The Great Grid Upgrade

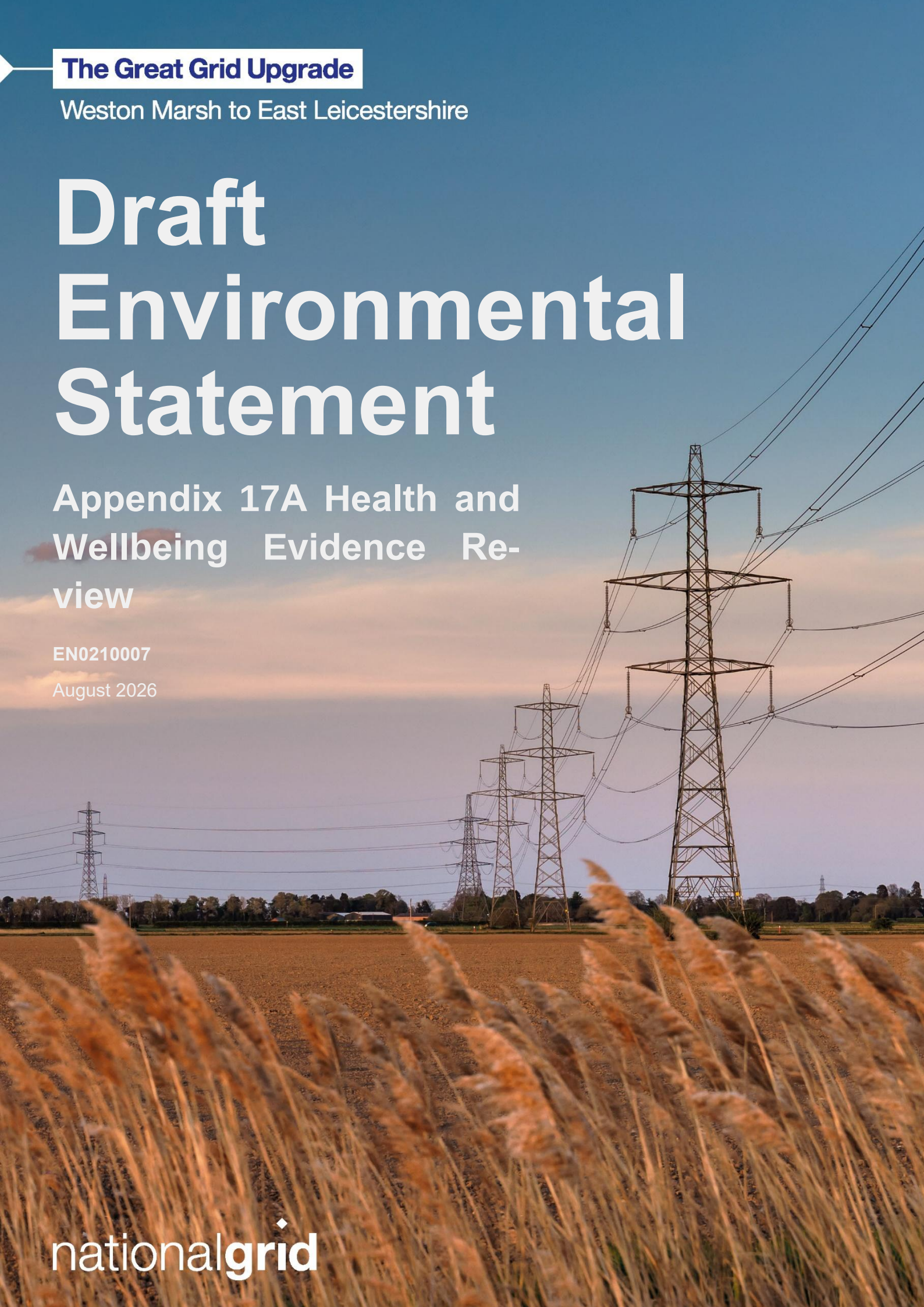
Weston Marsh to East Leicestershire

Draft Environmental Statement

Appendix 17A Health and Wellbeing Evidence Review

EN0210007

August 2026



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17.A Evidence Review of Health Determinants

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17A. Evidence Review of Health Determinants

17A.1 Introduction

17A.1.1 The document is an appendix to **Chapter 17 Health and Wellbeing** of the non-statutory Draft Environmental Statement (DES) (referred to in this document as "DES" and non-statutory DES") for Weston Marsh to East Leicestershire Project (the Project).

17A.1.2 The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 ('The EIA Regulations') (Ref 17A.1) require an EIA to describe and assess the direct and indirect significant effects on population and human health in an appropriate manner. Ongoing design, survey and assessment work, as well as feedback received during the Stage 2 Consultation and ongoing engagement, will be used to refine the Project and improve understanding of its potential effects on Human health, which will be reported in the Environmental Statement (ES) submitted with the application for development consent.

