is one of the largest contributors to greenhouse gas emissions in Norfolk.
- Due to the rural nature of Norfolk and few public transport services in these rural areas there is greater reliance on private cars. There is opportunity to provide more sustainable modes of travel in relation to greenhouse gases or promote use of alternative fuels such as electric vehicles.

3.8 COMMUNITY AND ACCESS

RELEVANCE TO TRANSPORT STRATEGIES

3.8.1. Transport has a role in providing access to education and services at all levels. It enables social interaction, combatting loneliness particularly in rural areas. The provision of transport services and infrastructure also needs to reflect housing demand and provision.

POLICY AND LEGISLATION

Local, Regional and National

- Breckland Housing and Homelessness Strategy 2017-2021
- Broadland District Council Housing Allocations Policy 2015
- Great Yarmouth Borough Council Housing Strategy 2018-2023
- King's Lynn & West Norfolk Borough Council Affordable Housing Policy 2011
- North Norfolk Housing Strategy 2016-2020
- Norwich City Council Housing Strategy 2013-2018
- South Norfolk Housing Strategy 2016-2019
- Lifetime homes, lifetime neighbourhoods- A national strategy for housing in an Aging Society (2008)
- Building Schools for the Future 2010
- Government Construction Strategy 2016-2020

- The Housing Act 2004
- Greater Norwich Local Plan (emerging)

SUMMARY OF CURRENT BASELINE

Education

3.8.2. A lower proportion of individuals (aged 16 and over) in Norfolk had NVQ4 and above qualifications (degree, higher degree and professional qualifications), compared with the average across England (28.8% and 35.9% respectively). Norfolk has a higher proportion of individuals with no qualifications, compared with the average across England (26.3% and 22.5% respectively)[56].

Index of Multiple Deprivation

3.8.3. The English Indices of Deprivation 2015 update those published in 2010. They measure relative levels of Deprivation for 153 upper tier local authorities, 326 lower tier local authorities, Clinical Commissioning Groups and 32,844 Lower- layer Super Output Areas (LSOAs).

3.8.4. Norfolk has been ranked 88th most deprived upper tier local authority out of the 152-upper tier local authorities in England. 7.9% of the LSOAs (neighbourhoods) in Norfolk are in the most deprived 10% nationally[57]. This can be seen broken down to the population and deprivation pointers in the districts of Norfolk in Table 3-15 below.

Table 3-15 - Population in districts of Norfolk living in the most deprived 10% of areas nationally

Local Authority	Number of LSOAs in the nationally most deprived 10%	% population living in the nationally most deprived 10%	Population living in the nationally most deprived 10%	Population (ONS 2013 mid-year estimate)	Percentage of children living in low income families (2016)	Percentage of households experiencing fuel poverty (2016)	Homeless and in priority need 1,000 households (2017-2018)
Breckland District Council	1	1.7%	2,273	132,587	13%	10%	1
Broadland District Council	0	0.0%	0	125,499	9%	9%	2
Great Yarmouth	13	23.1%	22,572	97,796	20%	13%	3

[56] 2011 Census- Qualification gained. Available at: http://www.norfolkinsight.org.uk/dataviews/tabular?viewId=236&geoId=54&subsetId=12 (Accessed January 2019)

[57] Norfolk County Council. The English Indices of Deprivation 2015 – A County summary, LSOA analysis and comparison of change.

Local Authority	Number of LSOAs in the nationally most deprived 10%	% population living in the nationally most deprived 10%	Population living in the nationally most deprived 10%	Population (ONS 2013 mid-year estimate)	Percentage of children living in low income families (2016)	Percentage of households experiencing fuel poverty (2016)	Homeless and in priority need 1,000 households (2017-2018)
Borough Council							
King's Lynn & West Norfolk Borough Council	7	8.5%	12,614	148,758	15%	11%	1
North Norfolk District Council	0	0.0%	0	102,043	14%	11%	3
Norwich City Council	8	9.3%	12,649	135,893	22%	12%	1
South Norfolk District Council	0	0.0%	0	127,570	10%	10%	1
Norfolk County Council	29	5.8%	50,108	870,146	15%	11%	2

Housing

3.8.5. Provision of transport services and infrastructure needs to reflect housing demand and provision. The main challenges for housing in Norfolk are[58]:

- Delivering housing and employment growth;
- Continuing to improve the quality of council homes;
- Reducing the number of privately owned homes in poor condition;
- Understanding the impact of welfare and social housing reforms on housing need and responding with the right balance of housing tenure, types, size and affordability;
- Improving access to the private rented sector;
- Helping people to manage the effects of welfare reform;

[58] Norfolk Housing Strategy 2013-2018 Available at: https://www.norwich.gov.uk/download/downloads/id/1526/housing_strategy.pdf (Accessed March 2019)

- Reducing the number of people in fuel poverty;
- Supporting people to remain living independently;
- Tackling and preventing homelessness; and
- Meeting specialist housing needs.

Breckland

3.8.6. Breckland District Councils statement of five year housing land supply released in March 2017 sets out the year on year expected delivery from different components of supply. These components include: large sites with planning permission, small sites with planning permission, windfall development and allocations without planning permission. The statement estimates a total deliverable supply of housing in Breckland from 2017/18 to 2021/22 being 3,605 units[59]. However, the council acknowledges it is unable to currently demonstrate a five year land supply for these units. The emerging Local Plan is the key resolution of the current position, as a number of allocations for housing development will be made on land that would not currently be considered suitable.

Broadland, Norwich and South Norfolk

3.8.7. Policy 4 of the Joint Core Strategy for Broadland, Norwich and South Norfolk[60] sets out the housing allocations within these districts. The allocations are divided into those within the Norwich Policy Area (NPA) and those outside the NPA. The NPA is a longstanding local planning area used to ensure that the growth needs arising from the Norwich urban area are addressed as close to it as possible. The total number of allocations to 2026 within the NPA are 21,000 and outside the NPA are between 1,730 and 2,660.

3.8.8. There is an emerging Greater Norwich Local Plan which is being produced by Broadland District Council, Norwich City Council and South Norfolk Council, working together with Norfolk County Council through the Greater Norwich Development Partnership. The plan aims to help with meeting local housing and economic growth needs whilst protecting and enhancing the environment.[61]

[59] Breckland Statement of Five Year Housing Land Supply. Available at: https://www.breckland.gov.uk/media/3908/5-Year-Land-Supply-July-2017/pdf/Statement_of_Five_Year_Housing_Land_Supply_31.03.17_FINAL.pdf?m=636391656139970000 (Accessed March 2019)
[60] Joint Core Strategy for Broadland, Norwich and South Norfolk Adopted Document 2014. Available at: https://www.broadland.gov.uk/downloads/file/1310/joint_core_strategy_adopted_document_2014 (Accessed Jan 2019)
[61] Greater Norwich Local Plan. Available at: http://www.gnlp.org.uk/ (Accessed May 2019)

Great Yarmouth

3.8.9. Great Yarmouth Borough Councils Local Plan Part 2 Development Management Policies and Site Allocations document is currently in preparation. The Interim Housing Land Supply Policy[62] aims to proactively manage the delivery of housing sites in the borough (outside of the Broads Authority Executive Area) by giving guidance as to which sites might be appropriate for development in the short term until the emerging Development Policies and Site Allocations Local Plan Document is adopted.

Kings Lynn and West Norfolk

3.8.10. The Strategic Housing Market Assessment - update in June 2014 projected that in King's Lynn & West Norfolk housing growth between 2013 and 2028 will be around 670 to 690 households per year[63].

North Norfolk

3.8.11. North Norfolk District Council prepares Five Year Housing Supply Statements annually to help predict the amount of housing that will be built in the district over the next five years. The Interim Statement: Five-Year Supply of Housing Land & Housing Trajectory 2018 – 2023 estimates a total of 2,147 housing requirement during this time frame[64].

FUTURE TRENDS

3.8.12. The number of households and demand for dwellings across the county is likely to increase. Job growth in Norfolk is targeted to increase by 55,000 for the period 2001-2021. Planned housing and employment growth will require improvements in sustainable travel modes, as well as improved infrastructure to support this growth. Management of future housing development in Norfolk will be critical to the delivery of the transport strategies.

3.8.13. A key issue for developing skills in Norfolk is getting access to education and learning, whether this is at an institution such as school or college or work base learning such an apprenticeship. New educational facilities are important for Norfolk's ambitions to raise the levels of skills and education attainment to be realised. However, they have also added additional pressures to the transport systems with students and staff travelling to the sites.

SUSTAINABILITY ISSUES

3.8.14. Sustainability issues in relation to community and access are as follows:

[62] Great Yarmouth Borough Council, Interim Housing Land Supply. Available at: https://www.great-yarmouth.gov.uk/CHttpHandler.ashx?id=1216&p=0 (Accessed March 2019)
[63] Housing Strategy, Policies and Information. Available at: https://www.west-norfolk.gov.uk/info/20001/housing/269/housing_strategy_policies_and_information (Accessed March 2019)
[64] North Norfolk Interim Statement: Five-year Supply of Housing Land & Housing Trajectory 2018-2023. Available at: https://www.north-norfolk.gov.uk/media/4301/interim-statement-of-five-year-supply-of-housing-land-2017-2018.pdf (Accessed March 2019)

- Access to reliable, affordable and safe transport is important for all age groups for social interaction, helping to avoid loneliness and isolation.
- Public transport plays an essential role for those who do not have use of a car.
- There may be inequalities in access to healthcare, jobs and other services.
- An increase in population and new housing will increase demand for local transport services.
- Growth of education facilities, as well as students in apprenticeships will increase pressure on transport networks.
- Access to education and other facilities is important, particularly in deprived areas.

3.9 CULTURAL HERITAGE AND THE HISTORIC ENVIRONMENT

RELEVANCE TO TRANSPORT STRATEGIES

3.9.1. The increase of population and development may lead to an increase in traffic. These factors in combination have the potential to impact upon the historic environment, including heritage assets both directly and indirectly.

