

24.1 INTRODUCTION

24.1.1 Health, or more importantly what constitutes good health, is difficult to define and measure in all its aspects for a population, not least because perceptions regarding health, and expectations of good health, vary. Following best practice, this Health Impact Assessment (HIA) takes the World Health Organization's (WHO) definition, which states that health is

'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' (WHO, 1948).

24.1.2 Due to the nature and scale of AMEP and potential health outcomes, coupled with the fact that a HIA has not been recommended by the Primary Care Trust or the Health Protection Agency, a HIA has not been undertaken for this project. Instead, an assessment of possible impacts on health is discussed in this chapter. The aim of the chapter is to evaluate potential health impacts (both positive and negative) likely to arise from the construction and operation of AMEP.

24.1.3 Recommendations on how any positive health impacts can be enhanced and negative health impacts reduced are also presented.

24.1.4 It is unlikely there will be regional health impacts associated with AMEP, therefore impacts on a local level only have been looked at, except for socio economic impacts which have also been looked at on a regional level as well.

24.2 LEGISLATION, POLICY AND GUIDANCE

24.2.1 There is no specific legislation in the UK which relates to assessing health impacts in the context of planning.

24.2.2 The draft Ports NPS recognises that ports can affect the health, wellbeing and quality of life of the population. Accordingly the applicant and the decision maker are required to consider the cumulative impact of a range of direct and indirect impacts on health.

24.3 ASSESSMENT METHODOLOGY AND CRITERIA

24.3.1 Health at the population level is influenced by a number of so-called “determinants of health”. Many of these are socio-economic in nature. Those commonly thought to be important are:

- employment;
- income;
- access to services;
- transport;
- housing;
- education;
- crime and fear of crime;
- social capital; and
- the physical environment.

24.3.2 To determine the potential health impacts of AMEP on nearby residents it is conventional to consider the pathways by which AMEP might affect these determinants and by how much. For example, a development that creates new employment opportunities will contribute positively to health. Conversely, if a development will cause degradation in air quality, this will have a negative consequence for health.

24.3.3 In terms of assessing the potential health impacts associated with AMEP, relevant chapters of the ES (such as *Ch 15 Traffic & Transport*, *Ch 16 Noise* and *Ch 17 Air Quality*) have been reviewed and any significant impacts identified in these chapters considered in terms of their potential implications on health.

24.3.4 The assessment of health effects has been undertaken as a desk based exercise and has not included any stakeholder engagement. However, through the IPC scoping process and consultations on the PEIR, groups and individuals have had the opportunity to comment on the proposals and express concerns.

Evidence Summary

24.3.5 To undertake the assessment of potential impacts on health, the findings of the ES have been considered in conjunction with evidence from published literature, a summary of which is presented below.

24.3.6 Evidence of how health can be impacted by different determinants and pathways is described below under the following headings:

- socio-economics;
- landscape and visual;
- transport;
- noise; and
- air quality.

Socio Economics

24.3.7 Employment and income are regarded as the key determinants of health, influencing where an individual lives, the education received, access to healthcare and even lifestyle and behaviour.

24.3.8 Ethnic minorities, young people and the disabled generally face the highest levels of unemployment. These groups are likely to be found in more insecure employment and be poorly paid, therefore having low socio economic status.

24.3.9 Unemployment is directly linked with poorer health (and vice versa). Unemployed individuals are more likely to report illness and injury as well as psychological symptoms such as demoralisation. Health outcomes associated with unemployment include physical health effects, mental health effects, suicide, effects on well being, role functioning (such as acting as a parent), poor self reported health and increased mortality.

24.3.10 Increased employment opportunities can have a positive influence on health through increasing social contact, involvement in a collective effort or activity and by forming social relationships. All of these contribute to well being. In addition, those in insecure employment are likely to have poorer mental health than those in secure employment. It has also been found that those in least favourable employment conditions (routine occupations) are nearly four times more likely to become ill than those in the most favourable (professional and managerial).

24.3.11 Employment and income together contribute to a person's socio economic status. In broad terms, the greater the income, the better the health; however, this relationship is not strictly linear. Above a certain amount, higher income is less proportionally related to improved health.

Landscape and Visual

- 24.3.12 Visual disturbances can become a focus for concern and anxiety. The built environment can impact on public health and the way that people utilise their environment. The built environment can influence physical activity and the health impacts associated with this. The natural environment is known to have a restorative function in that it reduces stress and anxiety levels. In Health Impact Assessment there is a consensus that there is a strong link between the visual environment and people's mental and physical health.
- 24.3.13 Light pollution from the built environment can have a negative health impact through annoyance, discomfort and loss of visual environment and visibility. Artificial lighting (emitted from premises so as to be prejudicial to health or a nuisance) is considered a statutory nuisance under the Environmental Protection Act 1990.

Transport

- 24.3.14 Transport plays a vital role in promoting health and well being. It does this directly by providing communities with access to a range of services and amenities required to treat ill-health and to manage and promote healthy living. It does so indirectly through achieving and maintaining social and family networks and accessing employment opportunities.
- 24.3.15 Transport can have a negative impact on health due to injuries and death through accidents. In addition, transport can lead to increased noise and air pollution resulting in respiratory and cardiovascular problems; noise and pollution have been covered in separate chapters.

Noise

- 24.3.16 Noise has the potential to affect health in a variety of ways. Some adverse effects can be auditory (damage to the ear) and occur as a direct impact of noise (at levels higher than considered here and in excess of statutory acoustic limiting values) whilst others are non auditory; such as annoyance, night time effects and mental health impacts and may be associated with exposure to environmental noise.
- 24.3.17 Annoyance is the most reported non auditory health effect associated with noise. Vibration can also cause annoyance to those experiencing it. Sleep disturbance associated with noise is also a major issue with certain vulnerable groups more likely to be affected. It has been shown that noise levels that are sufficiently high can induce cardiovascular

effects at the population level, including acute myocardial infarction (heart attack) ⁽¹⁾ .

