

# Rampion 2 Wind Farm

## Category 6: Environmental Statement

### Volume 2, Chapter 28: Population and human health

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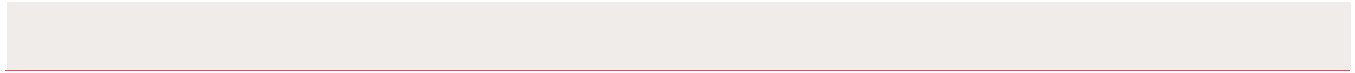
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# Executive Summary

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## **Introduction**

This section summarises the assessment findings for population and human health, based on **Chapter 28: Population and human health, Volume 2** of the ES (Document Reference: 6.2.28).

## **How effects on health have been assessed**

Health has been assessed for the entire lifetime of the onshore aspects of Rampion 2 which covers the construction, operational and maintenance, and decommissioning phases.

The population and human health assessment for the construction phase comprises analysis on potential effects associated with changes in air quality, noise exposure, transport nature and flow rate, visual amenity, land contamination, access to opportunities for physical activity, and socio-economic factors. The decommissioning phase assessment assesses the same health determinants except access to opportunities for physical activity due to the comparative lack of disruption along the onshore cable route corridor.

The assessment of health effects in the operation and maintenance phase comprises effects from changes in noise exposure, exposure to EMF and visual amenity.

In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

## **Baseline environment**

Individuals and communities have varying sensitivities to population and health effects associated with changes in environmental and socio-economic conditions. The baseline looks at the health and socio-economic circumstance of the communities living in Arun, Horsham, and Mid Sussex.

The results show mostly positive trends which are better than the national average. On this basis, it can be concluded that there is good health and socio-economic circumstance relative to the national average and that individuals living in the Study Area are not considered to be particularly sensitive to changes associated with the Proposed Development.

## **Embedded environmental measures**

A number of embedded environmental measures of the Rampion 2 design have been adopted to reduce the potential for impacts on human health.

Rather than provide health-specific mitigation, measures generally focus on environmental and socio-economic precursors to adverse health impacts due to the preventative nature of public health protection.

## **Likely significant effects**

### **Construction phase**

#### **Air quality**

The construction phase health assessment relating to changes in air quality considers potential effects associated with dust, odour, road traffic and construction equipment on site.

Following the implementation best practice measures dust emissions will be mitigated to a level which is negligible and not significant in air quality terms, with the consequential human health effect being not significant.

The risk of odour emissions is considered to be negligible in air quality terms on the basis that Brook Barn Farm Landfill is considered to have a small source odour potential. As a result, the human health effect (in a wellbeing and amenity context) is not significant.

Construction-related road traffic is not anticipated to result in any significant change in air quality, with the consequential human health effect being not significant.

The key construction activities comprise: Oakendene substation; open trenching; landfall; trenchless crossings; and National Grid Bolney substation extension works. Changes in local air quality and any associated potential health effects due to these activities have been assessed.

The largest change in air quality associated across all construction activities would occur around the Oakendene substation construction works which would take up to three years to complete. Specifically, the maximum change in air quality (annual mean nitrogen dioxide) is predicted to be  $+12.11\mu\text{g m}^{-3}$ . While this change would not cause exceedance of air quality objective thresholds, a quantitative assessment was undertaken to better understand the wider distribution of changes in air quality associated with construction of the Oakendene substation, and potential human health effects. The results show that there would not be any measurable change in health outcomes.

All other key construction activities would result in either a lower change in air quality or would last for a shorter duration. As a result, it is reasonable to assume that the associated impact on health will also be lower than those predicted for Oakendene substation.

Overall, changes in air quality associated with all key construction activities and related human health effects are considered to be **not significant**.

#### **Noise exposure**

The construction phase health assessment relating to changes in noise exposure considers potential effects from: construction compounds; landfall and trenchless crossings; Oakendene substation; National Grid Bolney substation extension works; onshore cable installation; construction and use of temporary and permanent accesses; construction road traffic; and offshore piling.

The construction/deconstruction of the temporary construction compounds will last up to 8 weeks, with the compounds in use up to a maximum of 3.5 years. While the daytime lowest observed adverse effect level would be exceeded at some receptors, these noise levels are unlikely to persist for longer than one month.



HDD operations would need to operate for 24 hours per day until completion. However drilling activities would not remain in one place and would last for between 1.7 weeks to 18 weeks (with an average duration of 3.3 weeks). While the daytime and night time lowest observed adverse effect level would be exceeded at some receptors, these noise levels will not persist in one place for any considerable period of time.

Onshore cable installation (trenched) could result in changes in noise exposure of above 75dB. While this is the case, these noise levels will not persist in one place for any considerable period of time and would only be experienced for a maximum of two days.

Construction of temporary and permanent accesses will result in temporary noise effects as the access works pass receptors within close proximity. During the use of such accesses, a maximum of 3 HGVs per hour would pass receptors. While noise levels of above the threshold value could be experienced, these worst-case noise levels would only be experienced for a maximum of two days.

Noise associated with construction of the Oakendene substation, extension works at the existing National Grid Bolney substation and offshore piling would remain below the lowest observed adverse effect level in all instances. Similarly, the maximum change in noise exposure from construction road traffic would be +1.5 dB, which is not considered significant in noise terms.

Where noise levels are high, they would not be experienced for a long enough duration for there to be any measurable human health effects. As a result, the overall effects are considered to be **not significant**.

#### Vibration exposure

There is potential for exceedance of the vibration threshold. However, such exceedances would be either transient, temporary or intermittent in nature. As a result, the overall effects on health are considered to be **not significant**.

#### Transport nature and flow rate

Three highways links have been assessed for impacts on: severance; pedestrian amenity; pedestrian delay; fear and intimidation; and accidents and safety.

**Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23) reports a significant severance effect on Link 18 – B2135, North of A283 due to a contribution of 110 HGVs per day. While this is the case, this represents impacts in the peak week, which will not be experienced throughout the whole construction phase. All other changes in traffic are not considered significant. As a result, the overall human health effects are considered to be **not significant**.

#### Visual amenity

While no significant visual effects are reported from settlements, some significant visual effects are reported from recreational routes. While this is the case, such impacts would only be temporary as people move along these routes and do not remain in the same place. Overall, the significant visual effects reported would not deter recreational users from using those specific or similar routes. As a result, the overall human health effects are considered to be **not significant**.

## Land contamination

Construction activities that involve breaking the ground surface and disturbing soil and groundwater have the potential to influence human health as a result of exposure to contaminants.

Potential human health effects have been assessed in relation to: mobilisation of contamination from construction activities located on, or adjacent to landfills and other potentially contaminated sites; build-up of ground gases from construction activities located on, or adjacent to landfills and other potentially contaminated sites; and accidental spillages and leaks impacting controlled waters during construction activities.

Overall, the mitigation measures applied would result in no significant effects on ground conditions. As a result, the overall human health effects are considered to be **not significant**.

## Access to opportunities for physical activity

Construction land take will generally be temporary in nature. The only exceptions to this are from any permanent features such as the proposed Oakendene substation and Oakendene substation permanent access, and the existing National Grid Bolney substation extension works – all of which would not PRoW or open space.

The majority of temporary land take (96%) would be of agricultural use, which is not publicly accessible. The majority of the remaining temporary land take is on recreational land; while this is the case, trenchless techniques would be used to limit disturbance on recreational resources. As a result, the overall human health effects are considered to be **not significant**.

## Socio-economic factors

Construction of the Proposed Development will have a beneficial impact on employment and Gross Value Added (which is the value generated by any unit engaged in the production of goods and services).

Having consistent income and being in long-term employment are two very important factors to achieving good health and wellbeing. A total of 4,140 short-term employment opportunities would be generated by the construction of the Proposed Development, the majority of which will be spread across the UK rather than locally within Sussex.

Similarly, it is estimated that construction activity will contribute in the region of £234 million Gross Value Added per annum, totalling to £936 million over the Proposed Development's over the entire construction phase. Of this, only a small proportion (around 7%) would be generated by Sussex-based businesses.

As both employment and Gross Value Added benefits would be spread across the UK, the benefit to population health is considered to be **not significant**.

## **Operation and maintenance phase**

### Noise exposure

Oakendene substation is the only aspect of the Proposed Development assessed for operation and maintenance noise impacts. During the daytime period, there would be no change in ambient sound level at all receptors. During the night time period, the change in noise level at receptors would be below the “no observed adverse effect level”, which is

described as noise exposure below which no effect at all on health or quality of life can be detected.

As a result, the overall human health effects are considered to be **not significant**.

### Electromagnetic fields

There are two cable routes required as part of the Proposed Development, one from the landfall to the proposed Oakendene substation (made up of two to four cable circuits operating at up to 275kV), and the other from the proposed Oakendene substation to the existing National Grid Bolney substation (made up of two cable circuits operating at 400kV).

The maximum calculated magnetic field strength associated with the 275kV and 400kV cable will be 19.9 $\mu$ T and 13.7 $\mu$ T, respectively, which equates to approximately 6% and 4% of the 360 $\mu$ T public exposure guideline limit for the protection of health. On the basis that the maximum calculated magnetic field strength produced by both cable routes is well below the 360 $\mu$ T public exposure guideline limit set to protect health, the overall human health effect is considered to be **not significant**.

### Visual amenity

While no visual effects from onshore operational aspects of the Proposed Development are reported from settlements, some significant visual effects are reported from recreational routes. While this is the case, such impacts would only be temporary as people move along these routes and do not remain in the same place. Furthermore, as vegetation planted to screen the views matures, the impact would reduce.