17A.1.3 This document provides a review and summary of the links between the health determinants (environmental, social, and economic factors that influence health) and health and wellbeing outcomes. The purpose of the document is to provide an overview of the scientific consensus on the potential health outcomes associated with impacts on health determinants assessed in **Chapter 17 Health and Wellbeing** of the DES, based on a review of available primary, secondary and grey literature. The evidence presented underpins the qualitative judgements on health outcomes made in the assessment.

17A.2 Scope and Methodology

Scope of the review

17A.2.1 This document is an appendix to **Chapter 17 Health and Wellbeing** of the DES, and the purpose of this document is to provide an overview of the scientific consensus on the types of health outcomes associated with impacts on health determinants assessed in the health assessment presented in **Chapter 17 Health and Wellbeing** of this DES. A literature search has reviewed relevant evidence published between 2008 and 2025.

17A.2.2 The review is mainly focused on secondary sources, such as systematic reviews, and grey literature, such as government reports and policy statements, that reflect a scientific consensus. Primary literature is referenced where secondary literature is not available.

17A.2.3 The spatial scope of the search included collecting evidence from the UK and high-income/developed countries with a comparable public and environmental health legislative and regulatory context.

17A.2.4 The review primarily focuses on health determinants and outcomes assessed in **Chapter 17 Health and Wellbeing** of this DES. However, where evidence is limited, the review showcases links between health determinants and health outcomes more generally.

Literature sources

17A.2.5 The following search engines and databases were used in conducting this review:

- Google and Google Scholar (Ref 17A.2)
- Biomed Central (Ref 17A.3)
- JSTOR (Journal Storage) (Ref 17A.4)
- National Institute for Health and Care Excellence (NICE) Evidence Search (Ref 17A.5)
- PubMed (Ref 17A.6)
- ScienceDirect (Ref 17A.7)
- Scientific American (Ref 17A.8)

Search for evidence on health determinants

17A.2.6 The aspects covered in this review correspond to the health determinants that have been assessed in **Chapter 17 Health and Wellbeing** of the DES, as set out in the EIA Scoping Report (provided as **Appendix 5A** to the DES). Further, under each health determinant, evidence for vulnerable groups relating to the corresponding determinant is provided, where relevant and where evidence is available.

17A.2.7 Health determinants are:

- Health related behaviours - Physical activity
- Social environment - Open space, leisure and play
- Social environment - Social interaction, community cohesion and social capital
- Economic environment - Employment and income
- Biosocial physical environment - Environmental/neighbourhood amenity
- Institutional and built environment - Health and social care services
- Institutional and built environment - Wider societal infrastructure and resources

17A.2.8 The available literature on links between the above determinants and health outcomes is, in general, not explicitly related to infrastructure projects. The search terms used in relation to broad determinants on health included ‘health’ OR ‘wellbeing OR ‘well-being’ AND:

- physical activity/exercise/active travel/connectivity
- relocation/involuntary residential relocation
- green space/open space/nature/play/leisure/recreation
- social interaction/volunteering/community engagement

- socioeconomic status/employment/income/wider economic benefits
- neighbourhood amenity/air quality/noise and vibration/ perceived risk of radiation
- health and social care services/access/quality/capacity
- wider societal infrastructure/resources

Evaluating the strength of evidence

17A.2.9 The strength of evidence for health outcomes associated with health determinants has been evaluated and classified as follows:

- Strong: secondary evidence based on a wide range of peer-reviewed research studies showing similar associations. The association is widely accepted by the public health community and there is consensus on the specific causal factors, the mechanism of effect and the strength of association.
- Moderate: a range of peer-reviewed research studies showing similar associations, with limited secondary evidence. The general association is widely accepted by the public health community, though there may be debate about the specific causal factors, the mechanism of effect and/or the strength of association.
- Weak: a few peer-reviewed/non-peer reviewed research studies to suggest an association, or studies showing conflicting findings.

17A.2.10 It should be noted that weak evidence does not necessarily indicate an absence of association between a health determinant and a health outcome but suggests that there is less certainty in the assessment of the likely effect. Further, while different levels of evidence within the review are useful for the purpose of comparison, lower levels of evidence may still be valid and reliable. The strength of evidence should not be considered as indicating the importance of the health effect.