Air Quality

- 24.3.18 Exposure to outdoor air pollution is associated with both acute and chronic health effects. Particulate matter (PM), mainly generated from engine emissions and construction activities, can adversely affect human health in varying degrees depending on its size, composition, origin and the length of exposure. The public health implications of the long-term effects of exposure to PM are an order of magnitude greater than those of the short-term effects, as measured by life years lost, although it is difficult to disentangle the two entirely. A strong body of epidemiological evidence provides compelling evidence of the association between long-term exposure to PM_{2.5} (air pollutants with a diameter of 2.5 micrometers or less) and cardiovascular disease, with consequent implications for mortality ⁽²⁾ .
- 24.3.19 Groups that are particularly vulnerable to exposure from air pollution include foetuses, young children, the elderly and those with cardio-respiratory disease, as well as the social-economically deprived (as health amongst the deprived is normally poorer to start with making them more vulnerable),
- 24.3.20 Dust emissions and subsequent deposition arising from construction activities can cause annoyance. Dust can also irritate the eyes and aggravate pre-existing respiratory problems, such as asthma.

24.4 **CONSULTATION**

- 24.4.1 The IPC Scoping Opinion takes into consideration stakeholder responses and summarises where health issues are raised as a concern. These are listed below in *Error! Reference source not found.*

24.5 **BASELINE**

- 24.5.1 Evidence suggests that different communities have varying susceptibilities to health impacts and benefits as a result of ethnicity, social and demographic structure and relative deprivation. The

(1) Bluhm et al (2005) Health Effects of Noise from Railway Traffic - The HEAT Study, Presented at the Internoise 2005 conference

(2) Health aspects of air pollution with Particulate matter, ozone and Nitrogen dioxide. Report on a WHO working group Bonn Germany January 2003

baseline below therefore provides an insight to how potential impacts might act disproportionately upon some communities and vulnerable people. The aim of the baseline is to understand the differing susceptibilities to health impacts and receiving of benefits as a result of variations in social and demographic status and relative deprivation in communities.

Population

24.5.2 AMEP is located in Ferry Ward within the unitary authority of North Lincolnshire Council, close to the border of North East Lincolnshire. The closest settlements to the site are the villages of East Halton and North Killingholme with populations in 2001 of 604 and 224.

Population Data by Gender

24.5.3 *Table 24.1* shows a breakdown of the population by gender in the Ferry Ward, North Lincolnshire and North East Lincolnshire. The gender ratio in North Lincolnshire and North East Lincolnshire mirrors that of England as a whole, however Ferry Ward in contrast has a higher proportion of males to females.

Table 24.1 *Population Data by Gender (2001)*

Area	Males (%)	Females (%)	Total
Ferry	50.04	49.96	10,180
North Lincolnshire	48.92	51.08	152,849
North East Lincolnshire	48.55	51.45	157,979
England	48.68	51.32	49,138,831

Source: Census 2001 – www.statistics.gov.uk

Population Data by Age

24.5.4 The age structure of a population indicates both the current and strategic (future) requirements of an area. A younger population, for example, may require additional access to schools, safe recreation play facilities and the development of future employment opportunities, while aging populations are likely to require a greater focus on health care, living support, accessibility and social networks. *Table 24.2* shows a breakdown of the population by age.

Table 24.2 Population Data by Age (2001)

	0-14 (%)	15-24 (%)	25-34 (%)	35-44 (%)	45-59 (%)	60-69 (%)	70+ (%)
Ferry	18.61	9.98	12.95	15.84	22.09	10.04	10.49
North Lincolnshire	18.87	10.80	12.56	14.93	20.64	10.20	11.98
North East Lincolnshire	20.61	11.44	12.96	14.61	18.68	9.89	11.80
England	18.88	12.18	14.36	14.94	18.88	9.25	11.51

Source: Census 2001 – www.statistics.gov.uk

24.5.5 Broadly speaking the age structures of Ferry Ward, North Lincolnshire and North East Lincolnshire are similar to that of England as a whole.

Ethnicity

24.5.6 Epidemiological evidence suggests that minority groups often experience fewer socio-economic and physical health benefits ⁽¹⁾ ; this may be a result of discrimination, levels of education, or even language barriers.

24.5.7 Table 24.3 shows that the population around AMEP site is dominated by white people with, on average, less than 1.17 percent (Ferry Ward), 2.46 percent (North Lincolnshire) and 1.42 percent (North East Lincolnshire) of the population being black or from another ethnic minority. This is significantly lower than the national average of 9.08 percent.

Table 24.3 Population Data by Ethnicity (2001)

Area	White (%)	Asian or Asian British (%)	Mixed (%)	Black or Black British (%)	Chinese or Other Ethnic Group (%)
Ferry North Lincolnshire	98.83	0.47	0.36	0.12	0.22
North East Lincolnshire	97.54	0.41	1.59	0.17	0.29
England	98.58	0.53	0.46	0.15	0.26
	90.92	1.31	4.58	2.30	0.89

Source: Census 2001 – www.statistics.gov.uk

Religion

24.5.8 The concept of a minority group can also be applied to religions. Those in minority religions may experience feelings of exclusion and a loss of social networks and support that comes from shared religious

(1) Samje C (1995) Health, Race and Ethnicity: Making Sense of the Evidence. King's Fund Institute: London.

celebrations and worship.

- 24.5.9 Exclusion is not deemed to be significant in the study area as the significant majority of the population is Christian and all others stating no religion or not stating a religion.

Table 24.4 Population Data by Religion (2001)

	Ferry	North Lincolnshire	North East Lincolnshire	England
Christian (%)	79.61	79.45	75.71	71.74
Buddhist (%)	0.13	0.12	0.10	0.28
Hindu (%)	0.03	0.19	0.19	1.11
Jewish (%)	0.00	0.03	0.06	0.52
Muslim (%)	0.16	1.14	0.48	3.10
Sikh (%)	0.12	0.31	0.07	0.67
Other religions (%)	0.20	0.12	0.14	0.29
No religion (%)	11.90	11.43	14.61	14.59
Religion not stated (%)	7.87	7.21	8.63	7.69

Source: Census 2001 – www.statistics.gov.uk

Education, Skills and Training

- 24.5.10 Education is an important determinant of health and influences almost every aspect of health including lifestyle, coping skills, future employment prospects and subsequent income, quality of housing and healthcare. Improving the quality and level of education is therefore a national imperative.