The offshore turbines themselves will be visible from areas within the South Downs National Park, West Sussex South Coast Plain, East Sussex and the City of Brighton & Hove, Hampshire and the Solent and Isle of Wight. Changes in views from these areas range from significant to not significant. However, the significant visual effects reported would not deter recreational users from using those specific or similar routes. As a result, the overall human health effects are considered to be **not significant**.

### **Decommissioning phase**

The decommissioning plan is to reverse the construction phase for above-ground structures, and to leave underground structures in situ.

As such, the potential human health effects associated with changes in air quality, noise exposure, transport nature and flow rate, visual amenity, land contamination and socio-economic factors are likely to be similar to or less than those reported for the construction phase. On this basis, human health effects during decommissioning are **not significant**.

### Cumulative effects

No significant cumulative effects have been identified in relation to Rampion 2 on population and human health from construction, operation and maintenance, and decommissioning activities.

### Transboundary effects

There are no onshore populations beyond the jurisdiction of the UK who will be impacted by the Proposed Development. As such, no significant transboundary effects have been

identified in relation to Rampion 2 on human health receptors from construction, operation and maintenance, and decommissioning activities.

## 28. Population and human health

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### 28.1 Introduction

28.1.1 This chapter of the Environmental Statement (ES) presents the results of the assessment of likely significant effects of Rampion 2 with respect to human health. It should be read in conjunction with the project description provided in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4) and the relevant parts of the following chapters and appendices:

- **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15) due to the inter-relationships between wellbeing and changes in visual amenity of offshore elements;
- **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17) due to the inter-relationships between health and changes in socio-economic factors, such as employment;
- **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18) due to the inter-relationships between wellbeing and changes in visual amenity of onshore elements;
- **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19) due to the inter-relationships between health and changes in local air quality;
- **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21) due to the inter-relationships between health and changes in exposure to noise and/or vibration;
- **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23) due to the inter-relationships between health and changes in transport nature and flow rate;
- **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24) due to the inter-relationships between health and exposure to land contamination;
- **Appendix 28.1: Human health baseline, Volume 4** of the ES (Document Reference: 6.4.28.1) which describes in detail the human health baseline;
- **Appendix 28.2: EMF health evidence base, Volume 4** of the ES (Document Reference: 6.4.28.2) which outlines the EMF health evidence base, which includes a summary of relevant guidelines; and
- **Appendix 28.3: Equalities Impact Assessment, Volume 4** of the ES (Document Reference: 6.4.28.3) which details the potential equality impacts associated with the Proposed Development.

28.1.2 This technical chapter describes:

- the legislation, policy and other documentation that has informed the assessment (**Section 28.2: Relevant legislation, planning policy, and other documentation**);

- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to human health within the Statutory Consultation have been addressed (**Section 28.3: Consultation and engagement**);
- the scope of the assessment for human health (**Section 28.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 28.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 28.6: Baseline conditions**);
- embedded environmental measures relevant to human health and the relevant maximum design scenario (**Section 28.7: Basis for ES assessment**);
- the assessment methods used for the ES (**Section 28.8: Methodology for ES assessment**);
- the assessment of human health effects (**Section 28.9 to 28.11: Assessment of effects** and **Section 28.12: Assessment of cumulative effects**);
- consideration of transboundary effects (**Section 28.13: Transboundary effects**);
- inter-related effects (**Section 28.14: Inter-related effects**);
- a summary of residual effects for human health (**Section 28.15: Summary of residual effects**);
- a glossary of terms and abbreviations is provided in **Section 28.16: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 28.17: References**.

28.1.3 The chapter is also supported by the following appendices:

- **Appendix 28.1: Human health baseline, Volume 4** of the ES (Document Reference: 6.4.28.1);
- **Appendix 28.2: EMF health evidence base, Volume 4** of the ES (Document Reference: 6.4.28.2); and
- **Appendix 28.3: Equalities Impact Assessment, Volume 4** of the ES (Document Reference: 6.4.28.3).

## 28.2 Relevant legislation, policy and other documentation

### Introduction

28.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to human health. Further information on policies relevant to the EIA and their status is provided in **Chapter 2: Policy and legislative context, Volume 2** of the ES (Document Reference: 6.2.2) of this ES.

## Legislation and national planning policy

- 28.2.2 There is no specific legislation relevant to the assessment of the effects on human health receptors in the context of EIA.
- 28.2.3 **Table 28-1** lists the national planning policy relevant to the assessment of the effects on human health receptors.

**Table 28-1 National policy relevant to human health**

Policy description	Relevance to assessment
<p><b>EN-1: National Policy Statement (NPS) for Overarching National Policy Statement for Energy (DECC, 2011a)</b></p> <p><b>Section 4.10 covers pollution control and other environmental regulatory regimes, whereby paragraph 4.10.2 states that:</b></p> <p><i>“The planning system controls the development and use of land in the public interest. It plays a key role in protecting and improving the natural environment, public health and safety, and amenity (...)”</i></p>	<p>The purpose of an ES is to protect the environment, health, safety and amenity.</p> <p>As detailed in <b>Section 28.1</b>, the human health chapter is informed by a range of inter-related technical disciplines which constitute environmental, social and/or economic determinants of health and wellbeing.</p>
<p><b>Section 4.10 covers pollution control and other environmental regulatory regimes, whereby paragraph 4.10.2 also states that:</b></p> <p><i>“Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.”</i></p>	<p>Human health is influenced by a range of factors, including exposure to environmental pollutants. Controlling the release of pollution at the source through embedded environmental measures (refer to <b>Table 28-13</b>) provides an opportunity for intervention to prevent health outcomes.</p>
<p><b>Section 4.13 covers health, whereby paragraph 4.13.1 states that:</b></p> <p><i>“Energy production has the potential to impact on the health and well-being (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy</i></p>	<p>While access to energy is clearly beneficial to society and to our health as a whole, the assessments provided in <b>Section 28.9</b>, <b>Section 28.10</b> and <b>Section 28.11</b> of this chapter focus on the human health effects at the project level. Both beneficial and adverse effects have been considered.</p>

Policy description	Relevance to assessment
<p><i>may have negative impacts on some people's health."</i></p> <p><b>Section 4.13 covers health, whereby paragraph 4.13.2 states that:</b></p> <p><b><i>"(...) where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate. The impacts of more than one development may affect people simultaneously, so the applicant and the IPC should consider the cumulative impact on health."</i></b></p>	<p>Consistent with the Institute of Environmental Management and Assessment (IEMA) Guide to 'Determining Significance for Human health in EIA' (see <b>paragraphs 28.2.7 to 28.2.35</b> for further details), a population health approach has been taken, whereby health outcomes of a group of individuals, including the distribution of such outcomes within the group has been assessed.</p> <p>This is on the basis that EIA analysis at the level of individuals will likely mean that all determinants of health conclusions, positive or negative, will be significant on all projects because of the effects to some particularly sensitive individuals.</p>
<p><b>Section 4.13 covers health, whereby paragraph 4.13.3 states that:</b></p> <p><b><i>"The direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests."</i></b></p>	<p>Both direct and indirect impacts on health have been considered when determining the scope of the human health assessment.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>Section 4.13 covers health, whereby paragraph 4.13.4 states that:</b></p> <p><b><i>"New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity."</i></b></p>	
<p><b>Section 4.13 covers health, whereby paragraph 4.13.5 states that:</b></p>	<p>Mitigation (for instance, mitigation required as a result of legislative requirements and/or standard sectoral practices) is required</p>



Policy description	Relevance to assessment
<p><b><i>“Generally, those aspects of energy infrastructure which are most likely to have significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either constitute a reason to refused consents or require mitigation under the Planning Act 2008.”</i></b></p>	<p>regardless of any EIA assessment and provides an opportunity for intervention to prevent any manifest health outcome. Tertiary mitigation measures are considered to be embedded and are detailed in <b>Table 28-13</b>.</p>
<p><b>Section 5.2 covers air quality and emissions, whereby paragraph 5.2.1 states that:</b></p> <p><b><i>“The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health (...)”</i></b></p>	<p>Potential impacts on health from air quality has been considered when determining the scope of the human health assessment.</p> <p>In this instance, potential human health effects from changes in local air quality during the construction/decommissioning phases have been scoped in, but the operation and maintenance phase has been scoped out.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>Section 5.10 covers land use including open space, green infrastructure &amp; Green Belt, whereby paragraphs 5.10.1 and 5.10.2 state that:</b></p> <p><b><i>“An energy infrastructure project will have direct effects on the existing use of the proposed site and may have indirect effects on the use, or planned use, of land in the vicinity for other types of development. Given the likely locations of energy infrastructure projects there may be particular effects on open space including green infrastructure.</i></b></p> <p><b><i>The Government’s policy is to ensure there is adequate provision of high quality open space (including green infrastructure) and sports and recreation facilities to meet the</i></b></p>	<p>Potential impacts on health from changes in access to opportunities for physical activity have been considered when determining the scope of the human health assessment.</p> <p>In this instance, potential human health effects from changes in access to opportunities for physical activity has been scoped in for the construction phase only.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>