17A.3 Summary evidence

Health related behaviours: Physical activity

17A.3.1 A 2024 factsheet published by the World Health Organization (WHO) (Ref 17A.9) states that in adults, physical activity contributes to prevention and management of noncommunicable diseases such as cardiovascular diseases, cancer and diabetes and reduces symptoms of depression and anxiety, enhances brain health, and can improve overall well-being. In children and adolescents, physical activity promotes bone health, encourages healthy growth and development of muscle, and improves motor and cognitive development. Further, WHO highlights the risks and poor health outcomes associated with sedentary behaviour such as poorer cardiometabolic health, increased adiposity and poorer social behaviour in children and adolescents and type-2 diabetes, increased all-cause mortality as well as cardiovascular disease and cancer mortalities in adults.

17A.3.2 A 2020 systematic review of reviews and meta-analyses found that physically active older adults are at reduced risk of mortality from all causes, including cardiovascular diseases, breast and prostate cancer, fractures, recurrent falls, Activity of Daily Living

(ADL)[1] disability, functional limitation and cognitive decline, dementia, Alzheimer's disease, and depression (Ref 17A.10).

17A.3.3 A 2020 systematic review and meta-analysis of 150 Cochrane systematic reviews published between 2000 and 2019 found physical activity was associated with a 13% reduction in mortality and an improvement in quality of life (Ref 17A.11).

17A.3.4 A 2021 systematic review and meta-analysis assessing objective physical activity found a 40% decreased risk for mortality in individuals in the highest category of light, moderate to vigorous and total physical activity compared to the lowest (Ref 17A.12).

17A.3.5 A 2018 literature review of studies from various countries examining the relationship between physical activity and happiness reported positive associations between physical activity and happiness and showed that as little as 10 minutes of physical activity per week resulted in increased levels of happiness (Ref 17A.13).

17A.3.6 A cross-sectional and longitudinal 2019 study found that walking had positive associations with psychological and social wellbeing and strolling in nature had positive benefits associated with emotional and social wellbeing. A systematic review and meta-analysis found a significant protective effect of objectively measured physical activity on prevalence and incidence of depression (Ref 17A.14).

17A.3.7 The 2019 UK Chief Medical Officers' Physical activity guidelines focus on the importance of physical activity for all age groups. They highlight the benefits where in childhood, strengthening activity help develop muscle strength and healthy bones, and in adults and older adults, they help to maintain strength and delay natural decline in muscle mass and bone density. The report further highlights the risks of inactivity and sedentary behaviour, which is associated with all cause and cardiovascular mortality, obesity and cancer risk (Ref 17A.15).

Vulnerable groups

17A.3.8 A 2018 systematic review undertaken by the Department of Health and Human Services in the US, noted that higher amounts of physical activity are associated with more favourable indicators of bone health and with reduced risk for excessive increases in body weight and adiposity in children ages 3 to 6 years. It is important to note that the beneficial effects for adiposity and bone health are two health characteristics that are known to impact future health outcomes in adult life (Ref 17A.16).

17A.3.9 A 2020 Lancet study on global trends in insufficient physical activity among adolescents finds that majority of adolescents globally do not meet physical activity guidelines. Further, the prevalence of insufficient physical activity in high income countries was 79.4%, with girls shown to be less active than boys (Ref 17A.17).

17A.3.10 A global 2021 overview of the prevalence, benefits, and promotion policies for physical activity for people living with disabilities (PLWD) states that PLWD are 16–62% less likely to meet physical activity guidelines and are at higher risk of serious health problems related to inactivity than people without disabilities. Meta-analyses have shown that physical activity has beneficial effects on cardiovascular fitness, musculoskeletal fitness, cardiometabolic risk factors, and brain and mental health outcomes. These meta-analyses also show that health benefits can be achieved

[1]Activity of Daily Living (or ADL) is a term used by healthcare professionals to refer to the self-care tasks an individual does on a day-to-day basis, including work

even with less than 150 min of physical activity per week, and suggest that some physical activity is better than none (Ref 17A.18)

17A.3.11 A 2019 study of 76 systematic reviews and meta-analyses shows strong evidence that moderate-intensity physical activity reduced the risk of excessive gestational weight gain, gestational diabetes, and symptoms of postpartum depression for pregnant women (Ref 17A.19).

Strength of evidence

17A.3.12 Based on the criteria set out in Section 17A.2, the evidence linking physical activity to health and wellbeing is strong.

Social environment – Open space, leisure and play

17A.3.13 The Health Foundation 2024 finds that people living in areas with less access to green space are more likely to be in poor health, as access to green space is lower in more deprived areas, and deprivation is itself strongly associated with poor health. Neighbourhoods with greater access to green space tend to have higher life expectancy. Men's life expectancy in neighbourhoods with the highest access to green space is 81.2, compared with 78.2 in neighbourhoods with the lowest. Women's life expectancy in neighbourhoods with the highest access to green space is 84.7, compared with 82.8 in neighbourhoods with the lowest access (Ref 17A.20).