POLICY AND LEGISLATION

Local, Regional and National

- Ancient Monuments and Archaeological Areas Act 1979
- Planning (Listed Building and Conservation Areas) Act 1990
- Government's Statement on the Historic Environment for England 2010

International

- UNESCO Convention Concerning the Protection of the World Culture and Heritage (1972)
- European Landscape Convention (2000)
- The Convention for the Protection of the Architectural Heritage of Europe (1987)
- The European Convention on the Protection of Archaeological Heritage (1995)

SUMMARY OF CURRENT BASELINE

3.9.2. The term 'cultural heritage' covers buried archaeological remains which allow the study of past societies through the medium of material culture and built heritage which is buildings and structures of heritage interest. Transport can affect the cultural heritage of an area through the potential development of new infrastructure.

Norfolk's Historic Landscape and grant schemes

3.9.3. Norfolk's historic landscape consists of coastal, heathland and woodland landscapes that are diverse in nature which have been altered by settlement. There are a number of heritage grant schemes supported by NCC and other organizations. Project examples include the Norman Connections that bring together castles and other heritage sites in England and Normandy with a shared Norman history in a joint interpretation and promotion project supported by the Interreg Iva France (Channel) England programme[65].

Designated Heritage Assets

3.9.4. For Norfolk as a whole there are approximately: 289 conservation areas, 10,866 listed buildings,446 Scheduled Monuments and 51 Parks and Gardens[66]. These are split into each respective district in Table 3-16. There are no registered battlefields in Norfolk.

3.9.5. Conservation areas are designated for their special architectural and historic interest. They are normally centred on listed buildings and groups of other buildings, open space, or historic street patterns. Planning legislation requires that special attention shall be paid to the desirability of preserving or enhancing the character or appearance of the conservation area.

3.9.6. Listing a building marks and celebrates a building's special architectural and historic interest and brings it under the consideration of the planning system, so that it can be protected for future generations[67].

3.9.7. Archaeological sites and monuments which meet the test of national importance may be scheduled. A Schedule (as we know it today) has been kept since 1913 of monuments considered to be of national importance by the government, although heritage protection of archaeological sites started as far back as 1882[68].

3.9.8. Historic parks and gardens are a fragile and finite resource: they can easily be damaged beyond repair or lost forever. The emphasis of the Register is on gardens, grounds and other planned open spaces, such as town squares. The majority of sites registered are, or started life as, the grounds of private houses, but public parks and cemeteries form important categories too[69].

[65] Norfolk County Council- Arts, heritage and tourism. Available at: https://www.norfolk.gov.uk/business/grants-and-funding/european-funding/funding-by-theme/arts-heritage-and-tourism (Accessed January 2019)
[66] Historic England- Listings. Available at: https://historicengland.org.uk/listing/the-list/advanced-search?searchType=nhleadvancedsearch (Accessed January 2019)
[67] Historic England- Listed Buildings. Available at: https://historicengland.org.uk/listing/what-is-designation/listed-buildings/ (Accessed April 2019)
[68] Historic England- Scheduling Selection Guides. Available at: https://historicengland.org.uk/listing/selection-criteria/scheduling-selection/ (Accessed April 2019)
[69] Historic England- Parks and Gardens. Available at: https://historicengland.org.uk/listing/what-is-designation/registered-parks-and-gardens/ (Accessed April 2019)

3.9.9. The Local Authorities within Norfolk have recognised the importance of their built heritage; this is reflected in development plans which contain a number of policies and planning restrictions in conservation areas. The proposals of any new transport infrastructure impinging on conservation areas and listed buildings are expected to respect and enhance their surroundings in terms of appearance.

Table 3-16 - Number of conservation areas, listed buildings and scheduled monuments within each district

Local Authority	Conservation Areas	Listed Buildings	Scheduled Monuments	Parks and Gardens
Breckland District Council	55	1585	135	9
Broadland District Council	21	1018	23	4
Great Yarmouth Borough Council	19	429	14	1
King's Lynn & West Norfolk Borough Council	44	1544	130	6
North Norfolk District Council	81	2309	83	18
Norwich City Council	17	1033	25	9
South Norfolk District Council	52	2948	36	7

3.9.10. Designated heritage assets will be mapped and presented in the SA/SEA report where they are relevant to any specific proposals arising from Transport Strategies.

Non-Designated Heritage Assets

3.9.11. Non-designated and unknown heritage assets may be present around Norfolk which may be of high value. These include, but are not limited to, locally listed buildings. The Norfolk Monuments Management project focuses on historic monuments that have no legal protection. Support is targeted on activities that have potential to harm heritage assets, including agricultural, drainage and forestry operations and heathland, river and pond/moat restoration[70].

[70] Norfolk Heritage Explorer. The Norfolk Monuments Management Project. Available at: http://www.heritage.norfolk.gov.uk/monuments-management (Accessed April 2019)

FUTURE TRENDS

3.9.12. Designated historical sites in Norfolk have statutory protection, so it is likely that the future baseline will look fairly similar to that of the present. However, increasing, risk from development can have an impact on the setting of assets, including historic landscapes from visual intrusion or aspects such as traffic, lighting and noise. Development can also result in the loss of undesignated or unknown heritage.

SUSTAINABILITY ISSUES

- Norfolk has a large amount of heritage assets around the county, in the case of buried archaeology some of these may be unknown and their significance may be affected by the potential development of new transport infrastructure.
- New and/or updated transport infrastructure in the vicinity of designated heritage assets such as scheduled monuments and listed buildings, can have an impact on their setting.
- Ancillary features of transport infrastructure, inclusive of marked parking bays, yellow lines etc. can adversely impact upon the setting of the historic environment.
- The character and quality of Norfolk's historic landscape and townscapes can be eroded by the construction and operation of transport infrastructure.

3.10 ECONOMY AND EMPLOYMENT

RELEVANCE TO TRANSPORT STRATEGIES

3.10.1. Access to jobs is vital for the economy, there is a need for resilient transport infrastructure to provide links to places of work.

POLICY & LEGISLATION

Local, Regional and National

- Sustainable Tourism in the Broads 2016 - 2020
- Great Yarmouth Tourism Strategy 2013-2018
- North Norfolk District Council Economic Growth Strategy and Action Plan
- Strong Roots: New Growth Norfolk Rural Strategy 2017-2020
- Norfolk Infrastructure Delivery Plan 2018-2028
- New Anglia LEP's Norfolk and Suffolk Economic Strategy
- Cambridge Norwich Tech Corridor (A11)
- The Regional Economic Strategy for the East of England 2008-2031
- New Anglia Strategic Economic Plan 2012-2026
- Norfolk and Suffolk Economic Strategy 2017
- A Strategic Framework for Tourism 2010-2020

SUMMARY OF CURRENT BASELINE

Employment

3.10.2. In Norfolk, the main employment centres are in Norwich, Great Yarmouth and King's Lynn, with a majority of the smaller employment centres situated in the market towns.

3.10.3. Norfolk has a higher proportion of individuals who are economically active, compared with the national average (78.9% and 78.4% respectively)[71].

3.10.4. As of 2016, job density in Norfolk (0.82) is very similar to that of East England (0.83) and Great Britain as a whole (0.84). Table 3-17 outlines employee jobs by industry within Norfolk and the seven districts. The data shows that the majority of people across Norfolk are employed in the Wholesale and Repair Trade Industry (Sector G) and the Human Health and Social Work Activities Industry (Sector Q). Across the districts, the proportion of people in the Manufacturing Industry (Sector C) is particularly high in Breckland.

Table 3-17 - Employee Jobs by Industry Table[72]

Industry Sector	Breckland	Broadland	Great Yarmouth	King's Lynn And West Norfolk	North Norfolk	Norwich	South Norfolk	Norfolk
B: Mining and Quarrying	0	1	0.8	0.2	0.5	0	0.2	0.3
C: Manufacturing	17.8	9.4	8.1	13	12.5	5.4	6.7	9.7
D: Electricity, Gas, Steam and Air Conditioning Supply	0.1	0	0.2	0.2	0.1	0.2	0.2	0.2
E: Water Supply; Sewerage, Waste Management and Remediation Activities	0.9	0.4	1.1	0.7	0.4	0.2	1.3	0.7
F: Construction	6.7	7.3	4.1	6.5	4.7	3.3	5.8	5.3
G: Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	17.8	16.7	16.2	18.5	18.8	17.4	13.5	17.2
H: Transportation and Storage	5	3.1	3.4	3.2	3.1	3.8	2.4	3.6
I: Accommodation and Food Service Activities	6.7	7.3	13.5	9.3	14.1	7.6	5.8	8.6
J: Information and Communication	1.3	2.1	1.1	0.8	1.1	3.3	1.9	1.9
K: Financial and Insurance Activities	0.9	12.5	0.8	2.3	0.9	4.3	1	3.6

[71] Office for National Statistics. Labour Market Profile- Norfolk
[72] Nomis Labour Market Profile -Norfolk. Available at: https://www.nomisweb.co.uk/reports/lmp/la/1941962835/report.aspx?c1=2013265926&c2=2092957698 (Accessed January 2019)

Industry Sector	Breckland	Broadland	Great Yarmouth	King's Lynn And West Norfolk	North Norfolk	Norwich	South Norfolk	Norfolk
L: Real Estate Activities	1.1	0.9	0.6	1.3	1.4	1.9	1.3	1.2
M: Professional, Scientific and Technical Activities	6.7	6.2	8.1	4.2	5.5	6.5	7.7	6.1
N: Administrative and Support Service Activities	7.8	5.2	4.7	6.5	3.9	12	7.7	7.8
O: Public Administration and Defence; Compulsory Social Security	3.3	2.6	2.4	4.6	3.1	5.4	3.4	3.9
P: Education	7.8	7.3	9.5	8.3	9.4	12	7.7	9.1
Q: Human Health and Social Work Activities	13.3	14.6	21.6	16.7	14.1	9.8	28.8	16.1
R: Arts, Entertainment and Recreation	2.2	2.1	4.7	2.8	4.7	2.7	1.9	3
S: Other Service Activities	1.8	1.2	1.2	1.5	2.5	2.4	1.9	1.9

Economy

3.10.5. The Norfolk economy is characterised by stable employment and growth rates but lower than average productivity and wages. The economy is characterised by a high proportion of small businesses as shown in Table 3-18.