Policy description	Relevance to assessment
<p><i>needs of local communities. Open spaces, sports and recreational facilities all help to underpin people’s quality of life and have a vital role to play in promoting healthy living.”</i></p>	
<p><b>Section 5.11 covers noise and vibration including assessment requirements and mitigation measures, whereby paragraph 5.11.1 states that:</b></p> <p><b><i>“Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) [...]”</i></b></p>	<p>Potential impacts on health from noise/vibration has been considered when determining the scope of the human health assessment.</p> <p>In this instance, potential human health effects from changes in noise exposure during all phases have been scoped in. Potential human health effects from vibration has been scoped in for the construction phase.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>Section 5.11 covers noise and vibration including assessment requirements and mitigation measures, whereby paragraph 5.11.9 states that:</b></p> <p><b><i>“The IPC should not grant development consent unless it is satisfied that the proposals will meet the following aims:</i></b></p> <ul style="list-style-type: none"> <li><b>• <i>avoid significant adverse impacts on health and quality of life from noise;</i></b></li> <li><b>• <i>mitigate and minimise other adverse impacts on health and quality of life from noise; and</i></b></li> <li><b>• <i>where possible, contribute to improvements to health and quality of life through the effective management and control of noise.”</i></b></li> </ul>	<p>Potential impacts on health from noise/vibration has been considered when determining the scope of the human health assessment.</p> <p>In this instance, potential human health effects from changes in noise exposure during all phases have been scoped in. Potential human health effects from vibration has been scoped in for the construction phase.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>Section 5.15 covers water quality and resources including assessment requirements and mitigation measures, whereby paragraph 5.15.1 states that:</b></p>	<p>Potential impacts on human health from water quality and resources has been scoped out of the human health assessment.</p>

Policy description	Relevance to assessment
<p><b><i>“During the construction, operation and decommissioning phases (...) there may also be an increased risk of spills and leaks of pollutants to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These could lead to adverse impacts on health (...) and could, in particular, result in surface waters, groundwaters or protected areas failing to meet environmental objectives established under the Water Framework Directive.”</i></b></p>	<p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>EN-5: NPS for Electricity Networks Infrastructure (DECC, 2011c)</b></p>	
<p><b>Section 2.10 details the assessment and technology-specific information for electric and magnetic fields (EMFs), whereby paragraph 2.10.2 states that:</b></p> <p><b><i>“(...) EMFs can have both direct and indirect effects on human health. The direct effects occur in terms of impacts on the central nervous system resulting in its normal functioning being affected. Indirect effects occur through electric charges building up on the surface of the body producing a microshock on contact with a grounded object, or vice versa, which, depending on the field strength and other exposure factors, can range from barely perceptible to being an annoyance or even painful.”</i></b></p>	<p>Potential impacts on health from EMFs has been considered when determining the scope of the human health assessment.</p> <p>In this instance, potential human health effects from EMF exposure associated with the operational and maintenance phases has been scoped in.</p> <p>Further details and rationale for the health determinants assessed within this chapter are provided in <b>Section 28.4</b>.</p>
<p><b>Section 2.10 details the assessment and technology-specific information for electric and magnetic fields (EMFs), whereby paragraph 2.10.3 states that:</b></p> <p><b><i>“To prevent these known effects, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 for both public and occupational exposure.”</i></b></p>	<p>The 1998 ICNIRP guidelines and electricity industry Code of Practice have informed the assessment of human health effects associated with EMFs.</p> <p>A summary of these are provided in the <b>paragraphs 28.2.7 to 28.2.35</b>.</p>
<p><b>Section 2.10 details the assessment and technology-specific information for electric and magnetic fields (EMFs), whereby paragraph 2.10.5 states that:</b></p>	

Policy description	Relevance to assessment
<p><b><i>“These guidelines [EMF exposure guidelines published by ICNIRP in 1998] also form the basis of a 1999 EU Recommendation on public exposure and a Directive on occupational exposure. Resulting from these recommendations, Government policy is that exposure of the public should comply with the ICNIRP (1998) guidelines in terms of the EU Recommendation. The electricity industry has agreed to follow this policy. Applications should show evidence of this compliance as specified in 2.10.9 below.”</i></b></p> <p><b>Paragraph 2.10.9 states that:</b></p> <p><b><i>“Government has developed with the electricity industry a Code of Practice, “Power Lines: Demonstrating compliance with EMF public exposure guidelines – a voluntary Code of Practice”, published in February 2011 that specifies the evidence acceptable to show compliance with ICNIRP (1998) in terms of the EU Recommendation. Before granting consent to an overhead line application, the IPC should satisfy itself that the proposal is in accordance with the guidelines, considering the evidence provided by the applicant and any other relevant evidence.”</i></b></p>	
<p>28.2.4 The UK Government published draft NPS EN1-EN5 (Department for Energy Security and Net Zero (DESNZ), 2023a; DESNZ, 2023b)) for consultation in September 2021 and subsequently in March 2023 with further amendments. The 2011 NPSs remain in force until the review is approved (designated) and under proposed transitional arrangements the 2023 amendments will only have effect in relation to applications for development consent accepted for examination after designation. However, the draft emerging NPSs can potentially be relevant considerations to the determination. Therefore, Rampion 2 has kept abreast of the potential changes to the energy NPSs and incorporated any updates where required in the ES.</p> <p>28.2.5 The emerging draft Overarching National Policy Statement for Energy (EN-1), (DESNZ, 2023a) provides additional considerations relevant to the assessment of the effects on human health receptors beyond those outlined in the 2011 NPSs which remain in force (<b>Table 28-1</b>). The relevant emerging national policy considerations are provided in <b>Table 28-2</b>.</p>	

**Table 28-2 Emerging national planning policy relevant to human health**

Policy description	Relevance to assessment
<b>Draft Overarching NPS for Energy (EN-1), March 2023 (DESNZ, 2023a)</b>	
<p>Section 4.3 covers health, whereby paragraph 4.3.6 states that:</p> <p><b><i>“Opportunities should be taken to mitigate indirect impacts, by promoting local improvements to encourage health and wellbeing, this includes potential impacts on vulnerable groups within society, i.e. those groups which may be differentially impacted by a development compared to wider society as a whole.”</i></b></p>	<p>An Equalities Impact Assessment is provided in <b>Appendix 28.3: Equalities Impact Assessment, Volume 4</b> of the ES (Document Reference: 6.4.28.3) which assesses in detail any potential equality effects (including on health and wellbeing) associated with the Proposed Development.</p>

### Local planning policy

28.2.6 **Table 28-3** lists the local planning policy relevant to the assessment of the potential effects on human health receptors.

**Table 28-3 Local planning policy relevant to human health**

Policy description	Relevance to assessment
<b>Adoption Arun Local Plan 2011-2031 (July 2018) (Arun District Council, 2018)</b>	
<p>The Local Plan has seven strategic objectives, one of which is:</p> <p><b><i>“To promote strong, well integrated and cohesive communities, through the promotion of healthy lifestyles, provision of good quality accessible community facilities and a safe environment, which delivers an enhanced quality of life to all. This includes meeting the needs of a growing elderly population”</i></b></p>	<p>Of most relevance to this assessment is the promotion of a <i>“safe environment”</i>, whereby the construction, operation and maintenance, and decommissioning phases of the Proposed Development should ensure any potential changes to the environment are protective of human health.</p> <p>Furthermore, the Proposed Development should not adversely impact cohesiveness of communities, healthy lifestyles and/or access to community facilities.</p> <p>All factors are assessed within this chapter.</p>
<p><b>Policy HWB SP1 states that <i>“All development shall be designed to maximise the impact it can make to</i></b></p>	<p>The human health chapter integrates an equalities impact assessment, the purpose of which is to ensure that the Proposed</p>

Policy description	Relevance to assessment
<p><b><i>promoting healthy communities and reducing health inequalities.” Amongst other factors, “(...) particular regard shall be had to (...) providing or contributing to the necessary infrastructure to encourage physical exercise and health, including accessible open space, sports and recreation facilities (including outdoor fitness equipment) and safe, well promoted, walking and cycling routes.”</i></b></p>	<p>Development avoids any potential adverse equality impact.</p> <p>Specifically, this chapter assesses potential human health effects associated with access to opportunities for recreation and physical activity.</p>
<p><b>Horsham District Planning Framework 2015 (Horsham District Council, 2015)</b></p>	
<p><b>One of the six priority themes for Horsham Council is: “<i>Safer and healthier: Improving health and well being.</i>”</b></p>	<p>The purpose of this chapter is to assess and where possible remove/reduce adverse impacts on health and wellbeing.</p>
<p><b>Policy 24 (Environmental Protection) states that “<i>(...) developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they (...)</i>” (amongst other factors) “<i>(...) minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment.</i>”</b></p>	<p>This chapter assesses potential human health effects associated with changes in relevant environmental health determinants, such as the ones referenced in this policy.</p>
<p><b>The Mid Sussex District Plan 2014-2031 (Mid Sussex District Council, 2018)</b></p>	
<p><b>One strategic objective for the District Plan relates to supporting healthy lifestyles. Specifically, “<i>to create places that encourage a healthy and enjoyable lifestyle by the provision of first class cultural and sporting facilities, informal leisure space and the opportunity to walk, cycle or ride to common destinations.</i>”</b></p>	<p>The purpose of this chapter is to assess and where possible identify mitigation to remove/reduce adverse impacts on health and wellbeing.</p>
<p><b>Policy DP29 (Noise, Air and Light Pollution) states that “<i>the environment, (...) and the quality of people’s life will be protected from unacceptable levels of noise, light and air pollution (...)</i>”.</b></p>	<p>This chapter assesses potential human health effects associated with changes in relevant environmental health determinants, such as the ones referenced in this policy.</p>

28.2.7 **Table 28-4** lists the local planning policy relevant to the assessment of the potential effects on human health receptors.