17A.3.14 A National Farmers' Union 2021 study reveals that visiting the countryside has improved the physical and mental health of people living in towns and cities across Britain over the previous year (Ref 17A.21)

17A.3.15 A WHO 2021 report on Green and Blue Spaces and Mental Health shows that besides green spaces, blue spaces can also positively influence mental as well as physical health. Blue spaces are: "outdoor environments – either natural or manmade – that prominently feature water and are accessible to humans either proximally (being in, on or near water) or distally/virtually (being able to see, hear or otherwise sense water)". Qualitative studies reviewed in the report highlighted unique and beneficial characteristics of blue spaces, including the visual openness of the space and fluidity of the water that provides a calming effect and the importance of safety perceptions (Ref 17A.22).

Vulnerable groups

17A.3.16 A 2024 study looking at the effects of playgrounds on children's health, analysed 247 studies and concluded that adding playground markings to schoolyards led to increased physical activity, also having positive effects on social and mental health (Ref 17A.22)

17A.3.17 A 2024 systematic review of quantitative review by Kilgour et al., states that physical activity in older people can reduce the incidence of sarcopenia, frequency of falls, cardiovascular disease, days spent in hospital, and all-cause mortality, even in frail older adults. The study reported barriers for older adults to physical activity, including safety concerns, lack of facilities, transport and equipment. It also reported outside facilities or green spaces near home as a key motivator for physical activity (Ref 17A.23).

17A.3.18 A 2024 systematic review on the impact of outdoor blue spaces on the health of the elderly finds that blue spaces promote potential health and wellbeing benefits by

relieving stress, stimulating physical activity and enhancing social connection (Ref 17A.24).

17A.3.19 A Lancet Public Health 2025 study confirms the association between leisure-time physical activity and increased disease-free years across population subgroups, showing that health benefits are often more pronounced among individuals with pre-existing health risks or disadvantaged backgrounds than in those with more favourable risk factor profiles. This suggests that enhancing population-wide physical activity initiatives and access to leisure could help reduce health disparities (Ref 17A.25).

Strength of evidence

17A.3.20 Based on the criteria set out in Section 17A.2, the evidence linking open space, leisure and play to health and wellbeing is strong.

Social environment – Social interaction, community cohesion and social capital

17A.3.21 Volunteer Scotland's 2018 report shows evidence that volunteering provides physical health benefits including healthy behaviours with increased physical activity, improved daily living and an improved ability to cope with one's illness, particularly for older people. Additionally, it provides mental health benefits like reduced depression, anxiety and stress, post-traumatic stress disorder and supports management of psychiatric or learning disabilities as well. Further, volunteering is associated with improved wellbeing, through increased social connectedness, sense of purpose and increased self-worth (Ref 17A.26).

17A.3.22 The Health Foundation 2024 highlights that our connections within our communities can have an important influence on our health. Experiencing a feeling of belonging to our community has a positive association with health, particularly mental health, as people living in neighbourhoods with higher levels of social cohesion experience better mental health (Ref 17A.27).

17A.3.23 The Marmot Review: Implications for Spatial Planning, shows that community capital differs in areas of deprivation, with less volunteering and unpaid work, less socialising and less trust in others, in the neighbourhoods that are perceived to be less safe. Evidence shows a strong link between social capital and health, especially in deprived communities where stress, isolation, depression, low social integration, and loneliness significantly raise mortality. Social participation acts as a protective factor against dementia and cognitive decline over the age of 65 and also have an impact on the risk of mortality by aiding recovery when becoming ill. Furthermore, there is some evidence that increasing community empowerment may result in communities acting to change their social, material and political environments

17A.3.24 The Marmot Review indicates that in some cases, social isolation is heightened by the physical environment, especially for elderly and disabled people. Fear of crime in public spaces and fear of traffic often stops elderly people from reaching services and community groups and taking advantage of interaction with neighbours and local retailer in public spaces and shops

17A.3.25 A 2020 study in the Journal of Positive Psychology and Wellbeing shows the negative impact of discrimination experiences on wellbeing and social cohesion,

including identities based on ethnicity, disability, sexual orientation, marital status, education, employment, income and religion (Ref 17A.28).

17A.3.26 The Transport, health and wellbeing evidence review for the Department of Transport 2019 finds that there are positive benefits of transport improving access to employment and education opportunities, community facilities as well as recreation and exercise, which leads to better health outcomes. In general, healthy and affluent groups are more likely to experience positive impacts whereas those on lower incomes, young, and older people are more likely to experience negative impacts. Increased traffic impacts levels of air and noise pollution in local areas, as well as journey times to essential services like healthcare, education and employment and other community facilities. Disruption to public transport routes, e.g. due to diversions associated with construction projects, impacts access to services like healthcare, education, employment as well as community assets for social interactions (Ref 17A.29).