Education and Qualification Levels

- 24.5.11 The percentage of the population with various levels of qualifications are shown in *Table 24.5*.
- 24.5.12 Ferry Ward, North Lincolnshire and North East Lincolnshire show a high proportion of their population having no qualifications, and as such a lower proportion having qualification levels three, four or five than across England as a whole.

Table 24.5 Education and Qualification levels (2001)

	Ferry	North Lincolnshire	North East Lincolnshire	England
Total number of schoolchildren and full-time students aged 16-74	7,494	110,156	110,925	35,532,091
People aged 16-74 with no qualifications (%)	31.20	33.06	37.12	28.85
People aged 16-74 who attained level 1 (%)	19.62	20.35	19.09	16.63
People aged 16-74 who attained level 2 (%)	20.46	20.32	19.53	19.36
People aged 16-74 who attained level 3 (%)	5.63	5.52	5.26	8.34
People aged 16-74 who attained level 4 / 5 (%)	14.37	12.88	10.53	19.90
People aged 16-74 with other qualifications / level unknown (%)	8.73	7.86	8.46	6.92
Level 1: 1+ O level, GCSE, CSE pass any grade, NVQ level 1 or foundation GNVQ				
Level 2: 5+ O levels 5+ CSE's (grade one) 5+ GCSE's (A-C), School certificate, 1+ A/AS level, NVQ level 2 or Intermediate GNVQ.				
Level 3: 2+A levels, 4+ AS levels, Higher School Certificate, NVQ level 3, Advanced GNVQ.				
Level 4/5: First Degree, Higher Degree, NVQ level 4 and 5, HNC, HND, Qualified teacher status, Qualified Medical Doctor, Qualified Dentist, Qualified Nurse, Midwife, Health Visitor.				
Other Qualifications e.g. City and Guilds, RSA, BTEC or professional qualifications				
Source: Census 2001 – www.statistics.gov.uk				

Employment

- 24.5.13 Income and employment influence a range of factors including access to housing, education, services and social networks as well as diet, lifestyle and coping skills. These in turn are key determinants of a variety of physical and mental health impacts and ultimately health and well-being.

Economic Activity of the Population aged 16-74

- 24.5.14 Table 24.6 shows the level of economic activity in the area. Ferry Ward, North Lincolnshire and North East Lincolnshire have similar levels of full time and part time employment compared to the national average, with Ferry Ward having slightly higher percentage and North East Lincolnshire a lower percentage in full time employment.

24.5.15 Unemployment rates in 2001 were similar in Ferry ward and North Lincolnshire and as a whole to the English average (3.50 percent, 3.62 percent and 3.35 percent respectively). North East Lincolnshire however had a much higher rate of unemployment at 5.45 percent. The area around the site already has a large number of industrial developments, for example Humber Refinery, Lindsey Refinery, the HST and Immingham Port. The port facilities in the Humber region as a whole are of prime importance because of the wealth and employment they bring and the attraction they provide for other industries to locate in the area.

Table 24.6 Economic Activity of the Population aged 16-75 (2001)

	Ferry	North Lincolnshire	North East Lincolnshire	England
Full-time employed (%)	42.31	40.38	36.76	40.81
Part-time employed (%)	11.86	13.36	15.16	11.81
Self Employed (%)	8.67	6.56	5.75	8.32
Unemployed (%)	3.50	3.62	5.45	3.35
Economically active student (%)	1.43	1.77	2.01	2.58
Retired (%)	14.61	15.82	15.08	13.54
Economically inactive student (%)	2.90	3.04	3.08	4.67
Looking after home / family (%)	7.63	7.35	7.82	6.52
Permanently sick / disabled (%)	5.20	5.39	5.65	5.30
Other Economically inactive (%)	1.88	2.72	3.23	3.10

Source: Census 2001 – www.statistics.gov.uk

24.5.16 However more recent data suggests unemployment for the year July 2009 - June 2010 was estimated to be 8.0 percent for North Lincolnshire (ONS, 2010) reflecting the national economic downturn. For more information on employment for North East Lincolnshire and the wider region see *Chapter 21 Socio Economics*.

Job Seekers Allowance (JSA) Claimant Percentages

24.5.17 *Table 24.7* shows the proportion of the resident population (aged 16-64) receiving out of work benefits. Ferry Ward has a similar proportion of JSA claimants to the national average (3.2 percent and 3.8 percent respectively) where North Lincolnshire and North East Lincolnshire sit higher than the national average at 4.5 and 6.4 percent. In Ferry, North Lincolnshire and North East Lincolnshire the figure is significantly higher for males than females, in line with England as a whole.

Table 24.7 JSA Claimant Percentages (February 2011)

	Ferry	North Lincolnshire	North East Lincolnshire	Great Britain
All people (%)	3.20	4.50	6.40	3.80
Males (%)	4.40	6.50	9.00	5.20
Females (%)	2.00	2.60	3.80	2.40

Source: <https://www.nomisweb.co.uk/reports/lmp/la/2038432014/report.aspx#tabwab>

Transport

24.5.18 Transport (both car ownership and public transport services) plays a vital role in the health and well-being of communities through the provision of access to a range of services and amenities required to treat illness as well as to manage and promote healthy living.

Car Ownership

24.5.19 Table 24.8 shows the level of car ownership in North Lincolnshire and Ferry Ward is higher than the national average; this is reflected particularly strongly in Ferry Ward where 39.28 percent of households have two or more cars. Conversely, North East Lincolnshire has a significantly lower proportion of households who own two or more cars (21.02 percent) and a notably higher proportion of households who don't own a car or van (33.15 percent).