Table 3-18 - Businesses by size in Norfolk (2018)

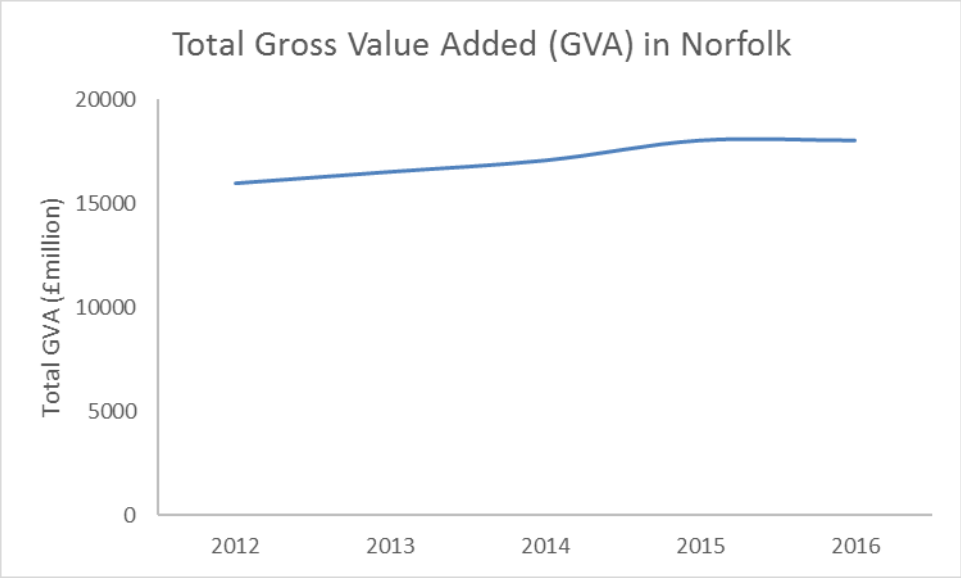
Local Authority	Large (250+)	Medium (50-249)	Small (10-49)	Micro (0-9)
Broadland	5	60	420	4255
Great Yarmouth	5	50	325	2450
Mid Norfolk	15	45	350	3800
North Norfolk	5	35	350	3115
North West Norfolk	15	55	375	2980
Norwich North	10	50	265	2060
Norwich South	35	100	440	3100
South Norfolk	15	65	320	4130
South West Norfolk	10	70	375	3530

Local Authority	Large (250+)	Medium (50-249)	Small (10-49)	Micro (0-9)
East of England	960	3960	22090	236890
England	8,990	36,050	199,135	2,073,885

3.10.6. When broken down by industry sector, Norfolk as a whole has a broadly similar composition of employment to England and Wales.

3.10.7. The total size of Norfolk's economy from 2012- 2015 is shown in Figure 3.4. Gross Value Added (GVA) is a measure of the increase in value of the economy due to the production of goods and services. The data shows that GVA in Norfolk has increased from approximately £16.9 billion in 2012 to £18.5 billion in 2015.

Figure 3-4 - Total Gross Value Added (GVA) in Norfolk[73]



3.10.8. In 2017, Norfolk's tourism industry hit a record of £3.25bn, this is attributed to[74]:

- 7% increase in the number of visitors in 2017;
- 3% increase in the value of the tourism industry from £3.15bn;
- An increase in the number of overnight visits by 7% and number of staying nights increasing by 9%; and

[73] Office for National Statistics 2016. Regional gross value added UK: 1998- 2016. Available at: https://www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedbalanceduk/1998to2016 (Accessed January 2019)
[74] Economic Impact of Tourism for Norfolk 2017. Available at: https://www.visitnorfolk.co.uk/Tourism-info-and-stats.aspx (Accessed January 2019)

- 3% increase in the number of jobs in the county's tourism sector which accounts for 18.4% of all employment.

FUTURE TRENDS

3.10.9. Norfolk's economy is growing which is driven by certain sectors of the economy. These key sectors/ industrial clusters can be summarised as follows[75]:

- Agriculture and Food Processing – Breckland, King's Lynn & West Norfolk, North Norfolk, Greater Norwich
- Tech/digital Industries – Greater Norwich
- Offshore Energy – Great Yarmouth
- Engineering & manufacturing – King's Lynn & West Norfolk, Breckland, Greater Norwich, Great Yarmouth
- Financial Services - Greater Norwich
- Health and Life Sciences – Greater Norwich
- Tourism – The Broads, The Brecks, Great Yarmouth, North Norfolk, King's Lynn & West Norfolk, Greater Norwich

Breckland

3.10.10. The growth of the Breckland population has led to growth in the working age population. Jobs growth has been very high at 23.1% for the period from 1991 to 2004 compared with Norfolk at 11.3%. It will be a significant challenge to continue this rate over the plan period, with at least 6,000 net new jobs forecast for the District up to 2021[76].

Greater Norwich (Norwich, Broadland, South Norfolk)

3.10.11. The Joint Core Strategy for Broadland, Norwich and South Norfolk[77] sets out that the local economy will be developed in a sustainable way to support jobs and economic growth both in urban and rural locations. This will:

- provide for a rising population and develop its role as an engine of the wider economy;
- facilitate its job growth potential with a target of at least 27, 000 additional jobs in the period 2008-2026; and

[75] Norfolk Strategic Framework- Shared Spatial Objectives for a Growing County. Available at: https://norfolk.citizenspace.com/consultation/norfolk-strategic-framework/results/20171220-norfolk-strategic-framework-final.pdf (Accessed January 2019)
[76] Breckland Adopted Core Strategy and Development Control Policies Development Plan Document. Available at: https://www.breckland.gov.uk/media/1574/Core-Strat-Final-20-03-2012/pdf/Core_Strat_Final_20_03_2012.pdf?m=635948423729470000 (Accessed March 2019)
[77] Joint Core Strategy for Broadland, Norwich and South Norfolk Adopted Document 2014. Available at: https://www.broadland.gov.uk/downloads/file/1310/joint_core_strategy_adopted_document_2014 (Accessed Jan 2019)

- increase the proportion of higher value, knowledge economy jobs while ensuring that opportunities are available for the development of all types and levels of jobs in all sectors of the economy and for all the workforce.

Great Yarmouth

3.10.12. Great Yarmouth Borough Councils Local Plan Part 2 Development Management Policies and Site Allocations document is currently in preparation. It will set out detailed planning policies and allocate sites for different uses such as employment. The Employment Land Update (2012)[78] shows that over the last ten years (2001-2011) the average annual employment land take-up has been 2.3 hectares per year. If this trend were to continue throughout the plan period then a total of 39.1 hectares would be needed to meet this level of demand.

Kings Lynn and West Norfolk

3.10.13. The local plan is currently undergoing consultation, the new plan sets out a strategy and detail for delivering growth in the borough. It identifies where development should be located and how it should be delivered up to 2036. The Local Development Framework- Core Strategy[79] states that the local economy will be developed sustainably:

- to facilitate job growth in the local economy, delivering the regional spatial strategy target of 5,000 additional jobs by 2021;
- job growth will be achieved through the provision of employment land as well as policies for tourism, leisure, retail and the rural economy; and
- to increase the proportion of higher Skilled jobs while ensuring that opportunities are available for the development of all sectors of the economy and workforce.

North Norfolk

3.10.14. The Council is preparing a new Local Plan, this document will guide development decisions in North Norfolk for the period 2016 to 2036 and is anticipated to be completed in late 2020.

3.10.15. Policy SS 5 Economy of the existing North Norfolk Core Strategy[80] states that at least 4,000 additional jobs will be provided between 2001 and 2021 in line with the indicative targets set out in the East of England Plan. Job growth will be achieved via policies for tourism, retail and the rural economy as well as provision of employment land.

[78] Great Yarmouth Borough New Local Plan, Employment Land Update November 2012. Available at: https://www.great-yarmouth.gov.uk/CHttpHandler.ashx?id=1246&p=0 (Accessed March 2019)
[79] Kings Lynn and West Norfolk Borough Council Local Development Framework- Core Strategy. Available at: https://www.west-norfolk.gov.uk/download/downloads/id/712/core_strategy_document.pdf (Accessed March 2019)
[80] North Norfolk Local Development Framework- Core Strategy. Available at:https://www.north-norfolk.gov.uk/media/1370/3-_core_strategy_-incorporating_development_control_policies-_adopted_2008_-updated_2012.pdf#page=2 (Accessed March 2019)

3.10.16. The Norfolk and Suffolk Economic Strategy (2017)[81] aims for a growth in businesses, an inclusive economy with highly skilled workforce and the bringing together of public and private sector partnerships. This will be achieved through actions and investment in priority places and themes.

3.10.17. The Local Industrial Strategy is the next stage in the evolution and implementation of the Norfolk and Suffolk Economic Strategy. It will build on the Economic Strategy but be a deeper and more focused piece of work. It will look in more detail at Norfolk and Suffolk's competitive strengths and the high growth sectors which are: clean energy, agri-food and ICT/digital. It is due to be published in Autumn 2019[82].

SUSTAINABILITY ISSUES

3.10.18. The sustainability issues relating to the economy are as follows:

- Transport is important for access to employment centre, particularly town centres.
- The number of small businesses within Norfolk highlight the need for transport services which can support growth.
- Important sectors within Norfolk include agricultural, forestry and fisheries and tourism.
- To sustain economic growth and enable well paid employment, provision of reliable and accessible transport networks are needed.

