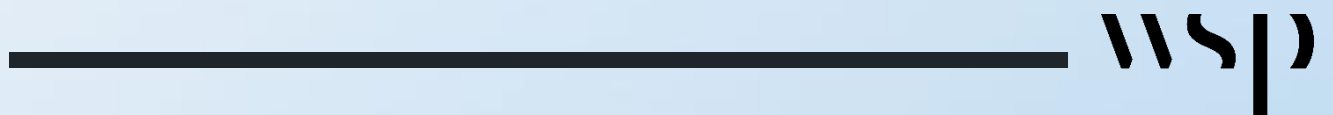


Appendix D

Health Impact Assessment





Norfolk County Council

Norfolk LTP4 Part 2 - Implementation Plan

Appendix D - Health Impact Assessment

Type of document (version) Public

Project no. 70091812

Our Ref. No. 70091812

Date: March 2022

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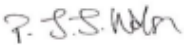
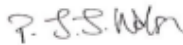
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Quality control

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft for NCC	Final for consultation		
Date	March 2022	March 2022		
Prepared by	C Town R Dipoti	R Dipoti		
Signature				
Checked by	C Beard	C Beard		
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Authorised by	P Walsh	P Walsh		
Signature				
Project number	70091812	70091812		

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1 Introduction

- 1.1.1 Norfolk County Council (NCC) has commissioned WSP to undertake a Sustainability Appraisal (SA) that incorporates the requirement of a Strategic Environmental Assessment (SEA) of the Draft Local Transport Plan (LTP) Implementation Plan (IP) of their fourth Local Transport Plan Strategy (LTP4). The SA also incorporates the findings of the Health Impact Assessment (HIA) and the Equalities Impact Assessment (EqIA).
- 1.1.2 WSP previously undertook the SA, HIA and EqIA of the LTP4 Strategy (Part 1) in June 2021, which also included the assessment of the King's Lynn, Great Yarmouth and the Transport for Norwich Strategies. The IP forms Part 2 of the LTP4.
- 1.1.3 The LTP4 Strategy was formally adopted in 2021, and the Implementation Plan sets out proposals for the application of the policies in the adopted strategy. Both the IP and the LTP4 Strategy represent one plan and therefore, should be read in conjunction with one another. Although both the IP and the LTP4 Strategy represent one plan, as they have been developed individually, the assessment has been undertaken separately.
- 1.1.4 The Health Impact Assessment (HIA) has been undertaken to assess the impacts of the LTP4 and IP on human health in Norfolk, and the likely effects on health outcomes in the local population.
- 1.1.5 The outcomes of the HIA have informed the SA.

2 Scope and Methodology

2.1 Introduction

2.1.1 A rapid desktop HIA was undertaken in March 2022. The key tasks for this HIA were as follows:

- Develop a summary health and wellbeing baseline and profile of the Norfolk area;
- Identify relevant evidence from literature; and
- Assess the potential health and wellbeing impacts of the IP, and the nature and likelihood of such impacts.

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 IP. 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:

- Office for Health Improvement and Disparities¹ Local Authority Health Profiles;
- Office for National Statistics Labour Market Profiles (Nomis); and
- Office for Health Improvement and Disparities “Local Health” datasets.

Appraisal

2.2.6 The proposed implementation of transport interventions 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 finally the effect that the objectives are likely to have on the health of the study area population as presented in **Section 5: Assessment of Interventions**.

2.2.7 Although both the IP and the LTP4 Strategy represent one plan, due to the timescales on the development of these, the assessment has been undertaken separately. As the IP and LTP4 Strategy are intrinsically linked, the assessment of the IP will build upon the previous assessment of the LTP4 Strategy and assess how effective the IP actions will be in delivering LTP4 Strategy policies.

Recommendations

2.2.8 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 and IP.

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 interventions. It has been assumed that specific projects that arise as a result of this IP will be appropriately assessed to identify project-specific impacts on local populations.

¹ Formerly Public Health England (PHE)

- 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 IP 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 to be released through 2022. At the time of writing the best available data was used, 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 informed by the HIA of the LTP4 that was adopted during the Covid-19 pandemic. Professional judgement, using previous experience and available literature, has been used to assess how the LTP4 and IP 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 modal shifts and how the population will behave as restrictions 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”².
- 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”³.
- 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 may well be unjust and unfair.
- 3.1.8 HIAs apply the below model of health and wellbeing (**Figure 3-1**). The Socio-Environmental Model of Wellbeing considers that health and wellbeing are a result of external influences,

² World Health Organisation (N/A). Definition of health assessment (HIA). [online]. Available online at: <http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/definition-of-health-impact-assessment-hia> (Accessed 8 March 2022).

³ World Health Organisation (N/A). Constitution. [online]. Available online at: <https://www.who.int/about/who-we-are/constitution> (Accessed 8 March 2022).

where an individual or population experiences a combination of adverse external factors which could result in health inequality.