Table 24.8 *Car Ownership (Percentage of Households)*

	Ferry	North Lincolnshire	North East Lincolnshire	England
No car or van (%)	14.37	23.62	33.15	26.84
1 car or van (%)	46.35	45.96	45.83	43.69
2 or more cars or vans (%)	39.28	30.41	21.02	29.47

Source: Census 2001 – www.statistics.gov.uk

Housing

24.5.20 Housing is an often underrated determinant of health. It is not only required to provide shelter, security and a family base, but the quality of housing is also associated with economic, social, mental and physical well-being (European Network for Housing Research, 2008).

24.5.21 Additionally, home ownership is also an indicator of wealth. The types of households that are available in an area are an indicator of the relative wealth of the area. Factors influencing housing and subsequent health outcomes therefore reflect the quality, distribution, overcrowding, affordability and ownership of homes.

Proportion of Different Household Types

24.5.22 The predominant housing in Ferry Ward is detached (47.45 percent) and semi-detached houses (33.39 percent). Those living in terraced houses, flats or mobile or temporary structures make up less than 20 percent, which is less than half the national average.

Table 24.9 *Proportion of Different Household Types (2001)*

	Ferry	North Lincolnshire	North East Lincolnshire	England
Detached house or Bungalow (%)	47.45	32.24	19.63	22.59
Semi-detached house or bungalow (%)	33.39	42.35	33.21	31.69
Terraced house or bungalow (including end terrace) (%)	16.36	15.06	34.37	25.93
Flat; maisonette or apartment (%)	2.59	9.49	12.60	19.37
Mobile or temporary structure (%)	0.21	0.86	0.19	0.42

Source: Census 2001 – www.statistics.gov.uk

Tenure Type

24.5.23 Housing tenure, illustrated in *Table 24.10*, demonstrates that the percentage of people that own their home outright or with a mortgage is higher in Ferry Ward, North Lincolnshire and North East Lincolnshire than the national average. The significant majority in Ferry Ward own their property in which they live with only 19.02 percent renting (compared to the national average of 29.23 percent).

Table 24.10 *Tenure Type (2001)*

	Ferry	North Lincolnshire	North East Lincolnshire	England
Owns outright or with a mortgage (%)	78.66	73.08	72.09	68.72
Rented from Council (local authority) (%)	10.14	15.49	12.54	13.21
Rented from Housing	0.58	1.70	3.06	6.05

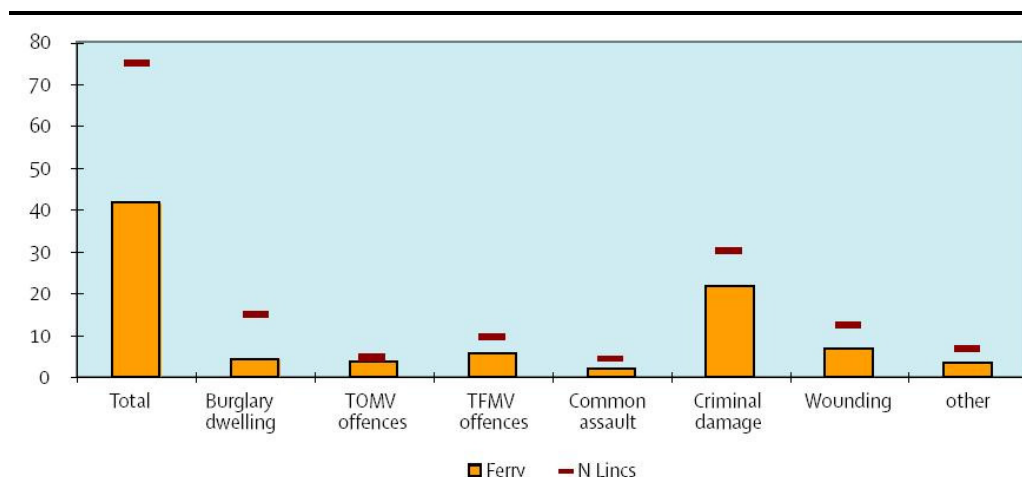
	Ferry	North Lincolnshire	North East Lincolnshire	England
Association/ Registered Social Landlord (%)				
Rented from Private landlord or letting agency (%)	7.43	6.40	9.23	8.80
Rented from Other (%)	0.87	0.95	0.87	1.17
Living Rent Free (%)	2.32	2.38	1.85	2.05

Source: Census 2001 – www.statistics.gov.uk

Crime

- 24.5.24 Crime has serious health impacts, both direct and indirect. Violent crime results in physical and psychological injury, which can require emergency treatment and long-term intervention. Furthermore, theft and burglary can materially affect living standards and have psychological effects for the victims, with consequences for health.
- 24.5.25 The North Lincolnshire Neighbourhood Profile for Ferry Ward (NLC, 2010) provides information on crime and anti social behaviour in the Ward highlighting that Ferry Ward residents are at much lower risk of crime and anti social behaviour than the average North Lincolnshire resident, with crime rates well below the local authority average, see *Figure 24.1* .
- 24.5.26 In 2006/7, there were a total of 444 crimes recorded by the police in Ferry ward, a 30 percent increase on the previous year. This was mostly due to a sharp rise in recorded crimes of criminal damage.

Figure 24.1 Crime Rates per 1000 residents in Ferry Ward for Selected Crimes (2006/7)



Note 1: TOMW –Theft of motor vehicle

Note 2: TFMV –Theft from a motor vehicle

Source: Humberside Police, 2007 (<http://www.humberside.police.uk/about-us/corporate-documents-and-publications/joint-annual-report-2007-2008>)

Health of the Community

24.5.27 The 2001 Census required people to describe their self perceived health over the preceding 12 months as “good”, “fairly good” or “not good”, as well as recording those with a long term illness. This is a subjective measure of health and an indication of general health rather than recorded health events. It is however, a useful tool in obtaining local community perceptions of health and is shown for Ferry Ward and North Lincolnshire in *Table 24.11*.

24.5.28 A significant proportion of the population in Ferry Ward rate their health as “good” or “fairly good” (91 percent) in line with North Lincolnshire, North East Lincolnshire and England.