3.11 HEALTH

RELEVANCE TO TRANSPORT STRATEGIES

3.11.1. Transport can play a key role in health, for example by encouraging active lifestyles. It can also impact health through road safety, air quality (covered in section 3.5 above), noise (covered in section 3.13 below) and changes to landscape (covered in section 3.12 below).

POLICY AND LEGISLATION

Local, Regional and National

- Norfolk's Joint Strategic Needs Assessment
- Norfolk Ambition- The sustainable community strategy for Norfolk, 2003-2023
- Norfolk and Waveney Joint Health and Wellbeing Strategy 2018-2022
- Fair Society, Healthy Lives: The Marmont Review 2010

International

- EU Health Program 2014-2020

[81] Norfolk and Suffolk Economic Strategy 2017. Available at: https://newanglia.co.uk/wp-content/uploads/2018/11/New-Anglia-Economic-Strategic-Brochure-Lowres.pdf (Accessed January 2019)
[82] Local Industrial Strategy. Available at: https://newanglia.co.uk/local-industrial-strategy/ (Accessed March 2019)

3.11.2. Life expectancy for both males and females is higher in Norfolk compared with the England average, as indicated in Table 3-19.

Table 3-19 - Life expectancy in Norfolk and the UK at Birth (2015-2017 projections)[83]

	Life Expectancy (males)	Life expectancy (females)
UK	79.2	82.9
Breckland	80.1	83.5
Broadland	81.1	84.5
Great Yarmouth	78.6	82.7
Kings Lynn and West Norfolk	80.1	83.1
North Norfolk	80.4	84.6
Norwich	78.3	82.8
South Norfolk	81.3	84.8

3.11.3. Deprivation and poverty influence the health and wellbeing of the population. The difference in life expectancy gap between those living in the most deprived and least deprived areas is about 7 years for men and 4.5 years for women[84]. The largest contributors to the gap in life expectancy between the most and least deprived populations in Norfolk are circulatory diseases, cancer and external causes (including suicide and injury) for males and circulatory diseases, cancer and respiratory diseases for females[85].

3.11.4. The age profiles in Norfolk compared with East of England and England are shown in Table 3-20 below.

[83] Office of National Statistics-Health State Life Expectancies, UK: 2015 to 2017. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/healthstatelifeexpectanciesuk/2015to2017 (Accessed January 2019)
[84] Norfolk and Waveney Joint Health and Wellbeing Strategy 2018-2022. Available at: https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/partnerships/health-and-wellbeing-board/reports-to-the-health-and-wellbeing-board/jhws-appendix-a.pdf (Accessed March 2019)
[85] Norfolk Joint Strategic Needs Assessment- Briefing Paper- Life Expectancy. Available at: http://www.norfolkinsight.org.uk/wp-content/uploads/2018/09/Briefing_paper_Life_Expectancy_v3.pdf (Accessed March 2019)

Table 3-20 - Population estimates for all persons by broad age group for 2017

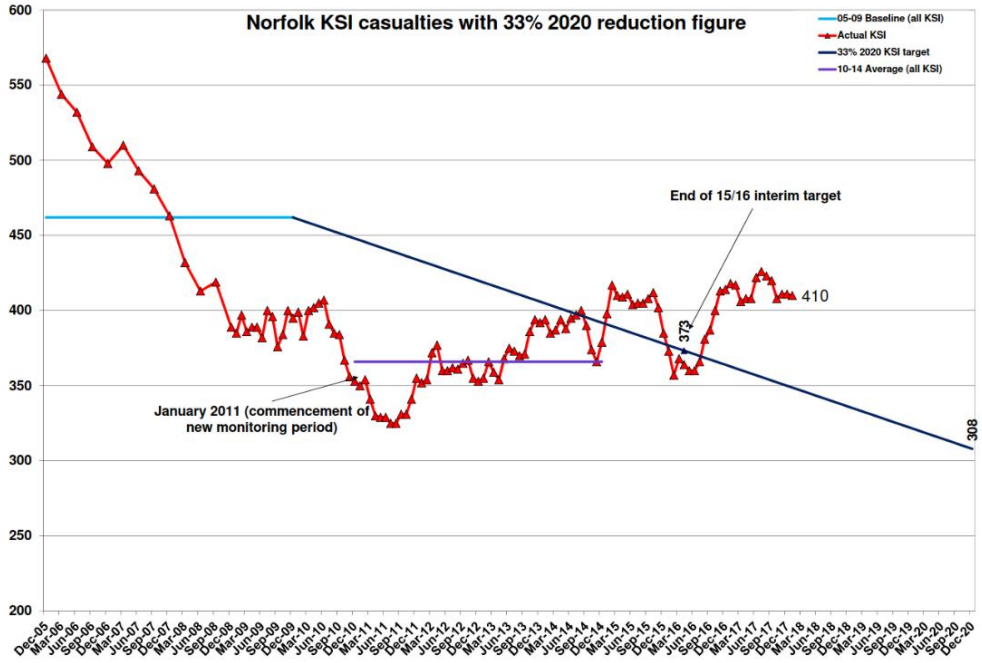
	Norfolk		East of England		England	
	Count	%	Count	%	Count	%
Persons aged 0 - 15	151,618	16.9	1,186,897	19.2	10,637,971	19.1
Persons aged 16 - 64	530,448	59	3,779,374	61.3	34,950,948	62.8
Persons aged 65+	216,324	24.1	1,202,161	19.5	10,030,511	18

3.11.5. The population estimates show Norfolk has a greater population of people aged 65+ compared with the rest of England.

Traffic Collisions

3.11.6. The number of people killed or seriously injured on roads in Norfolk since 2006 has decreased overall as can be seen in Figure 3.5. The casualty figures from 2017 to the start of 2018 show that the number of people killed or seriously injured in road traffic collisions was 410, the number of children (under 16) killed or seriously injured in road traffic collisions was 20 and the number of people slightly injured in road traffic collisions was 1,954.

Figure 3-5 - Number of people killed or seriously injured in road traffic collisions[86]



[86] Norfolk County Council- Casualty Reduction. Available at: https://www.norfolk.gov.uk/-/media/norfolk/downloads/roads-and-transport/roads/casualty-reduction-figures.pdf?la=en&hash=EECAAE9DBEDE87AD517BFE92F9AC2104E494FC95 (Accessed January 2019)

FUTURE TRENDS

3.11.7. Norfolk's road safety strategy is currently being reviewed. Norfolk's key road safety objectives are to[87]:

- To reduce the number killed and seriously injured on our county's roads to 310 or less;
- To reduce the number of motorcyclists killed or seriously injured on Norfolk roads to 74 or less; and
- To reduce the number of children killed or seriously injured on Norfolk roads to 22 or less.

3.11.8. Effective transport planning will play a role in encouraging active transport choices (e.g. walking and cycling) by Non-Motorised Users (NMUs) as well as accessibility to sports and recreation facilities. Continued traffic growth without adequate provision for NMUs facilities is unsustainable. The promotion of active transport choices will help in reducing obesity levels.

SUSTAINABILITY ISSUES

3.11.9. Sustainability issues in relation to health are as follows:

- The population of Norfolk is an ageing population; older generations may not have access to appropriate forms of private transport to access healthcare and social care facilities.
- The potential increase of road safety issues due to an increase in older drivers in the county because of an ageing population.
- Road safety is improving but continues to be an issue.
- There may be inequalities in access to healthcare, jobs and other services.

3.12 LANDSCAPE AND TOWNSCAPE

RELEVANCE TO TRANSPORT STRATEGIES

3.12.1. The introduction of new and/or updated transport infrastructure in the county has the potential to cause changes in landscape and townscape character quality, in addition to potential for visual impacts on residents and other receptors.

POLICY AND LEGISLATION

Local, Regional and National

- Thetford Green Infrastructure Strategy
- West Broadland Green Infrastructure Project Plan 2018
- Borough Council of King's Lynn and West Norfolk- Green Infrastructure 2010
- Greater Norwich Development Partnership- Green Infrastructure Strategy 2007
- Norfolk Coast AONB Management Plan Strategy 2014-2019
- Norfolk Infrastructure Delivery Plan 2017-2027
- Green infrastructure guidance- Natural England 2009

[87] Norfolk County Council- Casualty Reduction. Available at: https://www.norfolk.gov.uk/roads-and-transport/roads/road-safety/casualty-reduction (Accessed January 2019)

- Countryside and Rights of Way Act 2000

International

- European Landscape Convention 2000

SUMMARY OF CURRENT BASELINE

Area of Outstanding Natural Beauty

3.12.2. The Norfolk Coast Area of Outstanding Natural Beauty (AONB) is a significant feature of the Norfolk landscape; the AONB covers Kings Lynn and West Norfolk Borough Council, North Norfolk District Council and Great Yarmouth Borough Council.

3.12.3. The key characteristics of the Norfolk Coast AONB are the geomorphology, diversity and integrity of landscape and marsh coastlands. The geological influences of the AONB are the Cretaceous chalk and carrstone in the west, glacial deposits further east and more recent marine and freshwater formations near the coast. The landscape character is varied with coastal features including: saltmarsh, sand dunes, shingle and soft and eroding cliffs. Coastal and intertidal wildlife these features support include but are not limited to: wildfowl, waders, coastal birds (pink-footed geese, marsh harriers, bittern and marsh tit), natterjack toads and threatened birds (grey partridge, corn bunting and turtle dove)[88].

Landscape Character Areas

3.12.4. There are 10 Landscape Character Areas (LCA) within Norfolk; Table 3-21 below shows the number of LCAs present within each district, borough and city councils.