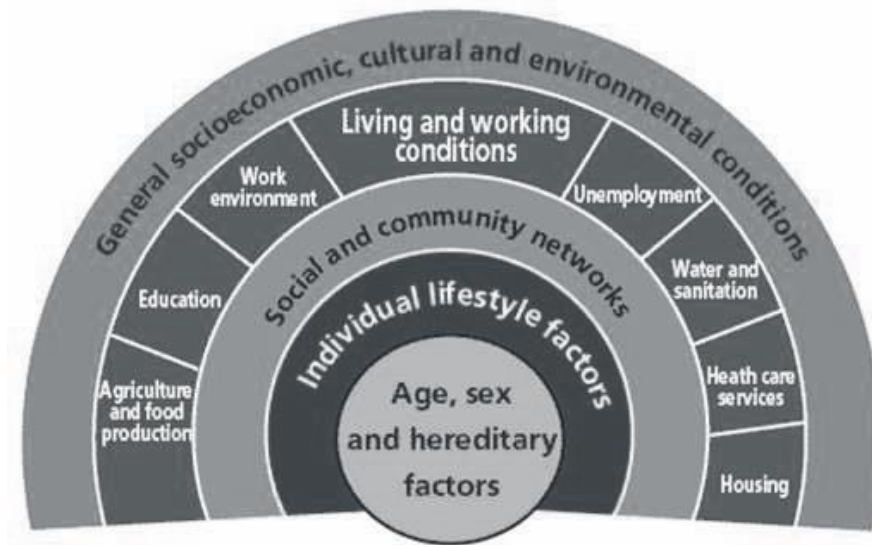


Figure 3-1 - Socio-Environmental Model of Health and Wellbeing⁴

- 3.1.9 The overall aim of this HIA will be to identify the aspects of the IP which have the potential to affect people’s health, both directly and indirectly. Some effects may be positive, others could be negative.

⁴ Dahlgren, G. and Whitehead, M. (1991) *Policies and Strategies to Promote Social Equity in Health*. Stockholm, Sweden: Institute for Futures Studies.

4 Community Profile and Baseline

4.1 Introduction

- 4.1.1 Amongst the communities living in, and directly affected by, any changes brought about by the key policies or proposed activities of the IP, the proportion and profile of vulnerable groups, identified previously in **Section 2.2**, have been described below using publicly available data.
- 4.1.2 Community profile data has been used to express the status of vulnerable groups with respect to their vulnerable health status and/or deprivation. In some cases, Health Profile Indicators are implicit rather than explicit, where direct Health Profile Indicators were not available.

4.2 Baseline

- 4.2.1 This section summarises the socio-economic and community baseline conditions for the spatial scope of the HIA. The most recent publicly available information has been used to create these profiles.

Population

- 4.2.2 The total population of Norfolk in 2020 was 914,000. Of this population, 449,000 (49.1%) were male and 465,000 (50.9%) were female⁵. Compared to surrounding counties in the East of England, Norfolk has the third highest population, with only Essex and Hertfordshire having larger populations (1,497,800 and 1,195,700 respectively). Norfolk also has a similar proportion of males and females compared to both the East (49.3% males and 50.7% females) and England (49.4% males and 50.6% females) averages.
- 4.2.3 The 2011 Census data indicates that the diversity of different ethnicities is relatively low in Norfolk, 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 4-1**.

⁵ NOMIS (2020). Labour Market Profile – Norfolk. [online]. Available at: <https://www.nomisweb.co.uk/reports/lmp/la/1941962835/report.aspx?town=norwich> (Accessed 17 February 2022).

Table 4-1 – Ethnicity in the local authorities of Norfolk and England (2011)

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

4.2.4 According to 2011 Census data, 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 at a proportion that is 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 any religion or faith, when compared to the other local authorities in Norfolk, and the national averages.

4.2.5 **Table 4-2** identifies the religious groups identified within the local authorities in Norfolk when compared to England.

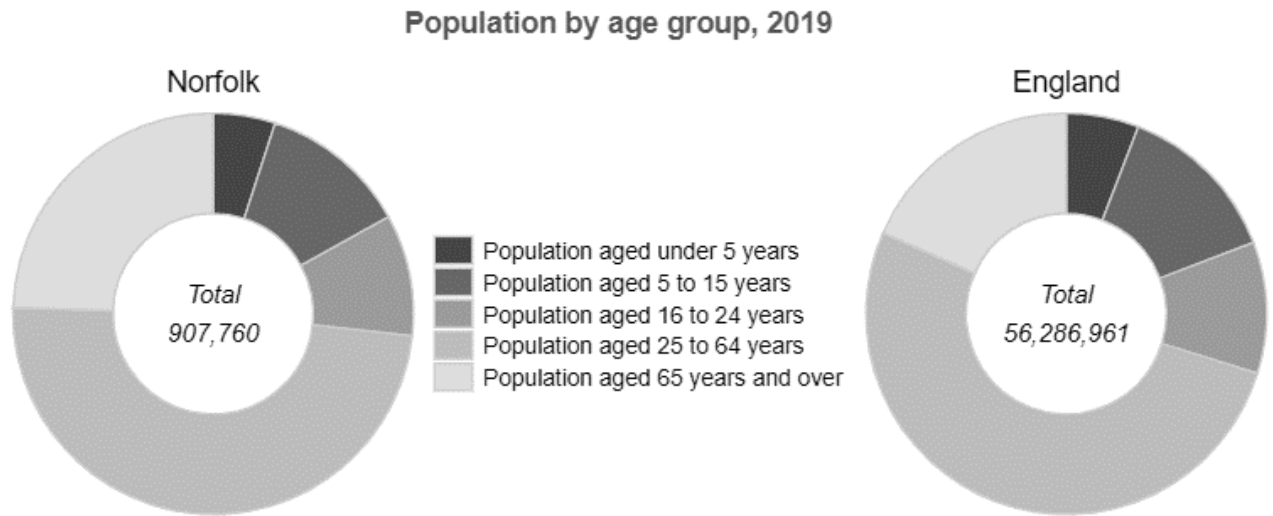
Table 4-2 – Religious Groups within the local authorities of Norfolk and England (2011)