Table 24.11 The Proportion of Residents rating themselves in Different Health Categories

	Ferry	North Lincolnshire	North East Lincolnshire	England
Good Health (%)	68.92	66.52	67.58	68.76
Fairly Good Health (%)	22.5	23.8	23.13	22.21
Not Good Health (%)	8.58	9.69	9.30	9.03
Limiting long term illness (%)	17.05	19.21	19.00	17.93

Source: Census 2001 – www.statistics.gov.uk

Life Expectancy at Birth

- 24.5.29 The health of people in the area can also be assessed using estimates of life expectancy. Areas with a life expectancy lower than the average tend to have poorer health than areas with higher levels of life expectancy. It was reported by The *North Lincolnshire Neighbourhood Profile for Ferry Ward* (NLC, 2010d) that life expectancy for people born in Ferry Ward has improved over the last 10 years, as it has across North Lincolnshire as a whole. *Table 24.12* shows how life expectancy at birth for males and females in Ferry Ward and North Lincolnshire are similar but slightly lower than that of the national average, suggesting there is minimal deprivation in terms of health in the area.

Table 24.12 *Life Expectancy at Birth (2003)*

	Ferry	North Lincolnshire	England
Life Expectancy (Males)	74.86	75.23	76.24
Life Expectancy (Females)	81.42	80.59	80.72

Source: North Lincolnshire Primary Care Trust (Ferry, North Lincolnshire, England)

Life Expectancy figures for North East Lincolnshire in 2010 mirrors that of the North Lincolnshire data for 2003 (North East Lincolnshire Council).

Index of Multiple Deprivation (IMD)

- 24.5.30 The Index of Multiple Deprivation (IMD) is a national measure which combines data on employment, income, educational attainment, health, crime, housing conditions, living environment and access to services, and presents this information in a single deprivation score. High IMD scores indicate relatively high levels of deprivation and low scores indicate relative affluence. In Ferry ward in 2007 has an IMD score of 16.17, placing it well above (therefore less deprived) the national and North Lincolnshire average of 21.37 and 21.23 respectively, therefore indicating relative affluence.
- 24.5.31 ***Error! Reference source not found.*** shows that Ferry Ward is in the 50 percent least deprived in terms of health.

24.6 *IMPACTS*

Socio-Economic Issues

- 24.6.1 This section looks at the potential significant socio economic effects of AMEP and what impact they might have on health.

- **Health Pathway:** employment opportunities;
- **Health Determinant:** employment, income, housing;
- **Receptors:** unemployed; and
- **Vulnerable Groups:** those with low socio-economic status.

Baseline Summary

24.6.2 2001 census data shows both Ferry Ward and North Lincolnshire have similar levels of full time and part time employment to the national average, with Ferry Ward having slightly higher levels of full time employment. However more recent data indicates that unemployment in North Lincolnshire has increased.

Impacts during Construction

24.6.3 *Ch 21 Socio Economics* states that based on a preliminary programme it is anticipated there will be 264 full time equivalent (FTE) jobs in relevant sectors (including architecture and design, construction of buildings and associated civil engineering work) for the construction period. At this stage it is assumed that the workforce will come from a wider area including the Yorkshire and Humber region.

24.6.4 The employment positions related to the construction phase will last a minimum of two years and can therefore only bring transient health benefits to those who are employed (ie for the duration of the employment). These health benefits will be felt most if employment is taken up by those who are currently unemployed or who are in short term temporary employment. Furthermore construction jobs often have a related multiplier effect creating additional indirect employment in business that in turn benefit from increased spending by local construction workers.

24.6.5 Procurement of goods and services may have the potential to create additional employment opportunities, which in turn may potentially increase people's incomes and have a positive impact on their health. The extent of these benefits will be determined by the level of local procurement. Some procurement will be spread across the national economy due to the nature of the goods; this combined with the temporary nature of the construction period will limit any health benefits.

Impacts during Operation

- 24.6.6 *Ch 21 Socio Economics* states that the employment impact at the site will be 4 100 FTE jobs. These new jobs will attract highly skilled workers from other areas, thereby creating a high number of offshore wind professionals in the local area. The net additional local impact is 3 740 FTE jobs taking into account deadweight, leakage, displacement, and indirect and induced multiplier effects. The UK-wide cumulative net additional impact is 10 600 FTE jobs.
- 24.6.7 The Energy and Utilities Skills Council, 2005 reported that the key occupations in the wind sector are Service Engineers, Fabrication Engineers, Structural Engineers, Site Wardens, and Installation Engineers (large scale). *Ch 21 Socio Economics* highlights that the majority of offshore wind jobs require higher qualified employees and that Training for AMEP will be provided by local colleges, e.g. Hull College, Lowestoft College, and other colleges and Further Education organisations.
- 24.6.8 It is not known what percentage of jobs will go to local people but the majority of direct jobs will require employees qualified in the sector. It is thought there will be a number (this can not be quantified at this stage) of employment opportunities for local communities, with training is being given at regional colleges to facilitate this. The scale of the employment opportunities is unlikely to have any health benefits at the population level, although individuals may benefit if moving from an unemployed status.
- 24.6.9 The presence of this workforce is unlikely to place additional demands on local services such as health care facilities and schools. As the operational workforce will be made up of skilled or highly skilled employees it is thought they may lead healthier lifestyles than the local population and therefore are likely to require less primary care services (see *Section 21.6.37* of the *Ch 21 Socio Economics*). Additional health care facilities will also be provided with the development of new housing and will therefore provide for the increase in demand.

Visual Environment

- 24.6.10 This section looks at the potential significant visual effects of the project and what impact they might have on health.
- **Health Pathway:** Physical Structure;
 - **Health Determinant:** living environment;
 - **Receptors (those exposed to health impacts):** Local residents, recreational walkers; and

- **Vulnerable Groups (those who are more vulnerable to health impacts):** those near to the site.

Baseline Summary

24.6.11 The local landscape character at the Site is industrial including an oil refinery and power stations at North Killingholme, the Humber Sea Terminal, conveyor structures and jetties on the existing quayside. For more information on the baseline see *Ch 20 Landscape and Visual*.