**Table 28-4 Emerging local planning policy relevant to human health**

Policy description	Relevance to assessment
<b>Draft Horsham District Local Plan 2019-2036 (Horsham District Council, 2020)</b>	
<p><b>Policy 25 (Environmental Protection)</b> states that <i>“(...) developments will be expected to minimise exposure to, and the emission of, pollutants including noise, odour, vibration, air and light pollution arising from all stages of development. Development proposals must ensure that they (...)”</i> (amongst other factors) <i>“(...) minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment.”</i></p>	<p>This chapter assesses potential human health effects associated with changes in relevant environmental health determinants, such as the ones referenced in this policy.</p>
<b>Mid Sussex District Plan 2021-2039 Consultation Draft (Regulation 18) (Mid Sussex District Council, 2022)</b>	
<p>The District Plan Vision is underpinned by three priority themes that promote the development of sustainable communities. One of which is <i>“social”</i>, ensuring cohesive and healthy communities.</p>	<p>The purpose of this chapter is to assess and where possible remove/reduce adverse impacts on health and wellbeing.</p>
<p><b>DPS6 (Health and Wellbeing)</b> states that <i>“all new development must be designed to achieve healthy, inclusive and safe places, which enable and support healthy lifestyles and address health and wellbeing needs in Mid Sussex, as identified in the Joint Strategic Needs Assessment and West Sussex Joint Health and Wellbeing Strategy.”</i></p>	<p>The purpose of this chapter is to assess and where possible remove/reduce adverse impacts on health and wellbeing. In addition, the human health chapter integrates an equalities impact assessment (<b>Appendix 28.3: Equalities Impact Assessment, Volume 4</b> of the ES (Document Reference: 6.4.28.3)), the purpose of which is to ensure that the Proposed Development avoids any potential adverse equality impact.</p>
<p><b>Policy DPN6 (Pollution)</b> states that <i>“development should not result in pollution or hazards, including air, noise, vibration, light, water, soil, odour, dust or other pollutants, which significantly adversely impact on people, including health and quality of</i></p>	<p>This chapter assesses potential human health effects associated with changes in relevant environmental health determinants, such as the ones referenced in this policy.</p>

Policy description	Relevance to assessment
<p><i>life (...).” “Mitigation measures may need to be implemented for development that is likely to increase levels of pollution, taking into account any cumulative impacts.”</i></p>	<p>Embedded mitigation measures referenced within this chapter are generally associated with environmental health determinants, which are inherently protective of health and wellbeing.</p>
<p><b>Policy DPN7 (Noise Impacts) states that “the natural environment and people’s health and quality of life will be protected from unacceptable levels of noise (...) Development will only be permitted where it:</b></p> <ul style="list-style-type: none"> <li>● <b><i>avoids significant adverse impacts on health and quality of life; and</i></b></li> <li>● <b><i>mitigates and minimises adverse impacts on health and quality of life; and</i></b></li> <li>● <b><i>where possible, contributes to the improvement of health and quality of life.”</i></b></li> </ul>	<p>This chapter assesses potential human health impacts associated with changes in noise exposure using key outputs from <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21). Embedded environmental measures referenced within this chapter that contribute to a reduction in noise look to avoid / minimise adverse impacts on health and wellbeing. Where possible and feasible, opportunities to enhance health and wellbeing are explored.</p>
<p><b>Policy DPN8 (Light Impacts and Dark Skies) states that “the natural environment and people’s health and quality of life will be protected from unacceptable levels of light pollution.”</b></p>	<p>Potential lighting impacts have been considered in <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18). As such, the potential health impacts of lighting have been considered in this chapter.</p>
<p><b>Policy DP9 (Air Quality) states that “the natural environment and people’s health and quality of life will be protected from unacceptable levels of poor air quality”.</b></p>	<p>This chapter assesses potential human health impacts associated with changes in local air quality using key outputs from <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19).</p>
<p><b>Policy DPN10 (Land Stability and Contaminated Land) states that “investigations and assessments of sites located in or in close proximity to potentially unstable or contaminated land will be required to be submitted as part of a planning application. The investigations and assessment work should consider the nature and extent of the risk, and potential impacts to human health, adjacent land uses and the natural environment.” “In particular,</b></p>	<p>This chapter assesses potential human health impacts associated with exposure to land contamination using key outputs from <b>Chapter 24: Ground conditions, Volume 2</b> of the ES (Document Reference: 6.2.24).</p>



Policy description	Relevance to assessment
<p><b><i>measures should be taken to avoid (...)" (amongst other factors) "unacceptable risks to the health of future users and occupiers of the development or people in the locality (...)"</i></b></p>	

## Other relevant information and guidance

- 28.2.8 The following other relevant information and guidance is relevant to the assessment undertaken for human health:
- Planning Practice Guidance: Healthy and safe communities (DLUHC, 2022);
  - Effective Scoping of Human Health in EIA (IEMA, 2022a);
  - Determining Significance For Human Health in EIA (IEMA, 2022b);
  - ICNIRP Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (Up to 300 GHz) (ICNIRP, 1998);
  - Power Lines: Demonstrating compliance with EMF public exposure guidelines – A voluntary Code of Practice (DECC, 2012).
- 28.2.9 A summary of each is provided below.

### National Planning Practice Guidance

- 28.2.10 The National Planning Practice Guidance (NPPG) supports the NPPF and provides guidance across a range of topic areas, including 'healthy and safe communities'. It is recognised in the NPPG, that the design and use of the built and natural environments, including green infrastructure are major determinants of health and wellbeing, whereby a "*healthy place*" is one which:
- supports and promotes healthy behaviours and environments and a reduction in health inequalities for people of all ages;
  - will provide the community with opportunities to improve their physical and mental health, and support community engagement and wellbeing;
  - is inclusive and promotes social interaction; and
  - meets the needs of children and young people to grow and develop, as well as being adaptable to the needs of an increasingly elderly population and those with dementia and other sensory or mobility impairments.
- 28.2.11 As stated in the NPPG, planning and health need to be considered firstly in terms of creating environments that support and encourage healthy lifestyles, and secondly in terms of healthcare capacity. In addition, engagement with individuals and/or organisations, such as the relevant Director(s) of Public Health, will help ensure local public health strategies and any inequalities are considered appropriately.

## IEMA Effective Scoping of Human Health in EIA

- 28.2.12 The guidance on 'Effective Scoping of Human Health in EIA' defines the approach for scoping wider determinants of health in or out of an EIA, and is derived from EU EIA Directive 2014/52/EU.
- 28.2.13 The guidance expects that an EIA Report will include a chapter on human health where wider determinants of health not covered by other EIA technical topics have been scoped in, or where other EIA technical topics have been scoped in to assess likely and potentially significant effects to human receptors.
- 28.2.14 For human health chapters, the scoping process primarily relates to: deciding if there are wider health determinants and population groups to include in the assessment; deciding the correct spatial and temporal assessment boundaries; specifying assessment methods sufficient to the complexity and important of the impact; and clarifying governance and engagement arrangements.
- 28.2.15 The guidance ensures that the EIA health chapter will align to Health Impact Assessment (HIA) principles and normally satisfy policies or validation requirements to undertake a HIA, without the need for a standalone HIA. This can be assured by early engagement with public health and planning stakeholders, and the general public during scoping.
- 28.2.16 Engagement can further assist scoping of health in EIA, it can highlight: which wider determinants of health and population groups are most relevant to a project; the regulatory context; key public health priorities and desired population health outcomes relevant to the project; specific wider groups for further engagement; and any other useful information or data. Internal engagement with other EIA practitioners is also encouraged as other technical topics will inform the scope of the human health assessment.
- 28.2.17 The guidance includes a non-exhaustive list of 21 wider health determinants to consider when scoping human health in EIA. These are varied and span the following categories: health related behaviours; social environment; economic environment; bio-physical environment; and institutional and built environment. When it comes to scoping health in EIA, the guidance recommends using this list as a foundation, where other wider health determinants that are not listed may be relevant for specific projects.
- 28.2.18 It is recommended that each determinant is scoped in or out following careful consideration of how each determinant relates to the following set of questions:
- is likelihood for the wider health determinant established through plausible source-pathway-receptor link which is probable given the actual project activities? If no, scope-out, if yes, proceed.
  - is the effect on the wider determinant of health potentially significant because the expected scale of change is:
    - ▶ central/influential to the public health agenda of the relevant jurisdiction as informed by an understanding of relevant scientific literature, local baseline conditions and local health priorities? If yes, scope-in, if no scope-out; or
    - ▶ contentious/unclear (negative effects) or strongly desired and in need of securing (positive effects) as informed by an understanding of relevant

consultation responses, regulatory standards and the health policy context?  
If yes, scope-in, if no scope-out.

- for negative effects, does committed mitigation avoid potentially significant population health effects? And does committed mitigation proportionately further minimise other effects? If yes, scope-out, if no scope-in.
- for positive effects, do committed enhancements already proportionately maximise public health opportunity with no significant population health effects to discuss? If yes, scope-out, if no scope-in.

28.2.19 The guidance also highlights how health impacts vary temporally across project stages (for example, pre-commencement, demolition, construction, operation and decommissioning), and that the scope should identify which stages should be included.

28.2.20 Geographic scope should also be considered when discussing health effects on different populations. For example, the health effects may vary between site-specific, local, regional, national and international populations. The geographic scope should identify areas where the project will exert most influence.

28.2.21 Finally, as population groups are the sensitive receptors for health in EIA, sub-populations, other than the general population should be considered. These include those with vulnerability due to young age, older age, income or unemployment, health status, social disadvantage, and access or geographic factors.