Religion	King' s Lynn and West Norfolk	North Norfolk	South Norfolk	Breckland	Broadland	Great Yarmouth	Norwich	England
Christian (%)	66.4	66.0	62.3	63.8	63.3	61.0	44.9	59.4
Muslim (%)	0.4	0.2	0.3	0.3	0.3	0.5	2.0	59.4
Buddhist (%)	0.3	0.3	0.3	0.2	0.3	0.2	0.7	0.5
Hindu (%)	0.1	0.2	0.1	0.1	0.2	0.3	0.8	1.5
Jewish (%)	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5
Sikh (%)	0.1	0	0	0	0.1	0	0.1	0.8
Other Religion (%)	0.4	0.5	0.4	0.5	0.4	0.3	0.7	0.4
No Religion (%)	24.8	25.2	28.7	27.6	30.0	30.3	42.3	24.7
Religion Not Stated (%)	7.4	7.6	7.7	7.4	7.4	7.2	8.2	7.2

Age

4.2.6 The age profile of residents within Norfolk indicates that the population is composed of a predominantly young and middle-aged population. Within Norfolk, 58.5% of the population are aged 16-64 years⁴. This is slightly lower than both the East average of 60.6% and the England average of 62.4%. **Figure 4-1** exhibits the population profile of Norfolk in 2020.

Figure 4-1 - Population age profile of Norfolk in 2019⁶



Life Expectancy

- 4.2.7 Life Expectancy is the measure of the average number of years a person would expect to live in good health based on contemporary mortality rates and prevalence of self-reported good health. The prevalence of good health is derived from responses to a survey question on general health.
- 4.2.8 Life expectancy in Norfolk for males is 80.0 years and for females is 83.9 years⁷. This is similar to the regional average of 80.2 years for males and 83.8 years for females. Life expectancy in Norfolk is slightly higher than the England average of 79.4 years for males and 83.1 years for females.
- 4.2.9 Across Norfolk, the life expectancy gap between the most deprived areas and least deprived areas is 7.4 years for men and 4.4 years for women. The areas of Great Yarmouth and King’s Lynn have the lowest life expectancy in Norfolk, as well as being some of the most deprived areas.

⁶ Public Health Profiles (2019) Local Profiles. [online]. Available at: https://localhealth.org.uk/#c=report&chapter=c01&report=r01&selgeo1=laut_2021.E10000020&selgeo2=eng.E92000001 (Accessed 3 February 2022)

⁷ Office for Health Improvement & Disparities (2021). Local Authority Health Profiles. [online]. Available at: <https://fingertips.phe.org.uk/profile/health-profiles> (Accessed 17 February 2022).

Weight and Physical Activity

- 4.2.10 The proportion of adults (aged 18+) in Norfolk classified as overweight or obese in 2020 was 62.3%⁶. This is in line with the regional average of 62.3% and slightly lower than the England average of 62.8%.
- 4.2.11 According to the Active Lives Survey⁸, the proportion of adults (aged 18+) described as active in Norfolk in 2020 was 58.7%, with 11.5% described as fairly active and 29.9% described as inactive. Levels of physical activity in Norfolk are similar to the England results whereby 61.4% are considered active, 11.5% considered fairly active and 27.1% considered inactive.
- 4.2.12 Within Norfolk, King's Lynn and West Norfolk have the lowest rates of adult physical activity (64.9%), while Norwich has the highest rates of physical activity (67.8%)⁶.
- 4.2.13 Obesity amongst children is measured through the National Child Measurement Programme (NCMP), which measures the weight and obesity level of both reception children (aged 4-5 years) and year 6 children (aged 10-11 years).
- 4.2.14 The prevalence of obesity among children in Norfolk is similar to the regional average, and slightly lower than the England average. Among year 6 children, the prevalence of obesity in 2020 in Norfolk was 19.7%, compared to the regional average of 19.1% and the England average of 21.0%. The prevalence of obesity amongst reception aged children within Norfolk was 19%, compared to the England average of 20.4%⁹.