Impacts during Construction

24.6.12 During construction, there will be short term landscape and visual impacts on the Site and surroundings including:

- clearance of vegetation and topsoil stripping;
- construction of the buildings and warehouses;
- construction of an internal access road;
- a temporary construction compound (including offices and canteen);
- temporary fencing;
- machinery and material storage;
- plant and vehicle movements and tall cranes;
- in-situ concrete works;
- construction site lighting; and
- construction works associated with the proposed new quayside storage area and the new quay. This will involve large scale heavy machinery which will be visible from the Humber Estuary and the landscape further north east.

24.6.13 Construction activities are therefore likely to result in visual disturbances to nearby residential receptors. These visual disturbances may impact on residents' quality of life and cause anxiety and concern as well as decreased wellbeing. In particular light pollution in the wintering months at the construction site may cause annoyance and discomfort to nearby residential receptors (see *Section 19.6.9 of Ch 19 Light* for more details) if lighting is not properly angled and consideration is not given to the potential for glare.

24.6.14 However, these visual impacts will be temporary during the construction phase and due to the existing visual baseline it is thought that any negative health impacts will be minimal.

Potential Impacts during Operation

24.6.15 During operation the following will impact on the visual environment;

- permanent structures include warehouses, offices, and hardstandings associated with the proposed SCP;
- a new quay including an area of reclaimed land;
- presence and movement of vessels and cranes at the proposed quayside associated with the transport of marine energy components to offshore locations; and
- temporary presence of marine energy components awaiting despatch out to sea.

24.6.16 The above structures are large scale additional features to the landscape but will be seen in association with the existing industrial infrastructure present in the area, such as the Lindsey Oil Refinery, Immingham Docks and Killingholme Power Station.

24.6.17 *Ch 21 Landscape and Visual Impact* states that the introduction of new structures and activity around the site will have a negative impact on the quality of views experienced by people living, working or visiting the surrounding area, especially in the vicinity of East Halton Marshes and North Killingholme Haven Pits. AMEP will be seen from fixed locations and as people move through the area on roads or along footpaths.

24.6.18 The change in the visual landscape may impact on residents at the following locations:

- dwellings adjacent to the site on Marsh Lane;
- the edges of settlements located south west of the site such as East Halton, North Killingholme, South Killingholme and Immingham;
- the edges of the settlements of Goxhill, Thornton Curtis and Wootton;
- isolated small patches of landscape in the vicinity of Brocklesby;

- isolated dwellings and recreational visitors in the relatively flat farmed landscape around Cherry Cobb Sands and Sunk Island Conservation Area; and
- Hedon, Burstwick, Keyingham and Patrington.

24.6.19 Residents at these locations may experience feelings of decreased quality of life which can cause anxiety and concern as well as decreased wellbeing, however it is thought that as the current visual environment is dominated by an industrial landscape those nearby residents will be more resilient to change and therefore any associated negative impacts on their health.

Traffic and Transport

24.6.20 This section looks at the potential significant impacts on traffic and transport which might impact on health.

- **Health Pathway:** increased congestion of road network and road accidents potentially resulting injury or death.
- **Health Determinant:** transport.
- **Receptors:** local road users and residents.
- **Vulnerable Groups:** nearby residents.

Baseline Summary

24.6.21 Information on baseline traffic data that has been used to assess the impacts of the proposed development (see *CH 15 Traffic and Transport*) has been provided by Pell Frischmann on behalf of the Highways Agency. This is provided in *Appendix D of Annex 15.1*.

24.6.22 At present there is no direct access to the application site via a public bus service. The closest bus stops to the application site are located in East Halton and South Killingholme, approximately 3.5 km by road from the nearest proposed site entrance.

24.6.23 The nearest mainline station is Habrough (approximately 5 km), which is currently served by Northern Rail Service 31 (Barton-on-Humber to Cleethorpes). Trains serve this station as well as the Ulceby and Thornton Abbey stations, every two hours.

Impacts during Construction

- 24.6.24 Access to and from AMEP will be via Rosper Road, which is a single carriageway road with no footways (see *Figure 3.2 in Annex 15.2, Transport Assessment*). There will be a number of site entrances.
- 24.6.25 Construction will take place over several years and involve a number of vehicular movements to and from the site. The increase in vehicles during the network peak hours along the expected delivery route is 20 HGV per hour (or 20 two way trips). Traffic impacts associated with the construction of the development are assessed to be low (see *Ch 15 Traffic and Transport* for more details), however some level of annoyance and stress amongst local residents and road users may occur due to the potential for increased journey times. There may also be a small risk of increased Road Traffic Accidents (RTAs) due to the increased number of HGV movements which has the potential to cause injuries.
- 24.6.26 During construction the materials will be delivered by sea where possible which will increase the number of vessel movements in the Humber Estuary by approximately 8.5 percent (see *Ch 14 Commercial & Recreational Navigation*) per year over the two year quay construction phase. This increase in vessel numbers may increase the number of accidents at sea with recreational boats leading to injury or the potential for loss of life. However, with a number of Hazard Management Actions (HMA) being proposed for mitigation it is thought the likelihood of accidents causing severe harm is low.

Impacts during Operation

- 24.6.27 During operation of the AMEP the morning peak hour along the A160 will have the greatest increase in traffic numbers which is likely to cause long queues. *Chapter 15, Traffic and Transport* states that the Humber Road will have problems during evening peak hours. During the evening peak hour the increase in AMEP trips is just under 500 vehicles therefore increasing the degree of saturation of the Humber Road to over 100 percent.
- 24.6.28 The increase in road users in the morning along the A160 and in the evening on the Humber Road will cause increased journey times for local road users which is likely to result in increased annoyance and stress when driving and decreased wellbeing.
- 24.6.29 It is likely that vulnerable groups in the local population will be affected most by the increase in traffic levels. Those such as young children and the elderly may experience negative health impacts. The elderly may experience annoyance from increased noise associated with more traffic on the roads. Young children are at higher risk of road

accidents. Other health impacts associated with the increase in road traffic include annoyance from increased noise and potential respiratory problems due to air pollution.