17A.3.27 The review also shows that transport can have both positive and negative impacts on feelings of isolation and connectedness, and relatedly social exclusion and wellbeing. It discusses the impact of community severance which refers to limited accessibility of a community caused by infrastructure, such as motorways without pedestrian crossings or railway tracks that divide a city in half, or a high volume of traffic and how community severance can lead to increased distances to workplaces and facilities such as schools, parks, shops, leisure centres, and health service. It also shows that people without a car, people on low-incomes, people living on isolated housing estates or in deprived areas, people with physical or sensory impairments, older people, children and young people, and people living in remote areas are most at risk for being socially excluded due to a lack of access to public transport or disruption to public transport services.

Strength of evidence

17A.3.28 Based on the criteria set out in Section 17A.2, the evidence linking community cohesion and social capital to health and wellbeing is strong.

Economic environment - Employment and income

17A.3.29 A 2017 systematic review and meta-analysis finds that income inequality negatively affects mental health, but the effect sizes are small and there is marked heterogeneity among studies (Ref 17A.30).

17A.3.30 The American Journal of Public Health's 2011 research on socioeconomic status and health finds that there is a strong and consistent relationship between socioeconomic measures of education, income and occupation and risks factors for cardiovascular disease. The highest level of risk was associated with lower levels of education, suggesting higher education as an appropriate predictor of good health (Ref 17A.31).

17A.3.31 The World Travel & Tourism Council's Travel & Tourism Economic Impact Research (EIR) shows that tourism is an important source of employment and in 2024, the sector supported a total of 357 million jobs globally. This suggests positive wider economic and employment benefits in areas with tourist attractions (Ref 17A.32).

17A.3.32 A review of existing literature on the effects of socioeconomic status changes on health found that evidence suggests that individuals who experience consistently high socioeconomic status or upward social mobility have better health outcomes

throughout life and in adulthood than those who experience consistently low socioeconomic status and downward social mobility (Ref 17A.33).

Vulnerable groups

17A.3.33 According to the Health Action Research Group's 2021 research, White ethnic groups are more likely to be promoted than BAME groups, even if they are less qualified and people with Indian or Pakistani-sounding names are 28% less likely to be invited to an interview than similarly qualified candidates with English-sounding names. The current BAME employment rate stands at 62.8%, while White ethnic groups have an employment rate of 75.6% (Ref 17A.34).

17A.3.34 Public Health England's 2019 guidance on health and work states that there is clear evidence that unemployment is bad for health and wellbeing, as it is associated with increased risk of mortality and morbidity. Particularly, for those with long-term conditions such as mental health problems, musculoskeletal (MSK) conditions and disabilities, health issues can be a barrier to gaining and retaining employment (Ref 17A.35).

17A.3.35 Institute of Health Equity's 2020 report states that the more deprived the area, the shorter the life expectancy. This social gradient has become steeper over the last decade, and it is women in the most deprived 10% of areas for whom life expectancy fell between the years 2010-12 and 2016-18 (Ref 17A.36).

Strength of evidence

17A.3.36 Based on the criteria set out in Section 17A.2, the evidence linking employment and income to health and wellbeing is strong.

Biosocial physical environment - Environmental/neighbourhood amenity

Air quality

17A.3.37 According to the WHO 2024, exposure to high levels of air pollution can cause various health outcomes. Increased health risks with exposure to air pollution include respiratory infections, heart disease, stroke, and lung cancer, which can severely affect people who are already ill, such as children, the elderly, and poor people. Furthermore, poor air quality increases the risk of stillbirth, miscarriage, and neurological conditions such as cognitive impairment and dementia (Ref 17A.37).

17A.3.38 A 2023 review identifies that numerous scientific studies have linked construction dust exposure to a variety of health impacts, including the increased risk and mortality from various respiratory and cardiovascular diseases, as well as the increased cancer risk (Ref 17A.38).

17A.3.39 Public Health England's Health Matters: Air pollution 2018 guidance highlights that poor air quality is the largest environmental risk to public health in the UK, as long-term exposure to air pollution can reduce life expectancy due to cardiovascular and respiratory diseases and short term exposure can lead to effects on lung function, exacerbation of asthma and increases in cardiovascular and respiratory admissions and mortality. Emerging evidence also associates air pollution with early life effects such as low birth weight and later life effects like dementia and cognitive decline (Ref 17A.39).