Lifestyle

- 4.2.15 Smoking is a major risk factor for many diseases, such as lung cancer, chronic obstructive pulmonary disease (COPD) and heart disease, as well as being linked to cancers in other organs, including lip, mouth, throat, bladder, kidney, stomach, liver and cervix.
- 4.2.16 Smoking prevalence among adults (aged 18+) in Norfolk in 2020 was slightly higher than both the regional and England averages. The prevalence of current smokers in Norfolk was 14.5%, compared to 13.7% for the region and 13.9% in the rest of England⁶.

⁸ Active Norfolk (2021). Active Lives Survey Report. [online]. Available at: <https://www.activenorfolk.org/2021/05/active-lives-survey/> (Accessed 17 February 2022).

⁹ Public Health England (2021). Local Health Profile – Norfolk. [online]. Available at: https://localhealth.org.uk/#c=report&chapter=c6&report=r01&selgeo1=laut_2021.E1000002_0&selgeo2=eng.E92000001 (Accessed 24 February 2022).

- 4.2.17 Between 2018 and 2019 there were 75 hospital admissions for episodes of drug related misuse in Norfolk, compared to 7,376 admissions recorded for England¹⁰.
- 4.2.18 Norfolk's hospital admissions for alcohol related conditions in 2020 was 38.3 per 100,000 people. This is lower than both the regional average of 39.8 per 100,000 people and the England average of 43.7 per 100,000 people.
- 4.2.19 Violent crime related hospital admissions in Norfolk are lower than both the regional and England values. In Norfolk in 2020 there were 24.1 per 100,000 admissions, compared to 36.1 per 100,000 for the region and 45.8 per 100,000 for England.

Economy and Employment

- 4.2.20 According to data from 2021, the average unemployment rate across Norfolk was 4.6% for those aged 16-64. This is a higher unemployment rate when compared to the region (4.1%) and lower when compared to England (5.0%). In the same period, the average employment rate for Norfolk was 76.4%, which is lower than the regional average of 77.1% and higher than the England average of 74.6%⁴.
- 4.2.21 A total of 80.1 of Norfolk's population are considered to be economically active (aged 16 years or over). Of those considered to be economically inactive, 28.0% are students, 18.3% are looking after family/home, 21.7% are long term sick, 18.9% are retired and 9.2% are other⁴.
- 4.2.22 There are lower proportion of people employment within managerial and professional occupations within Norfolk in 2021 when compared to regional and England levels. The levels of employment by occupation within Norfolk in 2021 are as follows⁴:
- Managers, Directors and Senior Officials – 9.0%;
 - Professional Occupations – 17.1%;
 - Associate Professional & Technical – 13.1%;
 - Administrative & Secretarial – 11.3%;
 - Skilled Trades Occupations – 12.7%;
 - Caring, Leisure and Other Service Occupations – 11.0%;
 - Sales and Customer Service Occupations – 7.7%;
 - Process Plant & Machine Operatives – 7.9%; and
 - Elementary occupations – 10.0%.

¹⁰ NHS (2019). Drug Related Hospital Admissions: data tables. [online]. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-drug-misuse/2019/drug-admissions-data-tables> (Accessed 8 March 2022).

- 4.2.23 The average gross weekly pay for full-time workers in Norfolk is £566.80. This is lower than the average gross weekly pay for full-time workers in both the region (£628.60) and England (£613.10)⁴. The average hourly pay for full-time workers in Norfolk is also lower than both the regional and England averages at £14.15 per hour, compared to £15.88 per hour regionally and £15.65 for England.
- 4.2.24 The rate of children (under 16 years) in Norfolk living in low-income families is 15.1%. This is higher than the regional average of 14.1%, however it is lower than the England average of 17.0%⁶.

Education

- 4.2.25 Qualification levels within Norfolk are slightly lower than the England and regional averages across all qualification levels. Additionally, there are higher portions of Norfolk's population with no qualifications when compared to both the region and England.
- 4.2.26 The levels of qualifications held within the Norfolk population are as follows⁴:
- NVQ4 and above – 35.0%;
 - NVQ3 and above – 56.1%;
 - NVQ2 and above – 74.8%;
 - NVQ1 and above – 88.2%;
 - Other qualifications – 5.0%; and
 - No qualifications – 6.7%.

Health

- 4.2.27 Census data shows that the proportion of residents within Norfolk living with a long-term illness or disability is higher than the England average, at 20.1% and 17.6% respectively¹¹.
- 4.2.28 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 statistics where 47.2% of the population self-rated themselves as 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' health¹².

¹¹ Public Health England (2011). Local Health. [online]. Available at: https://www.localhealth.org.uk/#bbox=532210,380366,135126,136047&c=indicator&i=t3.l.t_erm_ill&view=map7 (Accessed 17 February 2022).

¹² NOMIS (2011). 2011 Census – Health and provision of unpaid care. [online] Available at: <https://www.nomisweb.co.uk/reports/localarea?compare=E1000020> (Accessed 8 March 2022).