24.6.30 *Ch 15 Traffic and Transport* reports that there will be a negative impact on road safety with the additional committed development traffic flows on the highway network. This may therefore result in a higher likelihood of Road Traffic Accidents (RTAs) occurring along the main transport routes being used which could result in injury or even death.

24.6.31 During operation AMEP will cause an increase in shipping movements of approximately 1.8 percent per year. This increase in vessels numbers may increase the number of accidents at sea with recreational boats causing injury and potential loss of life. However, with a number of HMAs being proposed for mitigation it is thought the likelihood of accidents causing severe harm is low.

Noise

24.6.32 This section looks at significant noise effects and what impacts these may have on health.

- **Health Pathway:** annoyance, sleep disturbance and wellbeing.
- **Health Determinant:** physical environment.
- **Receptors:** nearby residential receptors.
- **Vulnerable Groups:** older people and shift workers.

Baseline Summary

24.6.33 Current noise sources in the vicinity of AMEP include road traffic, industrial noise, rail, and shipping noise. For more details on this refer to *Ch 16 Noise*.

Impacts During Construction

24.6.34 *Ch 16 Noise* states that for daytime construction work there is potential for minor noise impacts at the nearest receptors, predominantly from piling, but also from earthmoving and general construction. Therefore, the potential for any health impacts associated with daytime noise during construction is unlikely.

24.6.35 As there will be night time construction activities, there is potential for major impacts at nearby receptors on Station Road. The receptors are however unoccupied and consist of a lighthouse and a transport depot, therefore noise any noise impacts at these receptors will not affect people's health.

Impacts During Operation

24.6.36 *Ch 16 Noise* states that noise levels from AMEP during operation are predicted to meet the project-specific noise criteria (explained fully in *Ch 16 Noise*) at all residential receivers for the daytime and night time periods except at two non residential locations on Station Road, meaning that impacts are seen to be acceptable. The implementation of noise reductions on quayside cranes and fork-lift trucks will reduce the impacts.

24.6.37 Potential road traffic noise impacts are negligible, except where there are residential properties bordering the roads in Ulceby, South Killingholme and Immingham where the traffic noise impacts have been rated as moderate.

Air Quality

24.6.38 This section looks at significant air quality effects and what impacts these may have on health.

- **Health Pathway:** construction traffic.
- **Health Determinant:** living environment.
- **Receptors:** nearby residential receptors.
- **Vulnerable Groups:** elderly, children and those with respiratory diseases.

Baseline Summary

24.6.39 *Ch 17 Air Quality* reports that within the vicinity of AMEP site there are a number of important sources of emissions to air including Scunthorpe Steelworks, Immingham Docks, the A160, A180, the M180 and emissions associated with the presence of urban areas in Immingham and Hull.

Impacts During Construction

24.6.40 *Ch 17 Air Quality* states that there will be no significant increase in pollutant concentrations as a result of increased road traffic during the construction phase, as such there should not be any adverse affects on the health of nearby residents.

24.6.41 During construction there will be dust producing activities on-site, these being,

- stripping and levelling of ground;
- stockpiling of materials;
- movement of vehicles over exposed ground;
- other groundworks; and
- handling of friable materials.

24.6.42 The impacts associated with dust are only likely to be potentially significant within 200 m of the source. The correct implementation of dust mitigation measures is predicted to render residual impacts not significant, therefore there are unlikely to be any associated health impacts. However, should any dust from the workings be dispersed to residential properties, it will most likely have an effect through nuisance and annoyance resulting in a decreased sense of wellbeing. These impacts will however be temporary in nature.

Impacts During Operation

24.6.43 *Ch 17 Air Quality* states there are no significant residual air quality impacts identified associated with the operation of the AMEP site. With regard to operational traffic, no significant air quality impacts are identified in the context of the existing environment. Therefore there will be no negative health impacts associated increased pollutants.

24.7 MITIGATION MEASURES

24.7.1 A number of mitigation measures are proposed in *Ch 16 Noise, Ch 15 Traffic and Transport, Ch 20 Landscape and Visual Impact, Ch 21 Socio-Economics and Ch 17 Air Quality*. These measures have been taken into account when undertaking the assessment of potential health impacts.

24.7.2 Additional recommendations (to those mitigation measures discussed in other chapters) to minimise the negative impacts to health and maximise the positive impacts are detailed below.

- Implementation of a Traffic Management Plan as part of the CoCP is critical in minimising RTAs during construction. The project and its contractors should work closely with the local Highways Authority and consider the following:
 - set suitable speed limits to be observed by project vehicles;
 - measures to deal with unusual traffic movements; and

- adopt procedures for liaison with the local emergency services in case of accidents.
- Local employment and procurement should be encouraged. If feasible, and available, local suppliers should be used for goods and services. Jobs created by the scheme should also be advertised and made available in the local area initially.

24.8 *RESIDUAL IMPACTS*

24.8.1 The mitigation measures that have been suggested above, along with those suggested in other chapters (*Ch 16 Noise, Ch 15 Traffic and Transport, Ch 20 Landscape and Visual Impact, Ch 21 Socio-Economics*) will help to reduce any negative health impacts felt by the local community and increase positive health benefits. It is not possible to quantify residual impacts for potential health effects and therefore only qualitative analysis can be provided. The following residual impacts of the AMEP are expected to remain following implementation of mitigation measures outlined in the previous section:

- increased positive impact on health from local employment and procurement; and
- reduced negative impact in health from RTA.

24.9 *CUMULATIVE IMPACTS*

24.9.1 In assessing the health impacts associated with AMEP it is also important to take into consideration other planned or proposed schemes in close proximity to identify any cumulative health impacts that may be experienced.