Vulnerable groups

17A.3.40 With regards to early childhood, pregnancy and infancy, Public Health England's Health Matters: Air pollution 2018 guidance indicates that factors that adversely affect human development, including air pollution, can have both immediate and long-lasting effects on a person's health, and some health impacts may only emerge later in life. In addition to potential effects on foetal growth, air pollution exposure is also associated with low birth weight and premature birth (Ref 17A.39).

17A.3.41 UK Health Security Agency 2025 research shows that traffic-related air pollution is linked to adverse health effects, disproportionately affecting children and contributing to health inequalities. Children travelling to school are particularly vulnerable to high levels of traffic-related pollution. This can also reduce active travel and impact levels of physical exercise, road safety and socialising among children (Ref 17A.40).

17A.3.42 The Environment Agency's 2023 research analysis has shown that areas of highest deprivation and those with high proportions of ethnic minorities are disproportionately affected by high levels of air pollution. In 2016, nitrogen dioxide exceeded legal limits in the nearest play spaces for 14% of under 16-year-olds in Greater London. Two-thirds of these children lived in deprived areas (Ref 17A.41).

Noise and vibration

17A.3.43 A 2023 systematic reviews and meta-analysis shows that environmental noise exposure was more likely to result in a series of adverse outcomes. High noise exposure from different sources was associated with an increased risk of cardiovascular disease and its mortality, elevated blood pressure, diabetes and adverse reproductive outcomes. It also shows that the risk of diabetes, ischemic heart disease (IHD), cardiovascular (CV) mortality, stroke, anxiety and depression increases with increasing noise exposure (Ref 17A.42).

17A.3.44 A 2024 review on noise and mental health shows that annoyance and sleep disturbance due to noise are proposed as key drivers of noise-associated non-communicable disease (NCD) onset and progression including both physical and mental health conditions. Noise exposure has been implicated in a wide range of major NCDs including cardiovascular disease, metabolic disease, cancer, and respiratory disease (Ref 17A.43).

Vulnerable groups

17A.3.45 The 2024 review on noise and mental health shows that exposure to noise, particularly from sources such as traffic, can potentially impact the central nervous system. These harms of noise increase the susceptibility to mental health conditions such as depression, anxiety, suicide, and behavioural problems in children and adolescents (Ref 17A.43).

17A.3.46 BMC Public Health's 2021 cross-sectional investigation on road traffic noise and cognitive function in older adults shows that long term exposure to road traffic noise may be negatively associated with executive function (mental skills that support with everyday tasks, including planning, problem solving and adaptability) among older adults (Ref 17A.44).

Electric and Magnetic Fields (EMFs)

17A.3.47 In response, the WHO established the EMF Project to provide scientifically sound and objective answers to public concerns about possible hazards of low level electromagnetic fields. (Ref 17A.45).

17A.3.48 Current consensus statements from major health organisations including the WHO and the International Commission on Non-Ionizing Radiation Protection, based on extensive research, conclude that within established exposure limits, non-ionising EMFs do not cause and known adverse health effects (Ref 17A.46). However, there is ongoing public concern focussed on whether extremely low-frequency (0-300 Hz) EMFs (ELF-EMFs) emitted by high-voltage power lines and substations cause long-term health issues, particularly childhood leukaemia.

17A.3.49 Power lines are a source of ELF-EMFs at a frequency of 50 Hz. In 2002, the International Agency for Research on Cancer (IARC), a component of the WHO, appointed an expert Working Group to review all available evidence on static and extremely low frequency electric and magnetic fields. The Working Group classified ELF-EMFs as “possibly carcinogenic to humans,” based on limited evidence from human studies in relation to childhood leukaemia, although no mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified (Ref 17A.47). This classification relates to the level of certainty that a substance can cause cancer, and means, in this case, there is limited evidence in humans and less than sufficient evidence in experimental animals (Ref 17A.48).

17A.3.50 Numerous epidemiologic studies and literature reviews, including studies evaluating possible associations between exposure to non-ionising EMFs and risk of cancer in children such leukaemia and brain tumours, have been undertaken. No consistent evidence for an association between any source of non-ionising EMF and cancer has been found (Ref 17A.49).

17A.3.51 Perceived impacts of towers and power lines, while not linked to adverse health effects by scientific consensus, can nevertheless impact mental wellbeing and quality of life for some people. Some individuals report "hypersensitivity", citing symptoms such as aches and pains, headaches, depression, lethargy, sleeping disorders associated with ELF-EMF exposure. However, recent studies found that individuals do not show consistent reactions under properly controlled conditions of EMF exposure, nor is there any accepted biological mechanism to explain hypersensitivity. (Ref 17A.45)

17A.3.52 In the past, media portrayals have distorted public understanding of risk, leading to heightened feelings of stress and anxiety, uncertainty and powerlessness in relation to ELF-EMF exposure (Ref 17A.49).