- 4.2.29 Of the population of Norfolk, 9.1% stated 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 limitations¹⁰.
- 4.2.30 Suicide rates within areas can provide an indication of the current state of mental health of residents. The suicide rate within Norfolk between 2018 and 2020 was 11.5 per 100,000 people. This rate is higher than the regional rate of 10.8 per 100,000, and higher than the England rate of 10.4 per 100,000⁶.

Deprivation

- 4.2.31 The Index of Multiple Deprivation (IMD) is the official measure of relative deprivation for small neighbourhoods in England¹³. IMD is used by local governments to focus programmes in the most deprived areas and develop strategies, such as the IP.
- 4.2.32 There is significant variation in IMD scores throughout Norfolk, with the areas of highest deprivation located within the urban areas of the county, particularly areas like Great Yarmouth, King's Lynn, and Norwich. In general, the areas of lowest deprivation within Norfolk are located in the centre of the county, surrounding Norwich.

Transport and Accessibility

- 4.2.33 Although there are no motorways within Norfolk and limited rail services, there are a series of key transport infrastructure including airports, strategically important roads (including roads on the Highways England Strategic Road Network and Major Road Network i.e. A roads). Despite these travel links, significant numbers of people who live outside urban areas have to travel relatively long distances to access daily facilities, often with the added challenge of variable public transport quality. Norfolk's road network is also largely rural, restricting journey times and leading to congestion on some corridors¹⁴.

¹³ Department for Communities and Local Government (2016). The English Index of Multiple Deprivation (IMD) 2015 – Guidance. [online] Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015> (Accessed 8 March 2022).

¹⁴ Norfolk County Council (2010). Draft Local Transport Plan 4 Strategy 2020 – 2036. [online]. Available at: <https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-transport/local-transport-plan-4-draft-strategy.pdf> (Accessed 8 March 2022).

4.2.34 There are higher levels of car ownership within the areas of Norwich and King’s Lynn and West Norfolk. The proportion of car or van ownership within regions of Norfolk are outlined in **Table 4-3**, below:

Table 4-3 – Car Ownership within households within Norfolk (2011)¹⁵

Car or Van ownership within households	King’ s Lynn and West Norfolk	North Norfolk	South Norfolk	Breckland	Broadland	Great Yarmouth	Norwich
No cars or vans	10,346	7,455	6,157	8,462	6,106	11,445	20,125
1 car or van	28,076	21,233	22,382	23,904	23,667	18,836	28,729
2 cars or vans	18,242	12,921	18,118	16,504	17,842	8,926	9,511
3 cars or vans	4,443	3,187	4,435	4,092	4,182	2,103	1,531
4 or more cars or vans	1,870	1,250	1,717	1,557	1,539	769	423

Road Safety

4.2.35 Between 2016 and 2018, an average of 47.6 people per 100,000 were killed or seriously injured on roads in Norfolk. This is higher than both the regional average of 46.7 people per 100,000 and the national average of 42.6 per 100,000¹⁶.

¹⁵ NOMIS (2011). Car or Van Availability. [online]. Available at: <https://www.nomisweb.co.uk/census/2011/qs416ew> (Accessed 03 February 2022)

¹⁶ Office for Health Improvement & Disparities (2019). Local Authority Health Profiles –Killed or seriously injured (KSI) rate on England’s roads. [online]. Available at:

Air Quality

- 4.2.36 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 level¹⁷. Older people (75+), infants (0-5) and children (under 16 years) and those with long term health conditions, are the most likely to be vulnerable to the effects of air pollution.
- 4.2.37 Air quality across Norfolk is generally considered to be of good quality.
- 4.2.38 There are four AQMAs within Norfolk, declared primarily as a result of pollution caused by road transport. These four AQMAs are located in the following areas:
- Breckland District Council – one AQMA;
 - Borough Council of King’s Lynn and West Norfolk – two AQMAs; and
 - Norwich City Council – one AQMA.

Noise

- 4.2.39 Noise pollution can negatively impact upon health through impacting sleep and creating a nuisance for residents. The main sources of noise within Norfolk are due to roads, particularly the A47, A11 and A17.
- 4.2.40 Noise Important Areas (NIAs) are identified through a noise action plan. Within Norfolk, there are 162 NIA’s that have been identified. The location of these NIA’s is spread across the county, however there are concentrations of NIA’s within areas such as Norfolk and King’s Lynn.

<https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/pat/6/par/E12000006/ati/202/are/E10000020/yr/3/cid/4/tbm/1> (Accessed 8 March 2022).

¹⁷ 105 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. [online]. Available at: <http://www.comeap.org.uk/> (Accessed 8 March 2022).

5 Assessment of Interventions

5.1 Introduction

5.1.1 The interventions of the IP have been reviewed and assessed against the key determinants of health, previously outlined, to identify potential effects within the study area population.