24.9.2 The other main proposals in close proximity to AMEP site include;

- Grimsby Ro-Ro Berth;
- South Humber Bank Bioethanol;
- Heron Renewable Energy Plant;
- Hull Riverside Bulk Terminal;
- Humber Gateway Offshore Wind farm;

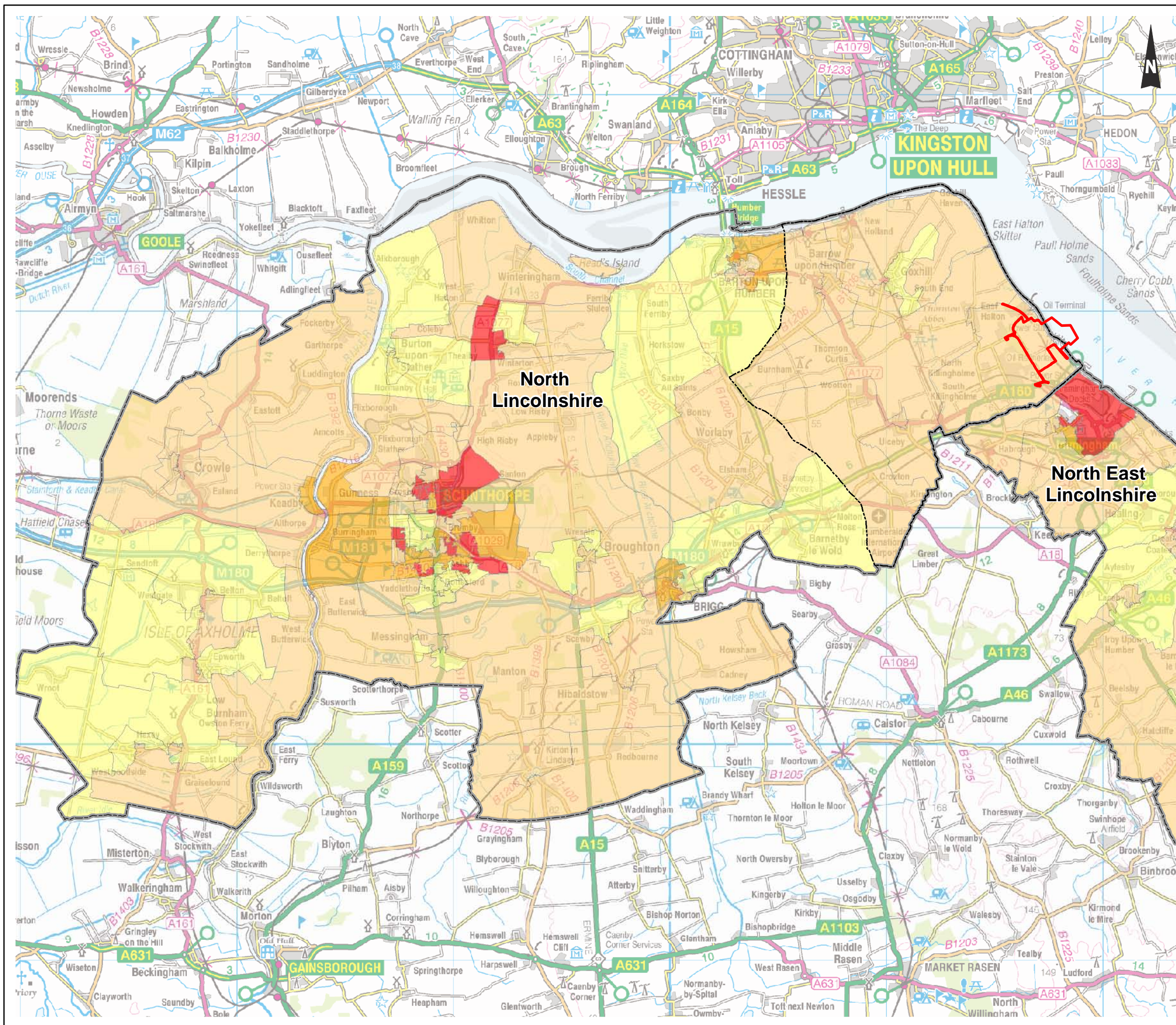
- Queens Road Development;
- Immingham Oil Terminal - Approach Channel Dredging
- Bioethanol Production Facility, Grimsby;
- URSA;
- Vireol Bioethanol production facility; and
- Siemens Offshore Wind manufacturing facility at Green Port in Hull.

24.9.3 Due to the number of other proposed developments in the area there are likely to be cumulative health impacts. Additional construction and operation traffic associated with other proposals in the area may well cause further increased journey times for local residents (depending which transport routes are used by other proposals), which may add to stress, annoyance and overall decreased well being. Furthermore, additional traffic will also increase the risk of road traffic accidents which could potentially result in injury or death.

24.9.4 The cumulative impact of additional industrialisation of the area may in itself have an increased negative impact on health and may impact peoples well being, enjoyment of living in the area, sense of wellbeing and decreased mental health.

24.9.5 The cumulative impact of AMEP along with other future proposals in the area is likely to have a positive impact on employment levels and therefore the health of those who gain employment. However, as the other proposals are located in different areas in the Humber the potential positive health impacts are likely to spread more widely across the region and are unlikely to be concentrated in the local area.

24.9.6 The additive affect of this project (even though playing a small part) with other future proposals may result in a degradation of air quality in the area and increased noise levels which has the potential to negatively impact on people's health.



Key

- Application Boundary
- Ferry Ward
- Unitary Boundary

Health Percentage of Population

- 0 - 25% - Most Deprived
- 25 - 50%
- 50 - 75%
- 75 - 100% - Less Deprived

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 PROJECTION: British National Grid

Rev	Date	Comments	Drw	Chk	App
C	00/00/0000	General Amendments	XXX	XXX	XXX
B	25/07/2011	General Amendments	MTC	WB	WB
A	30/05/2011	Preliminary Issue	MTC	CC	XXX



Project: **ABLE Marine Energy Park**

Client: **ABLE UK Ltd**

Title: **Figure 24.2
Index of Multiple Deprivation**

Scale:	Drawn	Checked	Approved
175,000@A3	MTC	WB	SP
Date	16/08/2011	16/08/2011	16/08/2011
Drawing No. ABLE_IMD.mxd	Revision:		B