17A.3.53 Studies have suggested that people hold negative health expectations of exposure to EMFs associated with power lines (Ref 17A.51). A prospective study in the Netherlands specifically studied residents’ health responses in relation to a new high voltage power line and found a negative impact on health perceptions in nearby residents (Ref 17A.52).

17A.3.54 Many groups opposed to pylons and other transmission structures being built close to their settlements flag anxieties about increased health risks as a major reason for their opposition. There have been a number of epidemiological studies investigating if suicide and depression are associated with EMF exposure. Overall, the results are inconclusive (Ref 17A.49).

17A.3.55 Research on public perceptions of EMFs suggests that, although EMFs are not commonly identified as a major environmental hazard, direct questioning indicates a bias towards assumptions of harm, with 58% of respondents believing that ELF-EMF exposure can damage human cells. A study in Ireland found that perceptions of risk may be influenced by uncertainty and assumptions about potential harm rather than familiarity with the scientific evidence base (Ref 17A.54).

Vulnerable groups

17A.3.56 Perception of environmental risk is socially patterned, with higher levels of concern consistently observed among women (particularly pregnant women), parents of young children, individuals with pre-existing health conditions, and communities experiencing socioeconomic or environmental disadvantage, as well as those living in proximity to perceived hazards (Ref 17A.55, Ref 17A.56, Ref 17A.57).

Strength of evidence

17A.3.57 Based on the criteria set out in Section 17A.2, the evidence linking environmental amenity to health and wellbeing is strong.

Visual amenity

17A.3.58 A 2015 study on the impacts of scenic environments on health finds that inhabitants of more scenic environments report better health, across urban, suburban and rural areas. This result stands even when taking socioeconomic indicators of deprivation, such as income and air pollution into account. The health benefits associated with scenic environments are associated with green and blue spaces, including environments with large areas of water, open blue skies or mountainous landscapes (Ref 17A.58).

17A.3.59 The construction of electricity pylons can be particularly contentious as a result of their visual impact, due to the regular occurrence of the pylons along a linear route, as well as their height. This can have a disrupting effect on the perception of natural and rural landscapes (Ref 17A.59).

17A.3.60 Landscape is a health resource that promotes physical, mental and social well-being. In order to promote health, landscapes must be perceived as pleasant, safe and attractive. Additionally, walking-friendly design promotes physical activity and landscapes can foster emotional well-being and health behaviour by offering the possibility of meeting and engaging with other people in public open spaces (Ref 17A.60).

Strength of evidence

17A.3.61 Based on the criteria set out in Section 17A.2, the evidence linking environmental amenity to health and wellbeing is moderate.

Institutional and built environment: Health and social care services

17A.3.62 The Department of Transport 2019 review finds that increased traffic impacts levels of air and noise pollution in local areas, as well as journey times to essential services like healthcare, education and employment. Disruption to public transport routes, e.g. due to diversions associated with construction projects, impacts access to services like healthcare, education, employment as well as community assets for social interactions (Ref 17A.60)

17A.3.63 The Care Quality Commission's 2024 research on primary and community care shows that the number of people waiting more than 2 weeks for a GP practice appointment increased by 18% from 4.2 million in February 2020 to 5 million in March 2024. Additionally, the 2 services that people had the most difficulty accessing were GP services (59% of survey respondents) and dental services (23% of survey respondents) (Ref 17A.61)

17A.3.64 A scoping review on the impact of distance and/or travel time on healthcare service access in rural and remote areas found that travel time may be a more meaningful measure than distance when assessing healthcare access in non-metropolitan populations, and that impacts to travel time impact the decision to access health services (Ref 17A.62).

17A.3.65 According to a 2018 report by the Organisation for Economic Co-operation and Development, WHO and the World Bank, poor quality health services are holding back progress on improving health in countries at all income levels. Additionally, the report indicates that around 15 percent of hospital expenditure in high-income countries is due to mistakes in care or patients being infected while in hospitals.

Vulnerable groups

17A.3.66 The Care Quality Commission's primary and community care 2024 research shows that the 10 integrated care system areas with the highest proportions of patients waiting over 2 weeks for a GP appointment were in comparatively rural areas – with half of these in the South West (Ref 17A.63).

17A.3.67 The Care Quality Commission's primary and community care 2024 research also shows that people in the most deprived areas of England were nearly 3 times more likely to be admitted to hospital for treatment that could potentially be avoided with timely and effective care in the community. Furthermore, school children living in the most deprived areas were more than twice as likely to experience tooth decay than those living in the least deprived areas (Ref 17A.64).