## IEMA Determining Significance for Human Health In EIA

28.2.22 The guidance on 'Determining Significance for Human Health in EIA' responds to gaps and inconsistencies across existing guidance as to how health, particularly with regard to significance, is assessed in EIA. This promotes greater consistency in the assessment process, in particular to how EIA health conclusions are reached, interpreted and used.

28.2.23 The EIA process uses the term 'significance' to describe the weight that should be placed on an issue during a decision, for instance, the extent to which it is 'material' to the decision. The European Commission defines significance as an informed expert's judgement of the importance, desirability or acceptability of a change. In the case of human health, this relates to whether the change is important, desirable or acceptable for public health. The judgement and its explanation must be context dependent and must be evidence based to minimise subjectivity from the practitioner. Available evidence to cite may include: scientific literature; consultation responses; baseline conditions; local health priorities; and regulatory standards.

28.2.24 A matrix of sensitivity and magnitude is typically used to determine significance (refer to **Table 28-17** of this chapter). For health, this identifies a relevant population and their sensitivity (receptor) and the level of change in determinants of health (magnitude of impact), which then gives an indication of the likely significant effects to population health outcomes. Major and moderate categories will normally be considered significant, supported with appropriate evidence and

justification. However, significant effects can be amended to residual effects with implementation of suitable secured additional mitigation.

- 28.2.25 Sensitivity can be informed by baseline data, including demographic statistics, public health statistics and deprivation mapping. Magnitude can be informed by a full understanding of the project and the findings of other EIA chapters, including their zones of influence and expected degrees of change. Both sensitivity and magnitude can be informed by professional judgements, for example judgement can inform the characterisation of the relevant population, their capacity to adapt and any vulnerable groups.
- 28.2.26 The indicative health sensitivity criteria is explained in **Table 28-14** of this chapter, and relates to: levels of deprivation; shared resources; inequalities between the most and least healthy; community outlook; ability to undertake daily activities; providing or requiring care; health status; and/or capacity to adapt.
- 28.2.27 The indicative health magnitude criteria is explained in **Table 28-16** of this chapter, and relates to: exposure; duration; frequency; morbidity or change in quality-of-life; amount of population affected; timespan of change; and/or service quality implications.
- 28.2.28 For each determinant of health, the levels of sensitivity and magnitude (from high to negligible) for the population and relevant sub-population(s) should be determined, and then assigned a level of significance (from major to negligible) based on expert judgement. A narrative explaining this with reference to local context and project-specifics should be provided alongside the level of significance. A single level of significance that reflects the overall public health conclusion should also be reached, including any significant changes in health inequalities.

#### ICNIRP Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields

- 28.2.29 **Appendix 28.2: EMF health evidence base, Volume 4** of the ES (Document Reference: 6.4.28.2) outlines the EMF health evidence base, which includes a summary of the ICNIRP guidelines, which are summarised here.
- 28.2.30 Health protection guidelines for public and occupational exposure to Extremely Low Frequency (ELF) EMFs were published by ICNIRP in 1998 (ICNIRP, 1998) and 2010 (ICNIRP, 2010). These guidelines have been used in a number of sources of recommendations and advice on exposure to EMFs. The updated 2010 ICNIRP guidance gives a less stringent 200 microtesla ( $\mu\text{T}$ ) reference level for general public magnetic field exposure (compared to the 100 $\mu\text{T}$  set in 1998).
- 28.2.31 In the UK, the former Health Protection Agency's (HPA) Radiation Protection Division has recommended that the UK adopts the 1998 ICNIRP guidelines under the terms of the European Commission (EC) Recommendation. The Radiation Protection Division was formed in 2005 from the former National Radiological Protection Board (NRPB), which was the independent statutory body established to give advice on EMFs, including advice on safe levels of occupational and public EMFs exposure. In 2013 it became part of the Centre for Radiation, Chemical and Environmental Hazards in Public Health England (PHE). This recommendation is based on advice on limiting exposure to EMFs published by NRPB in 2004,

following a review of the relevant scientific data (McKinlay, et al., 2004; McKinlay, et al., 2004).

- 28.2.32 **Table 28-5** summarises the relevant exposure guidelines. The ‘basic restriction’ level to protect health is for induced current in the central nervous system. The reference level for external fields indicates a threshold beyond which the potential for induced current to exceed the ‘basic restriction’ should be investigated. Reference levels have been published by ICNIRP and by the former HPA. They relate to the same ‘basic restriction’ published by ICNIRP in 1998. The reference levels given in the CoP are those specified by the former HPA, on the basis of modelling undertaken by Dimbylow (Dimbylow, 2005).
- 28.2.33 Although ICNIRP published updated guidance in 2010 that gives a less stringent 200 $\mu$ T reference level for general public magnetic field exposure, due to changes in the basis of the basic restriction, the 1999 EC recommendation for use of the more stringent 1998 ICNIRP guidance remains the basis of UK guidance and the CoP.

**Table 28-5 ELF EMFs exposure guidelines adopted in the UK**

Description		1998 ICNIRP guidelines, as adopted in the UK in the Code of Practice (CoP)	
		Occupational	Public
<b>‘Basic restriction’ (the quantity that must not be exceeded)</b>	Induced current density in the central nervous system	10mA m <sup>-2</sup>	2mA m <sup>-2</sup>
<b>ICNIRP reference level (not a limit in itself but a guideline for when ‘basic restriction’ investigation may be required)</b>	Magnetic field	500 $\mu$ T	100 $\mu$ T
	Electric field	10kV m <sup>-1</sup>	5kV m <sup>-1</sup>
<b>CoP reference level (not a limit in itself but a guideline for when ‘basic restriction’ investigation may be required)</b>	Magnetic field	1,800 $\mu$ T	360 $\mu$ T
	Electric field	46kV m <sup>-1</sup>	9kV m <sup>-1</sup>

## Power Lines: Demonstrating compliance with EMF public exposure guidelines – A voluntary Code of Practice

- 28.2.34 **Appendix 28.2: EMF health evidence base, Volume 4** of the ES (Document Reference: 6.4.28.2) outlines the EMF health evidence base, which includes a summary of the voluntary Code of Practice, which is summarised here.
- 28.2.35 Building on the outcomes of the SAGE process, in 2011 the former Department of Energy and Climate Change (DECC) published a voluntary Code of Practice (CoP) titled “*Power Lines: Demonstrating compliance with EMF public exposure guidelines*”. This details the recommended approach for demonstrating compliance with adopted ELF EMFs exposure guidelines, subsequently updated in March 2012 (DECC, 2012).
- The CoP “has been developed following publication of the Government response to the Stakeholder Advisory Group on extremely low frequency electric and magnetic fields (ELF EMFs)(SAGE) First Interim Assessment... [and] agreed by the Department of Energy and Climate Change with the Department of Health, the Energy Networks Association, the Welsh Assembly, the Scottish Executive, the Northern Ireland Executive and the Health and Safety Executive” (page 2).
- It implements the 1998 ICNIRP guidance for AC fields under the terms of the 1999 EC Recommendation, in the UK context.
- 28.2.36 The CoP states that the public exposure limit guideline values are for uniform, unperturbed fields near ground level, such as will be experienced from an overhead line. Although higher (less stringent) levels could be established on a case-by-case basis, the CoP states that the guideline levels will never be lower. As such, the guideline levels specified in the CoP are used as a conservative basis for the assessment in this report. The CoP specifies on page five that compliance of overhead lines and underground cables at voltages of >132kV should be shown by “*a calculation or measurement of the maximum fields (ie directly under the line, or directly above the cable)*”. However, for all substations and for overhead lines or underground cables at ≤132kV, the CoP states that compliance with the public exposure guidelines is assumed, based on evidence published by the Energy Networks Association (ENA) for types of infrastructure that by design are not capable of causing exceedance of the public exposure guideline limits.
- 28.2.37 The CoP specifies that, given the terms of the 1999 EC Recommendation, assessment of EMF exposure against the general public exposure guidelines is only required in general for residential exposure or certain other cases of long-term exposure of potentially vulnerable groups (for example, schools). The CoP states that “*In other environments, where exposure can be deemed not to be for a significant period of time, the ICNIRP occupational guidelines, rather than the ICNIRP general public guidelines, shall be deemed to apply*” (page 4).

## 28.3 Consultation and engagement

### Overview

- 28.3.1 This section describes the stakeholder engagement undertaken for Rampion 2. This consists of early engagement, the outcome of, and response to, the Scoping Opinion (Planning Inspectorate, 2020) in relation to the human health assessment, the Evidence Plan Process (EPP), non-statutory consultation and Rampion 2's statutory consultation. An overview of consultation and engagement undertaken for Rampion 2 relevant to the EIA is outlined in [Section 5.4 of Chapter 5: Approach to the EIA, Volume 2](#) of the ES (Document Reference: 6.2.5).
- 28.3.2 Given the social distancing restrictions which have been in place due to the COVID-19 pandemic, all technical consultation relating to the EIA has taken place online, primarily in the form of conference calls using Microsoft Teams.
- 28.3.3 It should be noted that a wide range of environmental, social, and economic factors have the potential to influence health, many consultation responses which relate to these determinants are also relevant to health. However, to ensure a focussed list and to avoid duplication of responses pertinent to the inter-related technical disciplines that inform the population and human health assessment, the responses referenced have been included only if they explicitly mention health.