Table 3-21 - Norfolk LCAs

Local Authority	Number of LCAs	Name of LCA
Breckland	3	Mid Norfolk
		Breckland
		South Norfolk and High Suffolk Claylands
Broadland	4	Mid Norfolk
		Central North Norfolk
		North East Norfolk and Flegg
		The Broads
Great Yarmouth	3	The Broads

[88]Norfolk Coast Area of Outstanding Natural Beauty- Management Plan Strategy 2014-2019. Available at: http://www.norfolkcoastaonb.org.uk/partnership/natural-beauty/70 (Accessed January 2019)

Local Authority	Number of LCAs	Name of LCA
		North East Norfolk and Flegg
		Suffolk Coast and Heaths
Kings Lynn and West Norfolk	4	The Fens
		North Norfolk Coast
		North West Norfolk
		Breckland
North Norfolk	6	North West Norfolk
		Central North Norfolk
		North Norfolk Coast
		Mid Norfolk
		North East Norfolk and Flegg
		The Broads
Norwich	3	Mid Norfolk
		Central North Norfolk
		The Broads
South Norfolk District	3	Mid Norfolk
		The Broads
		South Norfolk and High Suffolk Claylands

*Some of these sites are present in more than one district, borough or city council.

Townscape and Seascape

3.12.5. The major urban areas within Norfolk are those within and around Norwich, Thetford, Diss, Wymondham, Dereham, Great Yarmouth, Kings Lynn and North Walsham. Areas closer to the coastline are recently becoming increasingly urbanised due to tourism. Conservation Areas are covered under Historic Environment in Section 3.9 above.

3.12.6. The Norfolk coastline has been shaped throughout history by natural processes such as changes in sea level and coastal processes are constantly shaping the coast. The effects of changes in sea level and climate change will impact greater on the coastline leading to coastal erosion[89].

[89] Coastal erosion at Happisburgh, Norfolk. Available at: https://www.bgs.ac.uk/landslides/happisburgh.html (Accessed January, 2019)

FUTURE TRENDS

3.12.7. Designated landscapes are afforded some protection against development, however there may be some erosion of landscape quality from development in future, for instance through loss of tranquillity, increased lighting and visual intrusion. Development throughout in the county has the potential to cause small incremental changes in landscape and townscape character and quality. This includes from the loss of landscape features and visual impact.

SUSTAINABILITY ISSUES

- The character and quality of Norfolk's landscapes can be eroded by the potential construction and operation of transport infrastructure.
- Development of transport infrastructure has the potential to indirectly affect Norfolk's designated landscapes.
- Norfolk's coastline is constantly changing due to sea level changes and climate change

3.13 NOISE

RELEVANCE TO TRANSPORT STRATEGIES

3.13.1. The development of new transport infrastructure or changes to level of use of existing infrastructure is likely to have effects on noise levels.

POLICY AND LEGISLATION

Local, Regional and National

- Noise Policy Statement for England (DEFRA) 2010
- Environmental Noise (England) Regulations (2018)
- Environmental Noise (England) Regulations 2006 SI 2238 as amended by Environmental Noise (England) (Amendment) Regulations (2009 and 2010)
- Noise Act (1996)
- Noise and Statutory Nuisance Act (1993)
- Noise Insulation (Amendment) Regulations (1998)

International

- Environmental Noise Directive 2002/49/EC

SUMMARY OF CURRENT BASELINE

Noise Important Areas

3.13.2. Noise action plans provide a framework to manage environmental noise and its effects. They aim to protect quiet areas in agglomerations (large urban areas) where noise quality is good. Increased noise pollution affects quality of life and has been linked to health problems.

3.13.3. Noise from road, rail and air traffic is regulated under the Environmental Noise Directive which is implemented in England through the Environmental Noise (England) Regulations 2006. A Noise Important Area (NIA) is identified through a noise action plan. The main sources of noise in Norfolk are derived from the roads.

3.13.4. Noise levels can be measured by the following three indicators[90]:

- Lden (day-evening-night) - a 24-hour annual average noise level in decibels with weightings applied for the evening and night periods;
- LAeq, 16h - the annual average noise level (in dB) for the 16-hour period between 0700-2300; and
- Lnight - the night time annual average noise level (in dB) where night is defined as 2300-0700.

3.13.5. There are 162 identified NIA's around Norfolk. Table 3-22 shows the locations of these NIA's and the source of noise.

Table 3-22 - NIA's in Norfolk

Local Authority	Source	Quantity of NIAs
Breckland District Council	Road	13
Broadland District Council	Road	33
Great Yarmouth Borough Council	Road	23
King's Lynn and West Norfolk Borough Council	Road	22
North Norfolk District Council	Road	6
Norwich City Council	Road	26
	Rail	2
South Norfolk District Council	Road	37

FUTURE TRENDS

3.13.6. Given the projections for an increasing population in the county, and the popular use of cars as a main mode of transport, it is likely that noise levels will increase along major roads. Continued monitoring is being undertaken throughout the county, and the council are continuing to work with district and borough councils to develop noise action plans.

SUSTAINABILITY ISSUES

- An increase in noise from transport can have an adverse effect on general health, sleep and can be seen as a nuisance.
- A potential increase in transport development and infrastructure may adversely impact sensitive receptors and increase current noise levels across the county.

[90]Noise mapping Geographic Information Systems (GIS) datasets. Available at: https://www.gov.uk/government/publications/open-data-strategic-noise-mapping (Accessed: January 2019)

3.14 SOILS AND RESOURCES

RELEVANCE TO TRANSPORT STRATEGIES

3.14.1. Economic growth, population increase and potential transport development will place additional pressure on agricultural land. Maintenance of existing transport networks and any new transport infrastructure often requires consumption of mineral resources and generates construction waste.

POLICY AND LEGISLATION

Local, Regional and National

- Norfolk Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026 (adopted September 2011)
- Norfolk Minerals Site Specific Allocations Development Plan Document (DPD) (adopted October 2013, amendments adopted December 2017)
- Norfolk Waste Site Specific Allocations Development Plan Document (DPD) (adopted October 2013)
- Safeguarding our Soils: A Strategy for England 2009
- National Planning Policy for Waste 2014
- Our Waste, Our Resources: A Strategy for England (2018)
- Waste (England and Wales) Regulations 2011
- Waste Management Plan for England 2013
- Contaminated Land (England) Regulations 2006 (HMSO, 2006) as amended by the Contaminated Land (England) (Amendment) Regulations (2012)

International

- Framework Waste Directive 08/98EC
- Directive on the Landfill of Waste 99/31/EC
- Packaging and packing waste directive 2015/720/EC
- Waste Incineration Directive 2000/76/EC
- EU Energy performance in Buildings Directive 2002/91 EC
- Waste Electrical & Electronic Equipment Directive 02/96/EC
- End of Life Vehicles Directive 2000/54/EC

SUMMARY OF CURRENT BASELINE

3.14.2. Soils and geology play an important part in determining the environmental character of an area. The nature and alignment of the rocks has a major influence on the landform. Rocks provide the parent material from which the soils are created and, through their constitution and chemistry, they influence the rate at which soils are formed. Soil chemistry and structure strongly influence the type of vegetation, which occurs naturally in an area.

Geology and Geomorphology

3.14.3. Norfolk's bedrock geology is made up of mainly Neogene and Quaternary Rocks to the east of the county formed up to 23 million years ago with the local environment previously being dominated by shallow seas. To the west of the county White Chalk dominates which was formed approximately 66 to 100 million years ago in the Cretaceous Period. The local environment was previously dominated by warm chalk seas. There are some areas of Gault formation and Upper Greensand formation within the Kings Lynn and West Norfolk area of the county formed approximately 94 to 112 million years ago.

3.14.4. The superficial geology of the county is blanketed with a covering of Quarternary superficial deposits that formed within the last 2 million years. The Quarternary deposits include alluvium, clays, glacial sand and gravel.

Soils

3.14.5. Norfolk contains a wide variety of soils including: Till (Diamicton), Alluvium (Clay, Silt and Sand), glacial sand and gravel.

3.14.6. Norfolk's soils vary in thickness from a few centimetres to over a metre in response to the underlying geology, location in the landscape and agricultural practices.

3.14.7. Agricultural Land Classification (ALC) uses a grading system to assess and compare the quality of agricultural land at national, regional and local levels. It assesses the potential for land to support different agricultural uses, such as growing crops for food[91]. It doesn't consider the land's current use and intensity of use. A majority of the land in Norfolk ranges between ALC Grade 2 and 3 (Very Good, Good to Moderate). Some land in Great Yarmouth is also classified as Grade 1 (Excellent)[92].

Waste

3.14.8. There are multiple sites across Norfolk that have been allocated to increase waste management capacity[93]. These are listed below in Table 3-23. There is a need to provide 163,000 tonnes of new recycling, composting and source-segregated-anaerobic digestion capacity, about 703,000 tonnes of recovery infrastructure and about 2,060,000 m3 of new inert landfill/quarry restoration by 2026[94].