17A.3.68 The Care Quality Commission's adult social care 2024 research shows that in April 2024, waits for care home beds and home-based care accounted for 45% of delays in discharging people who had been in an acute hospital for 14 days or more, with nearly 4,000 people delayed on an average day (Ref 17A.64).

17A.3.69 The Care Quality Commission's mental health 2024 research shows that access to mental health services remains a challenge for many people. Research from the Strategy Unit shows that people who live in deprived areas, women, and people from 'other' ethnic minority groups (global ethnic majorities, including Asian, Black, Arab,

Hispanic among others) with mental health needs are more likely to attend urgent and emergency care departments (Ref 17A.64)[2].

17A.3.70 Longitudinal study using General Practice Workforces datasets from 2015-2020 in England has identified that workforce shortages are disproportionately affecting more deprived areas. There were significantly fewer FTE GPs per 10,000 patients in practices in higher IMD deciles (Ref 17A.65)

Strength of evidence

17A.3.71 Based on the criteria set out in Section 17A.2, the evidence linking health and social care services to health and wellbeing is strong.

Institutional and built environment - Wider societal infrastructure and resources

17A.3.72 US Department of Health and Human Services: Healthy People 2030's literature summary discusses barriers to health care access including lack of health insurance, poor access to transportation, and limited health care resources, with a special focus on how these barriers impact under-resourced communities. Many people face barriers that prevent or limit access to needed health care services, which may increase the risk of poor health outcomes and health disparities (Ref 17A.66).

17A.3.73 The NHS Health Economics Unit's article on healthcare planning outlines how health inequalities can be reduced, and health and well-being can be enhanced through the delivery of societal infrastructure. Major infrastructure programmes and projects can deliver economic outcomes such as job creation and economic growth. They can also deliver transformative outcomes and benefits, including access to critical health care services for all income groups, sustained job creation and economic growth, reduced inequalities in income and health, equitable access to labour market opportunities, improved skills, reduced regional disparities, digitalisation, low-carbon transition, disaster and climate adaption, social cohesion and social equity and stability (Ref 17A.67).

17A.3.74 A 2024 report by Energy UK on Community benefits from local infrastructure states how energy infrastructure offer a variety of benefits to local communities, including through community benefit funds. This includes case study examples of investments in local foodbanks, healthcare equipment, educational initiatives as well as employment opportunities (Ref 17A.68).

17A.3.75 A 2023 World Bank Group report finds that digital infrastructure has a causal, positive and significant impact on economic growth. This contributes towards reduced inequality in income distribution. Additionally, investments in complementary factors such as electrical infrastructure is essential to gain the maximum benefits of digital infrastructure. Further, in rural areas of developed countries, access to improved electrical infrastructure shows increased demand for labour, stronger bargaining power and economic growth (Ref 17A.69).

17A.3.76 A 2024 study on Community benefits for Electric Transmission Network Infrastructure by BMG Research for the Department for Energy Security and Net Zero found that electricity bill discounts were identified as the type of community benefit that was able

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to help increase acceptance for a new transmission infrastructure project for the most respondents (78%). Additionally, the research found that companies developing the infrastructure providing jobs, training, and apprenticeships for local residents to work in industry would make it more acceptable for local communities.

Strength of evidence

17A.3.77 Based on the criteria set out in Section 17A.2, the evidence linking wider societal infrastructure and resources to health and wellbeing is strong.

Pre-planning mental wellbeing impacts

17A.3.78 The 2022 HS2 Mental Health and Wellbeing Progress Report shows that residents report feelings of anxiety and negative feelings associated with the value of their properties, impact on their quality of life, impact on their local green spaces, construction noise and air emissions, construction traffic and social isolation caused by congestion and severance (Ref 17A.70). While the evidence draws on a specific project, the mental health and wellbeing impacts listed above are commonly experienced as part of the construction of most infrastructure projects across industries like transport, energy, water and others.

17A.3.79 Major infrastructure built close to existing communities can also impact mental health due to a perceived loss of control and voicelessness. Local communities can see themselves as relatively powerless and feel like others are more likely to be heard; and that their experiences are not seen as good evidence. This can have an adverse impact on mental health both before, during, and after construction (Ref 17A.71).

17A.3.80 The physical health impacts of construction periods are well known, with increased road traffic and demolition and construction works leading to potential increases in air and noise pollution. However, living close to construction sites can also impact people's mental health, with increased anxieties and feelings of overwhelm related to construction activities and the length of the programme. Recent literature has found that there is a lack of consideration of mental health impacts in major infrastructure assessment; and this in itself can also adversely impact the mental health of local communities (Ref 17A.72) (Ref 17A.73).

Strength of evidence

17A.3.81 Based on the criteria set out in Section 17A.2, the evidence linking pre-planning impacts of infrastructure projects to health and wellbeing is moderate.

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