### Scoping Opinion

- 28.3.4 Rampion Extension Development Limited (RED) submitted a Scoping Report (RED, 2020) and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate) on 2 July 2020. A Scoping Opinion (Planning Inspectorate, 2020) was issued on 11 August 2020.
- 28.3.5 The Scoping Report (RED, 2020) originally proposed that a stand-alone human health ES chapter would not be required on the basis that the main interactions with human health will likely be through ground conditions, noise and vibration, air quality, landscape and visual, socio-economics and transport effects, and that human health is addressed through the individual assessments for these aspects.
- 28.3.6 There were no specific comments in relation to the stand-alone human health assessment provided in the main Scoping Opinion, however comments were received from stakeholders in *Appendix 2: Respondents to consultation and copies of replies* (Planning Inspectorate, 2020) and these are provided in **Table 28-6**.
- 28.3.7 As previously stated, to ensure a focussed list and to avoid duplication of responses pertinent to the inter-related technical disciplines that inform the population and human health assessment, the responses referenced have been included only if they explicitly mention health.

**Table 28-6 Planning Inspectorate Scoping Opinion (2020) responses – human health**

Stakeholder	Scoping Opinion comment	How this is addressed in this ES
<b>Public Health England</b>	The ES should include a chapter on population and human health in order to capture a broader view of the impacts and effects of the proposal on the local population.	This chapter constitutes a standalone population and human health assessment to identify the impacts and effects on the local population across a range of health determinants.
<b>Public Health England</b>	This chapter should identify sensitive receptors in both the general population and vulnerable populations, the NSIP's potential direct and indirect impacts on each population, and the potential effects in relation to these populations.	<p>The sensitive receptors referenced within this chapter remain consistent with the inter-related technical disciplines that inform the assessment of population and human health.</p> <p>Furthermore, an Equalities Impact Assessment is provided in <a href="#">Appendix 28.3: Equalities Impact Assessment, Volume 4</a> of the ES (Document Reference: 6.4.28.3) which assesses in detail any potential equality effects associated with the Proposed Development. As part of this, an exercise was undertaken to identify specific vulnerable receptors.</p>
<b>Public Health England</b>	This chapter should reference health impacts and effects outlined in individual assessments of environmental aspects, and also include impacts and effects that sit outside these chapters, for example, local communities access to green and	This chapter draws from and builds upon key outputs across a range of technical disciplines. In addition, assessments have been completed on access to



Stakeholder	Scoping Opinion comment	How this is addressed in this ES
	<p>bluespace, and opportunities for recreation and physical activity, and note possible combined effects.</p>	<p>opportunities for physical activity (associated with land take) and exposure to EMF during the operation and maintenance phase.</p>
<p><b>Public Health England</b></p>	<p>The ES should accept the broad definition of health proposed by the World Health Organisation (WHO) and also include specific reference to mental health within the definition of health. There should be parity between mental and physical health, and any assessment of health impact should include the appreciation of both. A systematic approach to the assessment of the impacts on mental health should be taken.</p>	<p>This chapter accepts the broad definition of health proposed by the WHO. Both physical and mental health outcomes have been considered in the assessment.</p>
<p><b>Public Health England</b></p>	<p>The assessment should identify vulnerable populations and provide clear mitigation strategies that are adequately linked to any local services or assets.</p>	<p>The sensitive receptors referenced within this chapter remain consistent with the inter-related technical disciplines that inform the assessment of population and human health.</p> <p>An Equalities Impact Assessment is provided in <a href="#">Appendix 28.3: Equalities Impact Assessment, Volume 4</a> of the ES (Document Reference: 6.4.28.3) which assesses in detail any potential equality effects associated with the Proposed Development. As part of this, an exercise was undertaken to identify specific vulnerable receptors.</p>

Stakeholder	Scoping Opinion comment	How this is addressed in this ES
<b>Public Health England</b>	The ES should clearly describe the impact of construction and operation on both the quantity and quality of both publicly and non-publicly accessible green/bluespace and green infrastructure, and present the estimated effects of this for the local community. The assessment should identify changes in opportunities for outdoor recreation including physical activity. This should be distinct from the impact on tourism.	The scope of the population and human health assessment includes consideration of potential health effects from changes in access to physical activity during the construction phase. On the basis that no permanent land take is associated with the onshore cable installation, consideration of potential health effects from changes in access to physical activity during the operation and maintenance phase has been scoped out.
<b>Public Health England</b>	The ES should include an assessment of the impact of construction on links between communities, and access to services, facilities and leisure opportunities.	Severance during the construction phase has been considered as part of the health assessment relating to changes in transport nature and flow rate.
<b>Public Health England</b>	The ES should include consideration of physical and mental health impact and effects for sensitive receptors, the local population and visitors during construction, operation and maintenance, and decommissioning of the onshore substation. This is not limited to but should include: change in access to greenspace, impact on physical activity and recreation opportunities, community severance (if applicable, given location and size of substation), displacement of business or residence (if applicable), traffic and transport.	Potential health impacts (physical and mental health outcomes) across all phases of the Proposed Development (construction, operation and maintenance, and decommissioning) associated with a range of health determinants have been assessed for all project aspects, including the proposed Oakendene substation. This includes those listed, although no displacement of

Stakeholder	Scoping Opinion comment	How this is addressed in this ES
<b>Public Health England</b>	<p>Our position is that pollutants associated with road traffic or combustion, particularly particulate matter and oxides of nitrogen are non-threshold; i.e., an exposed population is likely to be subject to potential harm at any level and that reducing public exposures of non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards will have potential public health benefits. We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure), maximise co-benefits (such as physical exercise). We encourage their consideration during development design, environmental and health impact assessment, and development consent.</p>	<p>business would occur as part of the Proposed Development.</p> <p>It is acknowledged in <b>Section 28.9</b> that there may not be a concentration threshold below which no adverse health effects occur.</p> <p>As a result, the assessment of health effects associated with changes in air quality focusses on the absolute change in annual mean concentration, rather than air quality objectives.</p> <p>Embedded mitigation measures relevant to air quality are referenced in the relevant sections of the human health assessment.</p>
<b>Public Health England</b>	<p>It is noted that the current proposals do not appear to consider possible health impacts of Electric and Magnetic Fields (EMF). We are aware that the Human health impacts of project associated EMF are likely to be managed or eliminated, in line with the current guidance.</p> <p>We request that the ES clarifies this and if necessary, the proposer should confirm either that the proposed development does not impact any receptors from potential sources of EMF; or ensure that an adequate assessment of the possible impacts is undertaken and included in the ES.</p>	<p>The potential health effects from exposure to EMF has been assessed in <b>Section 28.10</b>.</p>

Stakeholder	Scoping Opinion comment	How this is addressed in this ES
<b>West Sussex County Council</b>	Human Health – WSCC agree this does not need its own chapter, as long as a clear and robust assessment for all relevant receptors is included in the relevant topic technical chapter. This should build upon best practice and use the assessment of other relevant chapters (such as noise, traffic, air, and water) to describe how these factors may lead to health outcomes of the local population.	While WSCC agree that human health does not need its own chapter, one has been provided in order to consolidate the assessment of potential effects on human health associated with a broad range of health determinants in one place, rather than across a range of different technical disciplines working to separate assessment methods.
<b>West Sussex County Council</b>	WSCC would expect to see any EMF effects covered by the assessment work undertaken.	The potential health effects from exposure to EMF has been assessed in <b>Section 28.10</b> .
<b>West Sussex County Council</b>	WSCC expects to see reference to West Sussex Joint Health and Wellbeing Strategy (2019-2024). This document sets out the vision of the Health and Wellbeing Board, its goals and the ways in which it will work to improve the health and wellbeing for all residents in West Sussex.	While no reference is made to the West Sussex Joint Health and Wellbeing Strategy (2019-2024), the assessment in this chapter is conducive to both health protection and promotion, which aligns with local public health objectives.
<b>West Sussex County Council</b>	WSCC would want to see reference made to data for West Sussex, presented by the Public Health and Social Research Unit, responsible for the Joint Strategic Needs Assessment (JSNA): the evidence base that underpins strategic Public Health decision-making in West Sussex by WSCC and its partners.	Data for West Sussex is included within <b>Appendix 28.1: Human health baseline, Volume 4</b> of the ES (Document Reference: 6.4.28.1). The data sources which inform the JSNA have been referenced and are

Stakeholder	Scoping Opinion comment	How this is addressed in this ES
		summarised in <b>Table 28-11</b> .
28.3.8	In response to the comments received in Appendix 2 of the Planning Inspectorate's Scoping Opinion (Planning Inspectorate, 2020) outlined in <b>Table 28-6</b> , this chapter has therefore been included in the ES to address consolidate the assessment of potential effects on human health associated with a broad range of health determinants in one place, rather than across a range of different technical disciplines working to separate assessment methods.	
28.3.9	A full list of the Planning Inspectorate's Scoping Opinion (Planning Inspectorate, 2020) comments and responses is provided in <b>Appendix 5.2: Response to the Scoping Opinion, Volume 4</b> of the ES (Document Reference: 6.4.5.2). Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.	

### Non-statutory consultation exercise – January/February 2021

- 28.3.10 RED carried out a non-statutory consultation exercise for a period of four weeks from 14 January 2021 to 11 February 2021. This non-statutory consultation exercise aimed to engage with a range of stakeholders including the prescribed and non prescribed consultation bodies, local authorities, Parish Councils and general public with a view to introducing the Proposed Development and seeking early feedback on the emerging designs.
- 28.3.11 There were no key themes emerging from non-statutory consultation exercise in January 2021 specifically relating to the stand-alone human health assessment.
- 28.3.12 Further detail about the results of the non-statutory consultation exercise can be found in the **Consultation Report** (Document Reference: 5.1).