[91] Natural England- A guide to assessing development proposals on agricultural land. Available at: https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land#agricultural-land-classification-alc (Accessed April 2019)
[92] Natural England. Agricultural Land Classification map Eastern Region (ALC008). Available at: http://publications.naturalengland.org.uk/publication/127056 (Accessed April 2019)
[93] Norfolk Minerals and Waste Development Framework. Waste Site Specific Allocations Development Plan Document. Available at: https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/minerals-and-waste-planning/waste-site-specific-allocations-development-plan-document.pdf?la=en (Accessed March 2019)
[94] Norfolk Minerals and Waste Development Framework- Waste Site Specific Allocations Development Plan Document 2013

Table 3-23 - Allocated waste site locations in Norfolk

Local Authority	Site Allocations
Breckland	Beetley WAS 01 Land at Beck Farm, East Bilney, East Dereham
	Carbrooke WAS 06 Land off B1108 Norwich Road, Carbrooke
	Ashill WAS 14 Land at Ashill Recycling Centre, Swaffham Road, Ashill
	Snetterton WAS 19 Land at Harling Road, Snetterton
	Thetford WAS 32 Land at Thetford transfer station, Burrell Way, Thetford
	Attleborough WAS 47 Land at West Carr Road, Attleborough
	Snetterton WAS 79 Land at North Farm, Snetterton
	Beetley WAS 87 Land West of Bilney Road, Beetley
Broadland	Frettenham, Horstead WAS 17 Land at Mayton Wood landfill site, Little Hautbois Road
	Attlebridge WAS 24 Land at Keeper's Cottage, Attlebridge
	Buxton with Lammas, Frettenham WAS 68 Land near Mayton Wood landfill site, Little Hautbois Road
	Morton-on-the Hill WAS 76 Land at SPC Atlas Works, Lenwade
	Morton-on-the Hill WAS 78 Land at SPC Atlas Works, Lenwade
Great Yarmouth	Great Yarmouth WAS 49 Land at Old Lindgreat Site, Harfreys Road, Great Yarmouth
	Great Yarmouth WAS 66 Land at Harfreys Road, Harfreys Industrial Estate, Great Yarmouth
	Great Yarmouth WAS 70 Land at Town Lands, Harfrey's Industrial Estate, Great Yarmouth
King's Lynn and West Norfolk	King's Lynn WAS 05 Land at Estuary Road, King's Lynn
	Middleton WAS 25 Land off East Winch Road / Mill Drove, Middleton
	Middleton WAS 36 Land at Blackborough End landfill site, Mill Drove, Middleton
	Feltwell WAS 37 Land at Feltwell landfill site, The Oakery, Lodge Road, Feltwell
	Middleton WAS 40 Land off Mill Drove, Blackborough End
	Docking WAS 45 Land off the B1454, Docking Common, Docking
	King's Lynn WAS 65 Land at the Willows Business Park, King's Lynn
North Norfolk	North Walsham WAS 30 Land at Folgate Road, Lyngate Industrial Estate, North Walsham

Local Authority	Site Allocations
	North Walsham WAS 94 Land off Folgate Road and Cornish Way, North Walsham
Norwich	Norwich WAS 90 Land at 49 Hurricane Way, Norwich
South Norfolk	Costessey WAS 31 Land at Costessey Transfer Station, Longwater Business Park, Costessey
	Tivetshall St Margaret WAS 33 Land at Pulham Market transfer station, Station Road, Tivetshall St Margaret
	Costessey WAS 58 Land at Longwater Industrial Estate, Costessey

3.14.9. The existing landfill sites that are present around Norfolk are listed in Table 3-24 below.

Table 3-24 - Existing landfill sites in Norfolk

Local Authority	Site Location
Breckland	Feltwell Landfill Site, Thetford
Kings Lynn and West Norfolk	East Winch Landfill
	Blackborough End landfill (Blue Canyon Land), East Winch
North Norfolk	Edgefield Landfill, Holt
Norwich	Cantley Landfill
	Spixworth Quarry
	Attlebridge Landfill

FUTURE TRENDS

3.14.10. Due to projected population trends, there will be increased pressure upon agricultural land through development.

3.14.11. With a growing population and increased development (including transport infrastructure), the potential for use of mineral resources and generating waste is increasing. There is a need to apply resource efficiency and waste management to avoid generating waste.

SUSTAINABILITY ISSUES

3.14.12. It is important that any future development of the transport network in Norfolk does not have adverse impacts or lead to the degradation of best and most versatile (BMV) agricultural land. BMV land is defined as Grades 1, 2 and 3a and is land which is most flexible, productive and efficient in

response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals[95].

Sustainability issues in relation to soils are as follows:

- Future development may lead to the degr[a]dation of BMV land.
- Improvements to transport infrastructure will likely require land take.
- There are likely to be increase pressures on agricultural land due to climate change.

Sustainability issues in relation to minerals and waste are as follows:

- Agricultural land and mineral resources are a finite resource.
- There is a large reliance on road transport for importing and exporting minerals, which is unlikely to change.
- Materials will be required for any new transport infrastructure, and subsequent waste produced.
- Resource efficiency is important in the reduction of waste and conservation of resources.

3.15 WATER RESOURCES AND FLOODING

RELEVANCE TO TRANSPORT STRATEGIES

3.15.1. There is potential for the transport strategies to impact both surface and groundwater quality. Transport management activities may impact water quality through the introduction of new transport infrastructure which may cause surface water run-off.

POLICY AND LEGISLATION

Local, Regional and National

- Broadland Rivers Catchment Plan 2014
- The Broadland Rivers Catchment Abstraction Management Strategy (2013)
- North Norfolk: Catchment Flood Management Plan 2009
- North Norfolk Strategic Flood Risk Assessment 2017
- Great Yarmouth Strategic Flood Risk Assessment 2017
- Greater Norwich Area Strategic Flood Risk Assessment 2017
- Water resources for the future: A Strategy for Anglian Region (RSS) 2009
- Environment Agency Anglian River Basin District River Basin Management Plan 2015
- Flood and Water Management Act 2010
- The Water Environment (Water Framework Directive (England and Wales) Regulations 2017
- The Flood Risk Regulations 2009
- Marine and Coastal Access Act (2009)

[95] Natural England Technical Information Note TIN049. Agricultural Land Classification: protecting the best and most versatile agricultural land. Available at: http://publications.naturalengland.org.uk/file/4424325 (Accessed April 2019)

International

- Water Framework Directive – 2000/60/EC
- Urban Waste Water Treatment Directive – 91/271/EEC
- Water pollution caused by Nitrates from agricultural sources: Nitrates Directive – 91/676/EEC
- Bathing Water Directive 2006/7/EC
- Drinking Water Directive – 98/83/EC
- EU Floods Directive 2007/60/EC

SUMMARY OF CURRENT BASELINE

Rivers

3.15.2. There are 16 main rivers that run through Norfolk; Table 3-25 provides the names and descriptions of the main rivers.

Table 3-25 - Main Rivers in Norfolk

Name of River	Description[96]
River Babingley	Rises east of the village of Flitcham and flows for 19.6 km until it enters the Great Ouse through Wootton Marsh.
River Bure	Rises at North Norfolk and flows for 51.5 km to where it flows out to sea at Gorleston.
River Burn	Flows through a low-lying catchment for 12.1 km before discharging into the salt marshes of Holkham National Nature Reserve (NNR)
River Gaywood	Rising in springs between Grimston and Gayton, and flows for 13 km before joining the Great Ouse in King's Lynn where it runs out to sea through the Wash.
River Glaven	Flows for 17 km, rising from tiny headwaters in lower Bodham and Baconsthorpe, the main river begins just below Selbrigg Pond where three streams combine at the outfall. The river meets the sea behind Blakeney Point.
River Heacham	Rises close to the village of Bircham Newton, where the river flows for 16.4 km to its outfall at Heacham beach.
River Hun	Rises at Hunstanton Park and flows for 6 km in to its mouth in Holme Dune National Nature Reserve (NNR).
River Ingol	Flows for 10.3 km through a predominantly rural catchment until it reaches its mouth, close to the RSPB Nature Reserve at Snettisham.

[96] Norfolk's River Trust. Available at: https://norfolkriverstrust.org/rivers/. (Accessed January 2019)

Name of River	Description[96]
River Mun	Rises at Northrepps and flows for nearly 8 km in an east south-easterly direction parallel to the coastline, turns north-eastwards to discharge its waters into the sea at Mundesley.
River Nar	Flows through north-west Norfolk, its progression from chalk river to fen river is distinctive.
River Stiffkey	Rises from springs in North Norfolk and meets the sea at Blakeney Harbour, close to the village of Stiffkey. The main river originates in Guybon's Wood, The Stiffkey is about 29 km long from source to sea.
River Waveney	Rises on the Norfolk-Suffolk border and continues eastwards towards Diss, Bungay and Beccles and then through Oulton Broad – the southernmost of the Broads National Park – before reaching the sea at Lowestoft.
River Wensum	Source can be found between the villages of Colkirk and Whissonsett. From here, the Wensum winds its way southeast for 30 miles through rich agricultural land and various urban areas.
River Wissey	Rises at Shipdham in Norfolk, flows in a westerly direction for nearly 31 miles through multiple villages and eventually joins the Great Ouse at Fordham, after passing through the Fens.
River Yare	Rises to the south of Dereham and flows eastwards across Norfolk, it joins River Tiffey just before Bawburgh. The river flows across the southern fringes of Norwich and joins River Wensum at Whitlingham in Trowse. It then flows eastwards into the Broads National Park and passes Berney Arms before entering Breydon Water, where it is joined by the Bure and Waveney before it reaches the North Sea at Gorleston.
Weybourne Beck	Rises at Hundred Acre Wood before flowing through agricultural land, into the village of Weybourne and out to sea via a piped outfall at Weybourne Hope. The total length is under 2.4 km.

Flood Risk

3.15.3. The Great Yarmouth Strategic Flood Risk Assessment (SFRA)[97] covers the Great Yarmouth Borough Council and parts of the Broads Authority administrative areas. The SFRA has identified that areas of Great Yarmouth borough are at high risk of flooding from tidal, coastal, fluvial and surface water sources.

[97] Great Yarmouth Strategic Flood Risk Assessment. Available at: http://www.broads-authority.gov.uk/__data/assets/pdf_file/0008/1036781/2017s5962-Great-Yarmouth-SFRA-Final-v2.0.pdf (Accessed March 2019)

3.15.4. The King's Lynn and West Norfolk SFRA[98] covers the Borough Council of King's Lynn and West Norfolk and provides information and guidance on flood risk for this area. The SFRA has identified that areas of King's Lynn and West Norfolk Borough are at high risk of flooding from tidal, coastal, fluvial and surface water sources.

3.15.5. The Greater Norwich SFRA[99] covers the Norwich City Council, Broadland District Council, South Norfolk Council and parts of the Broads Authority administrative areas. The SFRA has identified that parts of the Greater Norwich area are at high risk of flooding from both fluvial and surface water sources.

3.15.6. The North Norfolk SFRA[100] covers the North Norfolk District Council and parts of the Broads Authority administrative areas. The SFRA has identified that areas of North Norfolk are at high risk of flooding from tidal, fluvial and surface water sources.