5.2 Objective 1: Embracing the Future

5.2.1 The following policies are applicable to this Transport Strategy Objective:

- We will plan and prepare the county for future changes and challenges to ensure the best for our society, environment and economy (Policy 1);
- 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 (Policy 2);
- Innovation and new technologies will be embraced in order to respond to the new targets set by the recently adopted environmental policy (Policy 3); and
- Behavioural change and interventions that can help to increase the use of sustainable transport will be implemented (Policy 4).

5.2.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

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

Encouraging a shift to more active modes of transport i.e. walking and cycling, could encourage more active lifestyles amongst the population, resulting in positive health impacts. The increase in more active lifestyles and use of public transport, coupled with initiatives such as 'Mobility as a Service' which could range from car-sharing to phones apps, which allow customers to make easy, multi-modal journeys, could reduce the number of vehicles on the roads thereby reducing congestion and associated air and noise pollution.

The use of electric vehicles has been identified as one of the most effective means of reducing carbon, which would contribute to NCC aims to be carbon neutral across all sectors by 2030. NCC's Electric Vehicle Strategy will help to remove inequalities in access to charging points by promoting on-street charging points as well as adapting parking standards to ensure every new home with a parking space has an electric vehicle charging point, with similar standards for new workplaces. Improvements to air quality resulting from

a reduction in carbon emissions will contribute to improving health outcomes for the local population.

Technological advancements such as traffic management measures (i.e. speed cameras and smart phone apps to alert road users of traffic or accidents) and the provision of Beryl Bikes and/or e-scooters to a wider number of people has the potential encourage the use of more sustainable travel. This will also assist in reducing congestion on the road network, reducing the number of idling cars and resulting air and noise pollution.

Younger people are becoming increasingly aware of climate change and of low carbon transport options, this awareness is only expected to grow as the issues become more prevalent. Therefore, by promoting low-carbon transport options through improving walking and cycling infrastructure, as well as reliable public transport and electric vehicle infrastructure is implemented then uptake of these options by younger people is likely to increase.

Norfolk's population is aging, with this comes transportation challenges including a lack of sufficient transport links in rural locations, access to health care and other vital services, in rural locations, transport being inconvenient or uncomfortable, and a lack of encouragement to use active modes of transport and an increasing risk of isolation¹⁴. Elderly people are more likely to rely on public transport, therefore improvements to public transport is expected to ensure reliable journeys and improve connectivity to community facilities, healthcare services and other amenities. An increase in public transport usage could have beneficial effects on air quality and noise pollution as well as road safety, resulting in a potential reduction in the number of vehicles on the road. In addition, the introduction of autonomous vehicles could provide further independent mobility opportunities for the elderly, non-drivers or those with mobility issues, enabling easier access to healthcare, educational and/or employment opportunities whilst relieving chauffeuring burdens¹⁸. However, it is anticipated that such vehicles, alongside electric vehicles, will be more expensive than traditional vehicles which may not be affordable to those on low income.

5.3 Objective 2: Delivering a Sustainable Norfolk

5.3.1 The following policies are applicable to this Transport Strategy Objective:

- We will work with partners to inform decisions about new development ensuring they are well connected to maximise use of sustainable and active transport options. This will

¹⁸ Victoria Transport Policy Institute (2022). Autonomous Vehicle Implementation Predictions. [online]. Available at: <https://www.vtppi.org/avip.pdf> (Accessed 17 February 2022).

make new developments more attractive places to live, thus supporting a strong sense of the public realm (Policy 5);

- We will work with the development community and local stakeholders to ensure greener transport solutions are embedded in land-use planning to significantly reduce traffic generation by private car. We will also work to ensure that the necessary infrastructure to support the transition to a clean transport network is in place. We will seek that that any carbon impacts are monitored and offset by locally applicable measures. As part of our ongoing work on developing guidance for how we will deal with new development we will amongst other things consider how to establish carbon plans and budgets and devise methodologies to achieve carbon neutrality (Policy 6); and
- In air quality management areas, development will need to demonstrate its positive contribution to tackling the air quality problem (Policy 7).

5.3.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

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

By ensuring that any new developments are well connected to sustainable and active travel modes, i.e. walking or/and cycling, could encourage a more active lifestyle amongst the population. Provisions for foot/cycle ways in new developments would reduce severance and will improve accessibility to employment opportunities, community facilities, healthcare services and other amenities, promoting better health and wellbeing overall.

Through incorporating sustainable and active travel modes into new developments, increases in traffic volumes and congestion on the highways network could be prevented. This has the potential to also improve road safety, as well as air and noise pollution.

As mentioned in **Paragraph 4.2.33**, there are four 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.

5.4 Objective 3: Enhancing Connectivity

5.4.1 The following policies are applicable to this Transport Strategy Objective:

- 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 (Policy 8);
- Our priority for improved connectivity will be that the network is used by clean transport modes (Policy 9); and

- We will seek to improve connectivity between rural areas and services in urban centres (Policy 10).

5.4.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

- Physical activity;
- Economy and employment; and
- Access and accessibility.

5.4.3 The key determinants of health and wellbeing that are likely to result in both positive and negative health outcomes associated with this objective are:

- Air quality;
- Noise; and
- Road safety.