### Statutory Consultation exercises

- 28.3.13 Rampion 2's first Statutory Consultation exercise ran from 14 July to 16 September 2021, a period of nine weeks. The PEIR (RED, 2021) was published as part of Rampion 2's first Statutory Consultation exercise. **Table 28-7** provides a summary of the key issues raised in the feedback received during the first Statutory Consultation exercise in relation to the stand-alone human health assessment and outlines how the feedback has been considered in this ES chapter.
- 28.3.14 As previously stated, to ensure a focussed list and to avoid duplication of responses pertinent to the inter-related technical disciplines that inform the population and human health assessment, the responses referenced have been included only if they explicitly mention health.

**Table 28-7 First Statutory Consultation exercise (July – September 2021) feedback**

Stakeholder	Theme	How this is addressed in this ES
<b>Mid-Sussex District Council</b>	With the Wineham Lane North substation site being in close proximity to residential properties, it is essential that any potential long term health implications on nearby residents have been fully considered and demonstrated within your submissions.	Potential health impacts associated with a range of health determinants have been assessed for all project aspects, including the extension to the existing National Grid Bolney substation (on Wineham Lane).
<b>West Sussex County Council</b>	It is appreciated that studies show the risk of exposure to electromagnetic field from offshore wind farms as being negligible with not much evidence to suggest the contrary. However, to serve as reassurance to the public and all other stakeholders who may have concerns around this, we recommend that RED demonstrates that the risks, however little- have been assessed.	The potential health effects from exposure to EMF has been assessed in <b>Section 28.10</b> .

28.3.15 Following feedback to the Statutory Consultation in 2021 and after further analysis, it was identified that some coastal residents did not receive consultation leaflets as intended. Therefore, the Statutory Consultation was reopened between 7 February 2022 to 11 April 2022 for a further nine weeks. The original PEIR (RED, 2021) published as part of the Statutory Consultation in 2021 was unchanged and re-provided alongside the reopened Statutory Consultation in early 2022. No further comments were received in relation to the stand-alone human health assessment.

28.3.16 In addition to the first Statutory Consultation exercise in 2021, RED undertook three further targeted Statutory Consultation exercises:

- Second Statutory Consultation exercise – October to November 2022: This was a targeted supplementary consultation which focused on updates to the onshore cable route proposals which were being considered following feedback from consultation and further engineering and environmental works.
- Third Statutory Consultation exercise – February to March 2023: This was a targeted consultation which focused on a further single onshore cable route alternative being considered following feedback from consultation and further engineering and environmental works.
- Fourth Statutory Consultation exercise – April to May 2023: This was a targeted consultation which focused on the proposed extension works to the

existing National Grid Bolney substation to facilitate the connection of the onshore cable route into the national grid electricity infrastructure.

- 28.3.17 As part of the second, third and fourth Statutory Consultation exercises, RED sought feedback on the potential changes to the onshore cable route proposals and the proposed existing National Grid substation extension works to inform the onshore design taken forward to Development Consent Order (DCO) Application.
- 28.3.18 No specific feedback relating to the stand-alone human health assessment was received in the second, third and fourth Statutory Consultation exercises.
- 28.3.19 A full list of all comments received during the Statutory Consultation exercises and the responses to those comments is provided in the [Consultation Report](#) (Document Reference: 5.1).

## Evidence Plan Process (EPP)

- 28.3.20 The Evidence Plan Process (EPP) has been set up to provide a formal, non-legally binding, independently chaired forum to agree the scope of the EIA and Habitats Regulations Assessment (HRA), and the evidence required to support the DCO Application. The EPP commenced in January 2020 and has continued throughout the EIA helping to inform the ES.
- 28.3.21 For human health, further engagement has been undertaken via the EPP Expert Topic Group (ETG) Traffic, Air Quality, Noise and Socio-economics ETG Meeting.
- 28.3.22 Further information is provided in the [Evidence Plan](#) (Document Reference: 7.21).

## 28.4 Scope of the assessment

### Overview

- 28.4.1 This section sets out the scope of the ES assessment for human health. This scope has been developed as Rampion 2 design has evolved and responds to feedback received to-date as set out in **Section 28.3**.

### Spatial scope and study area

- 28.4.2 The spatial scope of the human health assessment differs for each health determinant assessed, and has formed the basis of the Study Area described in this section.
- 28.4.3 Environmental health determinants (such as changes to air quality and noise exposure) typically have a local distribution pattern, where the hazards are limited by their concentration and physical dispersion characteristics. Changes in transport nature and flow rate experience a similar distribution on the local road network.
- 28.4.4 Socio-economic health determinants (such as employment and related income generation) have a wider geographic scope of influence than environmental health determinants due to the willingness to commute significant distances to work.

- 28.4.5 The onshore aspects of the Proposed Development pass through three local districts, namely Arun, Horsham and Mid Sussex. As a result, the spatial scope for health-specific baseline statistics focusses on these district areas, using the West Sussex county, South East region and England averages as relevant comparators. While data for these areas is collected in relation to socio-economic baseline statistics, the average results for West Sussex should be given most consideration due to the highly mobile nature of workforces.
- 28.4.6 The Study Area defining the relevant sensitive receptors identified for assessment purposes have been co-ordinated and remains consistent with the inter-related technical aspects assessed within the ES, for example:
- **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17);
  - **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18);
  - **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19);
  - **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21);
  - **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23); and
  - **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24).

## Temporal scope

- 28.4.7 The temporal scope of the human health assessment is the entire lifetime of Rampion 2 which therefore covers the construction, operational and maintenance, and decommissioning phases, as follows:
- construction phase (landfall, onshore temporary cable corridor and onshore substation) – up to four years in respect of the landfall and onshore temporary cable corridor including use of construction compounds, and three years for the onshore substation (all defined in the assessment methodology as ‘short term’);
  - operation and maintenance phase (onshore substation) – around 30 years (defined in the assessment methodology as ‘long term’); and
  - decommissioning phase (substation) – four years (short term).
- 28.4.8 During the decommissioning phase, it is anticipated that the onshore electrical cables will be left in-situ with ends cut, sealed, and buried to minimise landscape and visual effects associated with removal. The onshore Oakendene substation, however, may be used as a substation site after decommissioning of the Proposed Development or it may be upgraded for use by another offshore wind project. This will be subject to a separate planning application. The extension to National Grid Bolney substation may be used for repowers or new connections after decommissioning of the Proposed Development. Should the onshore Oakendene substation or National Grid Bolney substation extension needs to be



decommissioned fully, the decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment. All relevant sites will be restored to their original states or made suitable for an alternative use. The assessment has therefore assumed a worst-case scenario that the substation will be decommissioned after the operation and maintenance phase.

## Potential receptors

28.4.9 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of Rampion 2. The receptors identified that may experience likely significant effects for human health are outlined in **Table 28-8**.

**Table 28-8 Receptors requiring assessment for human health**

Receptor group	Receptors included within group
Population health	Population living within the baseline Study Area.

## Potential effects

28.4.10 Potential effects on human health receptors that have been scoped in for assessment are summarised in **Table 28-9**.

**Table 28-9 Potential effects on human health receptors scoped in for further assessment**

Receptor	Activity or impact	Potential effect
<b>Construction</b>		
Population health	Health effects from changes in local air quality (including dust and odour)	Direct and short-term localised effects on human health (from respirable fraction) and wellbeing (annoyance from dust and odour).
	Health effects from changes in noise exposure	Direct and short-term localised effects on human health and wellbeing associated with annoyance from day-time construction activities and transport movements, and sleep disturbance from trenchless crossing (e.g. Horizontal Directional Drilling (HDD)) which is continuous and therefore may occur during the night time period.
	Health effects from changes in vibration exposure	

Receptor	Activity or impact	Potential effect
	Health effects from changes in transport nature and flow rate	Direct and short-term localised effects on human health and wellbeing associated with severance, pedestrian amenity/delay, pedestrian fear and intimidation and risk of accidents/injury.
	Health effects from changes in visual amenity	Direct and short-term localised effects on health and wellbeing from changes in the visual environment (including from participation in physical activity).
	Health effects from changes in exposure to land contamination	Direct and short-term localised effects on human health from exposure of construction workers to land contamination.
	Health effects from changes in access to opportunities for recreation and physical activity (for instance, through land acquisition)	Direct and short-term localised effects on human health and wellbeing from temporary and permanent land take and associated impacts on access to opportunities for physical activity and recreation through the use of Public Rights of Ways (PRoW) and open space.
	Health effects from changes to socio-economic factors (such employment and associated income)	Direct, indirect and short-term local (Sussex) and national effects on human health and wellbeing from uptake of employment generated from construction of the Proposed Development.

**Operation and maintenance**

<b>Population health</b>	Health effects from changes in noise exposure	Direct and long-term localised effects on human health and wellbeing associated with annoyance and sleep disturbance from operation of the sub-station.
	Health effects from changes in exposure to EMF	Direct and long-term localised effects on human health associated with exposure to electric and magnetic fields from operation of the underground cable, Oakendene substation and extension to National Grid Bolney substation.

Receptor	Activity or impact	Potential effect
	Health effects from changes in visual amenity	Direct and long-term localised effects on health and wellbeing from changes in the visual environment (including from participation in physical activity).
<b>Decommissioning</b>		
<b>Population health</b>	Health effects from changes in local air quality	Direct and short-term localised effects on human health.
	Health effects from changes in noise exposure	Direct and short-term localised effects on human health and wellbeing associated with annoyance from day-time construction activities and transport movements, and sleep disturbance from HDD which is continuous and therefore may occur during the night time period.
	Health effects from changes in transport nature and flow rate	Direct and short-term localised effects on human health and wellbeing associated with severance, pedestrian amenity/delay, pedestrian fear and intimidation and risk of accidents/injury.
	Health effects from changes in visual amenity	Direct and short-term localised effects on health and wellbeing from changes in the visual environment (including from participation in physical activity).
	Health effects from changes in exposure to land contamination	Direct and short-term localised effects on human health from exposure of decommissioning workers to land contamination.
	Health effects from changes to socio-economic factors (employment and associated income)	Direct, indirect and short-term local and regional effects on human health and wellbeing from uptake of employment generated from construction of the Proposed Development.