Water Quality and Quantity

3.15.7. The water quality of the rivers that flow within Norfolk can be affected by the agricultural activities that are carried out across the county. Agrichemicals and pollutants can contaminate groundwater reserves and degrade the quality of water. Roads and urban infrastructure are also another source of pollutant to the water environment. The increase of population in the county and the effects of climate change presents a challenge for the county. The aquatic environment is being increasingly threatened by the over-abstraction of water[101].

FUTURE TRENDS

3.15.8. At a local level, the future implications of climate change projections include:

- increased coastal and flood-plain flood events leading to damage to property and disruption to economic activity;
- water shortages; and
- higher incidence of damage to transportation, utilities and communications infrastructure caused by an increase in the number of extreme weather events (e.g. heat, high winds and flooding).

3.15.9. In terms of water quality, the requirements of the Water Frameworks Directive (WFD) should lead to continued improvements to water quality in watercourses. Water quality is also likely to continue to

[98] Kings Lynn and West Norfolk Strategic Flood Risk Assessment. Available at: https://www.west-norfolk.gov.uk/downloads/file/5300/strategic_flood_risk_assessment_final_report (Accessed March 2019)
[99] Greater Norwich Area Strategic Flood Risk Assessment. Available at: http://www.broads-authority.gov.uk/__data/assets/pdf_file/0006/1037355/2017s5962-Greater-Norwich-Area-SFRA-Final-v2.0.pdf (Accessed March 2019)
[100] North Norfolk Strategic Flood Risk Assessment. Available at: http://www.broads-authority.gov.uk/__data/assets/pdf_file/0004/1037065/2017s5962-North-Norfolk-SFRA-Final-v2.0.pdf (Accessed March 2019)
[101] Norfolk Rivers Trust- Key Issues. Available at: https://norfolkriverstrust.org/rivers/key-issues/ (Accessed January 2019)

be affected by pollution incidents in the area, the presence of non-native species and physical modifications to water bodies.

SUSTAINABILITY ISSUES

- Climate change is likely to increase the occurrence of flooding from all sources and hence raise the flood risk in Norfolk.
- Transport infrastructure could be required in areas of high flood risk.
- The physical and chemical quality of Norfolk's water resources is an important aspect of the natural environment and can be adversely affected by, for example, pollution or physical associated with transport infrastructure.

Appendix G

ENVIRONMENTAL, SOCIAL AND HERITAGE MAPS

Appendix G.1

ENVIRONMENTAL DESIGNATIONS

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

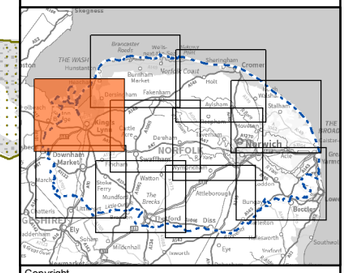
N

Legend

- Norfolk County Boundary
- Site of Special Scientific Interest
- Ramsar Site - Wetland of International Importance
- Special Area of Conservation
- Special Protection Area
- National Nature Reserve
- Local Nature Reserve
- Area of Outstanding Natural Beauty
- Ancient Woodland Inventory
- Registered Parks and Gardens
- Scheduled Monument Area

Flood Zones:

- Flood Zone 3
- Flood Zone 2



Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 1 OF 10

Scale at A3: 1:100,000

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Stage 1 check	**Stage 2 check**	**Originated**	**Date**
MDM	-	MDM	22/09/2020

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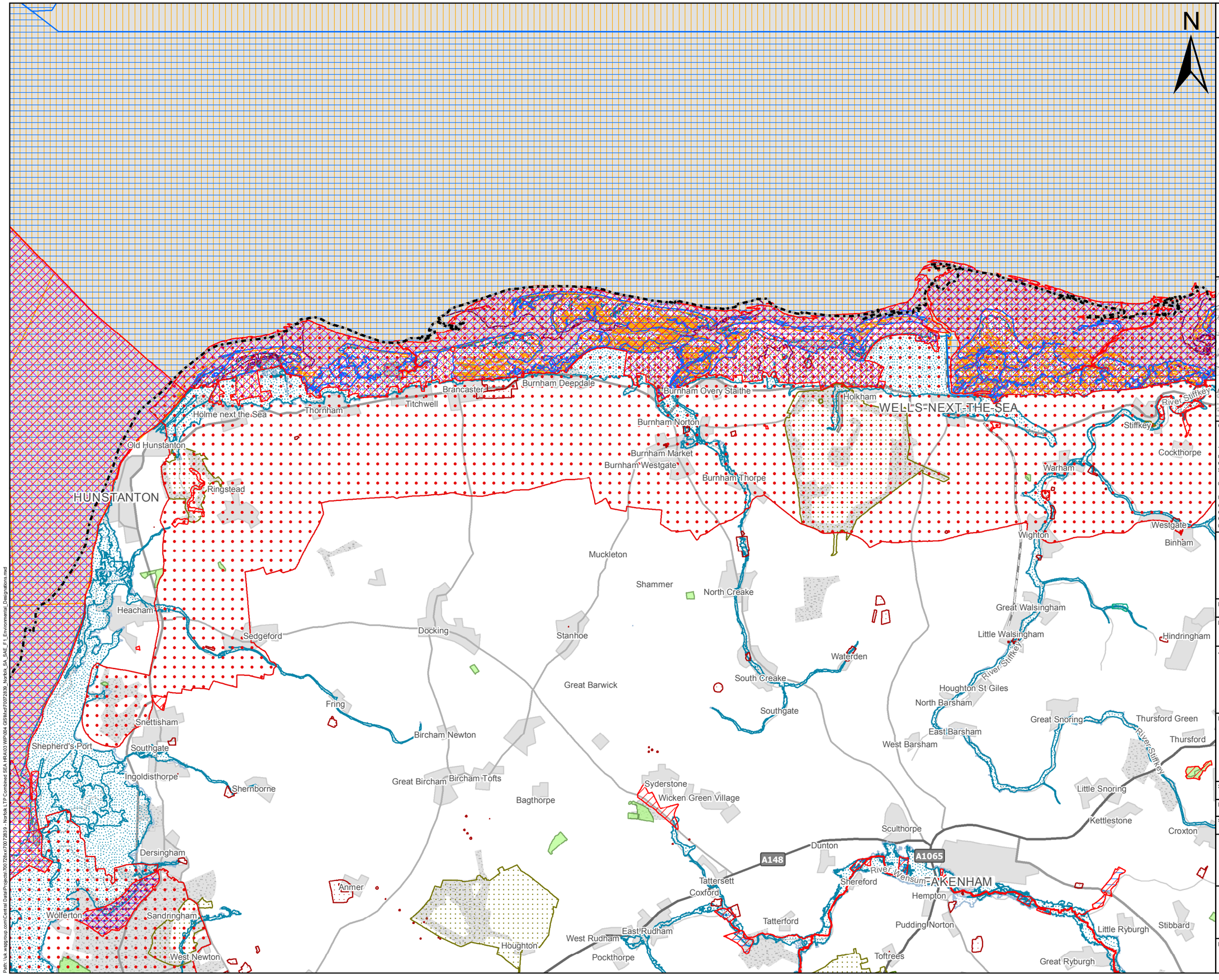

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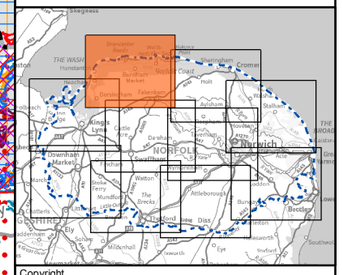

Revision Details	By / Check	Date	Suffix

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Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 2 OF 10

Scale at A3: 1:100,000

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Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

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Drawing Number: 70072839_Norfolk_SA_SAE_F1_Environmental_Designations

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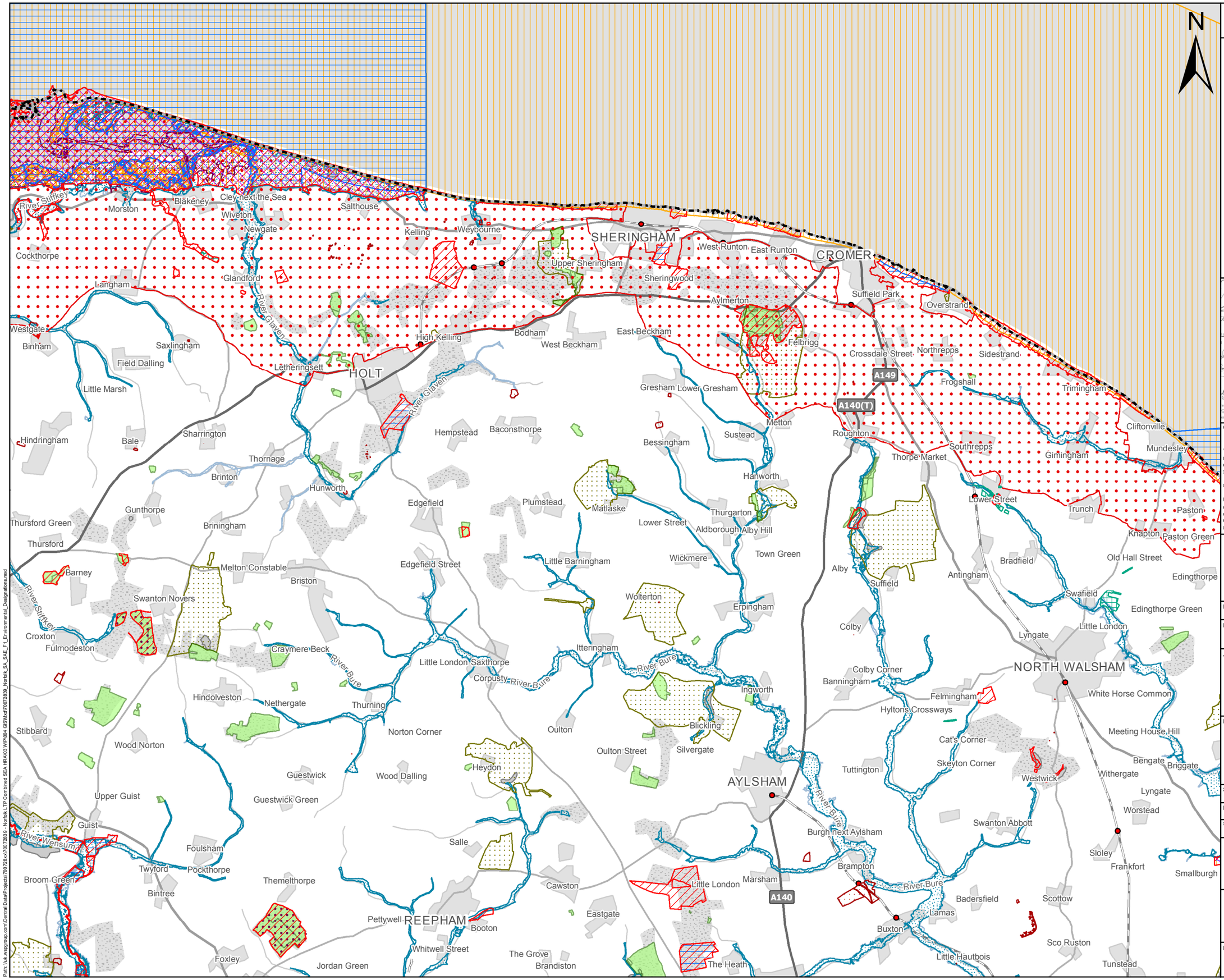