Providing greater connectivity to major ports, airports and cities, would enable greater economic opportunities for Norfolk, providing businesses with the opportunity to grow nationally and internationally. In addition, this could attract businesses and tourists to Norfolk, providing employment opportunities and strengthening the local economy. However, this could also result in an increased number of vehicles on the roads which could reduce road safety and increase both air and noise pollution. Any new infrastructure should be well designed to improve safety wherever practical and prioritise sustainable and active travel modes, i.e. walking or and cycling, are incorporated.

The promotion of clean transport modes and associated infrastructure 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 active travel options and/or the introduction of modern, more reliable public transport could lead to reduced traffic volumes and congestion on the highways network which has the potential to improve road safety and air and noise pollution.

Improving connectivity between rural areas and urban centres would reduce severance, improve accessibility to employment opportunities, community facilities, healthcare services and other 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) and road improvements for vehicles drivers.

5.5 Objective 4: Enhancing Norfolk's Quality of Life

5.5.1 The following policies are applicable to this Transport Strategy Objective:

- When making changes and improvements to our transport network, and in working with users on how they choose to use the transport network, we will seek to understand the consequences of the decisions on meeting the collective challenge of protecting and improving our global environment to meet the environmental policy target of working towards carbon neutrality (Policy 11);
- Our priority for tackling air quality will be to take action to improve air quality, including investigating vehicular restrictions or charging, where air quality falls below the threshold for Air Quality Management Areas. We will also embrace new ways of monitoring air quality to inform interventions, including in other areas, where this is deemed necessary (Policy 12); and
- We will seek to improve quality of place, conserving and enhancing our built and historic environments, when we take action to improve the transport network (Policy 13).

5.5.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

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

As mentioned in **Paragraph 4.2.33**, there are four AQMAs in Norfolk in urban centres in Norfolk. Efforts to improve air quality in these areas through traffic reduction measures i.e. Clean Air Zones, congestion charge systems and/or prohibiting petrol and diesel vehicles from city centres, could discourage the use of private vehicles and could encourage a modal shift to active travel options such as walking or cycling. Not only could this encourage a more active lifestyle amongst the population, but could also reduce air and noise pollution which could contribute to NCC's aims to be carbon neutral across all sectors by 2030.

Although the NCC's Electric Vehicle Strategy would promote the use of electric vehicles and would help to remove inequalities in access to charging points by promoting on-street charging points, it is recognised that a shift to sustainable travel rather than simply moving to electric vehicles would achieve quicker and more significant carbon reductions.

Therefore, provisions for foot/cycle ways within new developments and to surrounding existing infrastructure would reduce severance and will improve accessibility to employment opportunities, community facilities, healthcare services and other amenities, promoting better health and wellbeing overall. The identification of opportunities to create linear habitat creation along active travel networks could also improve the attractiveness of switching to active travel options.

Improvements to public transport could 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, due to a reduced 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 to stops and stations. Some studies have also suggested that public transport interventions increase the total physical activity levels of study participants¹⁹ which may have benefits to overall health and wellbeing and access to employment opportunities, community facilities, healthcare services and other amenities.

5.6 Objective 5: Increasing Accessibility

5.6.1 The following policies are applicable to this Transport Strategy Objective:

- We will work in partnership with agencies in Norfolk to tackle accessibility problems, targeting those communities most in need. We will seek to ensure that accessibility is planned as part of service delivery (Policy 14);
- We will identify routes important for sustainable and active transport and give priority – especially in urban areas – to sustainable and active modes of transport (Policy 15); and
- We commit to providing a network where transport and movement can be accessed, understood and used to the greatest extent possible by all people. We recognise that people who live, work in and visit Norfolk access the network in different ways, depending on their individual circumstances and characteristics, and that what enables good access for one person may act as a barrier to another. We will therefore robustly assess all schemes and pay due regard to the Public Sector Equality Duty (along with our other duties and responsibilities), to identify potential barriers and determine how best to overcome any barriers and facilitate access to the greatest extent possible for all. Where appropriate, on a case-by-case basis, we will make reasonable adjustments (Policy 16).

5.6.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

- Air quality;
- Noise;
- Physical activity;
- Road safety;

¹⁹ National Institute for Health and Care Excellence (2018) NICE Guideline: Physical activity and the environment. [online]. Available at: <https://www.nice.org.uk/guidance/ng90/resources/physical-activity-and-the-environment-pdf-1837748441797> (Accessed 8 March 2022).

- Economy and employment; and
- Access and accessibility.

Improvements to public transport in the form of increased reliability, greener fuels and an increased range of public transport services in rural areas, would improve accessibility to employment opportunities, community facilities, healthcare services and other 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.

By prioritising active modes of transport i.e. walking and cycling along some routes, this could encourage the population to take up a more active lifestyle, promoting better health and wellbeing overall. Through careful design, segregated/off-road foot/cycle paths could be incorporated, which would reduce collision risk and improve safety for pedestrians and cyclists. The use of more sustainable modes of transport could reduce the number of vehicles on the roads, reducing congestion and therefore the level air and noise pollution.