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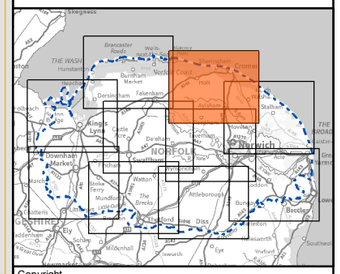

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Scale at A3: 1:100,000

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Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

0 1 2 3 4 Kilometers

wsp

Drawing Number: 70072839_Norfolk_SA_SAE_F1_Environmental_Designations

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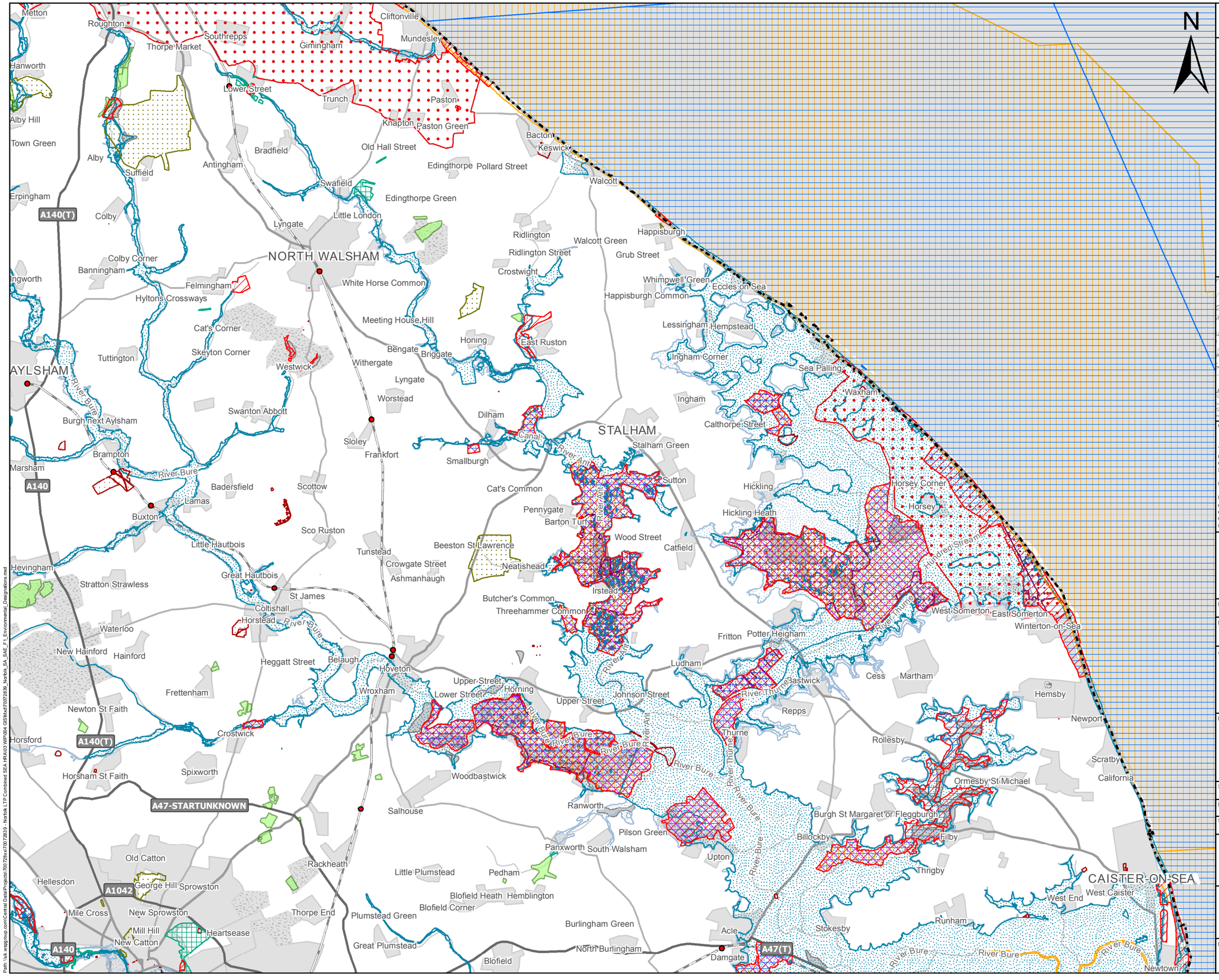

N

Legend

- Norfolk County Boundary
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- Area of Outstanding Natural Beauty
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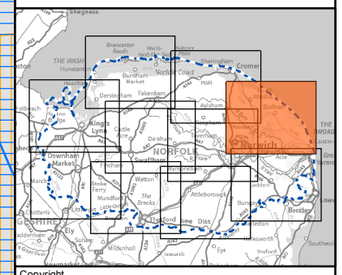
- Scheduled Monument Area

Flood Zones:

- Flood Zone 3
- Flood Zone 2



Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 4 OF 10

Scale at A3: 1:100,000

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Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

0 1 2 3 4 Kilometers

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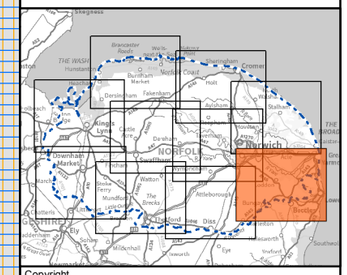

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 5 OF 10

Scale at A3: 1:100,000

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Stage 1 check	**Stage 2 check**	**Originated**	**Date**
MDM	-	MDM	22/09/2020

0 1 2 3 4 Kilometers

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Drawing Number: 70072839_Norfolk_SA_SAE_F1_Environmental_Designations

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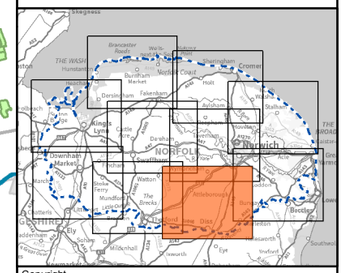

Revision Details	By / Check	Date	Suffix

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Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 6 OF 10

Scale at A3: 1:100,000

Drawn: UKCAF001

Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

0 1 2 3 4 Kilometers

Drawing Number: 70072839_Norfolk_SA_SAE_F1_Environmental_Designations

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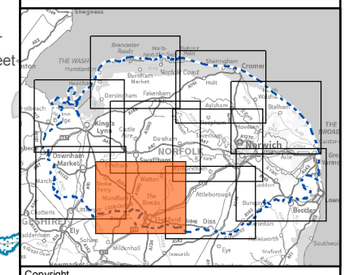

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 7 OF 10

Scale at A3: 1:100,000

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Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

0 1 2 3 4 Kilometers

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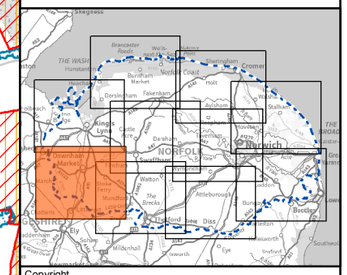

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 8 OF 10

Scale at A3: 1:100,000

Drawn: UKCAF001

Stage 1 check	Stage 2 check	Originated	Date
MDM	-	MDM	22/09/2020

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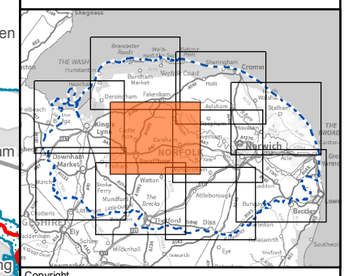

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 9 OF 10

Scale at A3: 1:100,000

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MDM	-	MDM	22/09/2020

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Drawing Number: 70072839_Norfolk_SA_SAE_F1_Environmental_Designations

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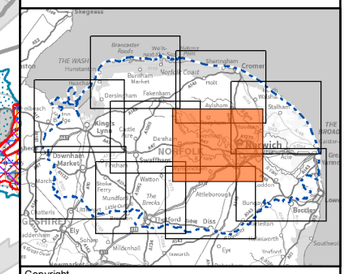

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: NORFOLK COUNTY COUNCIL DRAFT LTP4

Drawing Title: ENVIRONMENTAL DESIGNATIONS PAGE 10 OF 10

Scale at A3: 1:100,000

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