Technological advancements such as the provision of Beryl Bikes and/or e-scooters to a wider number of people and initiatives such as 'Mobility as a Service' which could range from car-sharing to phones apps, which allow customers to make easy, multi-modal journeys, has the potential to encourage the use of more sustainable travel options. Such initiatives have the potential to reduce congestion on the road network, reducing the number of idling cars and resulting air and noise pollution.

5.7 Objective 6: Improving Transport Safety

5.7.1 The following policy is applicable to this Transport Strategy Objective:

- Using the safe systems approach, the county council and road safety partners will work together to contribute to a reduction in the number of people killed and seriously injured on the road network (Policy 17).

5.7.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

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

5.7.3 Economy and employment is the only key determinant of health and wellbeing associated with this objective that is likely to result in neutral health outcomes associated .

5.7.4 As shown in **Paragraph 4.2.32**, Norfolk has a significantly higher rate of people killed and seriously injured in road traffic collisions compared to the national average. Through the introduction of reduced speeds and road analysis this has the potential to reduce

congestion, driver stress and improve driver wellbeing and safety which could reduce the number of casualties. Reduced congestion could also lead to a reduction in air and noise pollution.

- 5.7.5 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 associated air and noise pollution, promoting better health and wellbeing overall.

5.8 Objective 7: A Well Managed and Maintained Transport Network

5.8.1 The following policies are applicable to this Transport Strategy Objective:

- Maintaining the current highway asset will be a key priority for funding. Works should be targeted to ensure A and urban/inter-urban routes are in good condition (Policy 18);
- We will identify corridors important for sustainable and active transport and focus maintenance on provision for these users where its impact would be most beneficial in market towns and urban areas (Policy 19);
- In urban areas we will focus on measures to improve public transport corridors to make those journeys quicker and, in areas identified as having less congestion, we will aim to make all journeys more reliable (Policy 20);
- The likely impacts of climate change on the highway network should be addressed to ensure assets are resilient. Where assets can't be made resilient to impacts of climate change, such as coastal erosion, we should have planned alternatives so we can respond faster and avoid disruption. We will use a risk-based approach to determine the priority for action (Policy 21); and
- 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 and used proactively (Policy 22).

5.8.2 The key determinants of health and wellbeing that are likely to result in positive health outcomes associated with this objective are:

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

5.8.3 The key determinants of health and wellbeing that are likely to result in negative health outcomes associated with this objective are:

- Air quality;
- Noise; and
- Road safety.

Maintenance of the existing highways network could encourage an increase in private vehicular usage; this could result in an increase in air and noise pollution due to an increased congestion on 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 and/or new roads, 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 encourage a modal shift to more active travel modes i.e. walking or cycling. Reduced traffic congestion on the highways network could improve road safety and air and noise pollution. Improvements to existing cycle/footpaths within urban areas could reduce severance, improve accessibility to employment opportunities, community facilities, healthcare services and other amenities, promoting better health and wellbeing overall.

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 any improvements in public transport, may increase its use, particularly for those who live nearby. For example, FirstGroup introduced an upgraded X1 bus service between Weston and Bristol City Centre which included new livery and interiors with Wi-Fi, leather seats and services every 20 minutes. The improved bus service has seen an increased in patronage of 21-24% and passenger surveys have shown a significant increase in satisfaction²⁰. Some studies have also suggested that public transport interventions increase the total physical activity levels of study participants¹⁹ which may have benefits to health, access to services and physical activity.

Due to a large number of coastal communities, communities close to rivers and the 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

²⁰ Campaign for Better Transport (N/A). Improving local transport helps the economy – experience from the Local Sustainable Transport Fund. [online]. Available at: <https://bettertransport.org.uk/sites/default/files/research-files/Improving%20local%20transport%20helps%20the%20economy%20-%20experience%20from%20the%20LSTF.pdf> (Accessed 8 March 2022).



resilient network across Norfolk will result in greater journey reliability, including during extreme weather events.

Technological advancements in traffic data, such as being able to inform network users of collisions and delays in real time could reduce congestion and stress levels. This would enable drivers to plan alternative routes, thus avoiding areas of congestion which has the potential to improve road safety and overall wellbeing. Other technological advancements could include electric vehicles, NCC's Electric Vehicle Strategy will help to remove inequalities in access to charging points by promoting on-street charging points as well as adapting parking standards to ensure every new home with a parking space has an electric vehicle charging point, with similar standards for new workplaces. Improvements to air quality resulting from a reduction in carbon emissions will contribute to improving health outcomes for the local population. In addition, the introduction of autonomous vehicles could provide further independent mobility opportunities for older people, non-drivers or those with mobility issues, enabling easier access to healthcare, educational and/or employment opportunities whilst relieving chauffeuring burdens¹⁸. However, it is anticipated that such vehicles, alongside electric vehicles, will be more expensive than traditional vehicles which may not be affordable to those on low income.



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