## Activities or impacts scoped out of assessment

- 28.4.11 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out activity or impact is considered in turn in **Table 28-10**.

**Table 28-10 Activities or impacts scoped out of assessment**

Activity or impact	Rationale for scoping out
<p><b>Health effects from changes in local air quality (Operation and maintenance)</b></p>	<p>Emissions of air pollutants during the operation and maintenance phase have been scoped out of <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19) on the basis that:</p> <ul style="list-style-type: none"> <li>• there will be no emissions associated with the onshore cable or onshore substation; and</li> <li>• the amount of road traffic for servicing Rampion 2 will also be very low.</li> </ul> <p>On the basis that air quality impacts at human receptors are unlikely to be significant, human health effects from changes in local air quality during the operation and maintenance phase is also unlikely.</p>
<p><b>Health effects from changes in transport nature and flow rate (Operation and maintenance)</b></p>	<p>Operational traffic is anticipated to be negligible and infrequent, and has been scoped out of <b>Chapter 23: Transport, Volume 2</b> of the ES (Document Reference: 6.2.23) as a result. On this basis, no human health effects are considered to be likely.</p>
<p><b>Health effects from changes to socio-economic factors (employment and associated income) (Operation and maintenance)</b></p>	<p>Employment during operation of Rampion 2 is anticipated to be below 100 workers. On the basis that socio-economic benefits of employment will be limited, associated human health benefits will also be limited.</p>
<p><b>Health effects from changes in access to opportunities for recreation and physical activity (for instance, through</b></p>	<p>Following the construction phase, there is no permanent land take associated with the onshore cable installation.</p>

Activity or impact	Rationale for scoping out
<p><b>land acquisition) (Operation and maintenance)</b></p>	<p>The only permanent land take is associated with the proposed Oakendene substation (6.0ha) and Oakendene substation permanent access (0.22ha), and the existing National Grid Bolney substation extension works (0.63ha). However, this infrastructure does not impact PRow or open space.</p> <p>As such, there is no potential for any associated impacts on access to opportunities for physical activity and recreation through the use of PRow and open space.</p>
<p><b>Health effects from impacts to water quality and resources (all phases)</b></p>	<p><b>Chapter 26: Water environment, Volume 2</b> of the ES (Document Reference: 6.2.26) assesses potential impacts on the water environment, ensuring compliance with the standards within the Water Framework Directive, which are inherently protective of the environment and human health. As a result, no further assessment within this chapter is deemed necessary.</p>

## 28.5 Methodology for baseline data gathering

### Overview

- 28.5.1 Baseline data collection has been undertaken to obtain information over the study areas described in **Section 28.4**. The current baseline conditions are for the Study Area are presented in **Section 28.6**.
- 28.5.2 No site surveys have been undertaken as part of baseline data gathering, which has been entirely desk based.

### Desk study

- 28.5.3 The data sources that have been collected and used to inform this human health assessment are summarised in **Table 28-11**.

**Table 28-11 Data sources used to inform the human health ES assessment**

Source	Date	Summary	Coverage of Study Area
Office of National Statistics (ONS)	Mid-2020	Small Area population estimates, England, and Wales: mid 2020	Arun, Horsham, Mid Sussex
	2011-13 to 2018-20	Healthy life expectancies	West Sussex
	2001-03 to 2017-19	Life expectancy estimates all ages UK	Arun, Horsham, Mid Sussex
	2013 to 2021	Mortality statistics (age standardised mortality, cancer, respiratory system, circulatory system)	Arun, Horsham, Mid Sussex
	2017-2022	Estimated dementia diagnosis rate (aged 65 and over)	West Sussex
	2011-12 to 2019-20	Childhood obesity prevalence	Arun, Horsham, Mid Sussex
	2020 estimates	Proportion of current cigarette smokers local authority areas of England	Arun, Horsham, Mid Sussex
	2021	Population in England and Wales by religious group	Arun, Horsham, Mid Sussex
	2021	Sexual orientation	Arun, Horsham, Mid Sussex
	2021	Proportion of people in each ethnic group	Arun, Horsham, Mid Sussex
	2021	Disability census	Arun, Horsham, Mid Sussex
	2021	Gender identity	Arun, Horsham, Mid Sussex

Source	Date	Summary	Coverage of Study Area
<b>Office for Health Improvement and disparities (OHID) Fingertips</b>	2014-15 to 2016-17	Depression and anxiety prevalence	Arun, Horsham, Mid Sussex
	2021-13 to 2020-21	Emergency hospital admissions for intentional self-harm	Arun, Horsham, Mid Sussex
	2001-2021	Suicide registrations	Arun, Horsham, Mid Sussex
	2015-16 to 2020-21	Percentage of adults (aged 18+) classified as obese	Arun, Horsham, Mid Sussex
	2007-08 to 2019-20	Year 6: Prevalence of Overweight (Including Obesity)	Arun, Horsham, Mid Sussex
	2015-16 to 2020-21	Percentage of physically active and inactive adults	Arun, Horsham, Mid Sussex
	2013-14 to 2020-21	Smoking prevalence in adults (15+) current smokers Quality and Outcomes Framework (QOF)	Arun, Horsham, Mid Sussex
	2006/7-2010/11 to 2013/14 to 2017/18	Hospital stays for alcohol related harm – narrow definition	Arun, Horsham, Mid Sussex
<b>Ministry of housing, communities and local government</b>	2019	Index of multiple deprivation (IMD) and health deprivation and disability domain	Arun, Horsham, Mid Sussex

## Data limitations

- 28.5.4 There are no data limitations relating to human health that affect the robustness of the assessment of this ES.

## 28.6 Baseline conditions

### Current baseline

#### Introduction

- 28.6.1 Individuals and communities have varying susceptibilities to adverse and/or beneficial population and health effects associated with changes in environmental and socio-economic conditions as a result of: demographic structure (for instance, age); existing burden of poor health; behaviours (for instance, lifestyle choices which constitute risk factors); and socio-economic circumstance. As an example, an elderly individual with an existing chronic cardiovascular health condition who is a smoker and has a lower than average socio-economic circumstance, would be considered more sensitive than a healthy working age individual.
- 28.6.2 The aim of the following information, is to provide a summary of local health and socio-economic circumstance of the communities living in the district Study Area (Arun, Horsham and Mid Sussex), using the county (West Sussex) and national (England) averages as relevant comparators. Where data for the district Study Area is unavailable, representative data for West Sussex (for instance, a lower spatial resolution) has been collected and compared to the national average. Refer to [Appendix 28.1: Human health baseline, Volume 4](#) of the ES (Document Reference: 6.4.28.1) for the population and health baseline in full.

#### Demography

- 28.6.3 Mid-2020 statistics show that a higher proportion of the district Study Area population is aged 65+ compared to the regional and national averages. Population change in the district Study Area from between 2015 and 2020 has increased, and is higher than the national average; most notably, the population change in Horsham between these years is more than double that of the national average.

#### Physical health

- 28.6.4 Male and female life expectancy in the district Study Area has gradually increased over the years and is consistently higher than the county and national averages. Healthy life expectancy in West Sussex has decreased for both males and females between 2011-13 to 2018-20.
- 28.6.5 All-cause mortality rate within the district Study Area is consistently lower than the national and county averages. When analysing specific causes of mortality (cardiovascular disease, respiratory disease and cancer), all show a general decrease from between 2013 and 2021.

#### Mental health

- 28.6.6 From 2014/15 to 2016/17 there was an increase in percentage of the district Study Area population reporting depression/anxiety. Overall, the percentage of the population reporting depression/anxiety in the district Study Area is consistently lower than the national average.



- 28.6.7 There has been a decrease in dementia diagnosis rates (in those aged 65+) in West Sussex from 2017 to 2022, which has remained consistently lower than the national average.
- 28.6.8 Emergency hospital admissions for intentional self-harm in the district Study Area fluctuates above and below the county average. Suicide rate in the Study Area has also fluctuated over the years.

### Lifestyle and behavioural risk factors

- 28.6.9 The prevalence of children (year 6) who are overweight or obese in the district Study Area is consistently lower than the national average. The percentage of adults in the district Study Area who are classified as obese has been lower than all relevant comparators since 2017/18. There is a clear positive trend over time, showing that adult obesity is becoming more prevalent.
- 28.6.10 Adult smoking prevalence shows that the percentage of the adult population who are cigarette smokers in the district Study Area has been consistently lower than the West Sussex and national comparators since 2013/14.
- 28.6.11 From 2016/17-20/21, there was a lower rate of hospital admissions for alcohol related harm compared to the West Sussex and national comparators.

### Deprivation

- 28.6.12 The Index of Multiple Deprivation (IMD) is the official measure of relative deprivation in England. Lower Super Output Areas (LSOAs) are ranked and then categorised by deprivation decile, whereby decile 1 is the most deprived 10% of areas nationally and decile 10 is the least deprived 10% of areas nationally.
- 28.6.13 Levels of deprivation are higher by the urban coastline areas of Arun and reduce in the more rural areas of Horsham and Mid Sussex.
- 28.6.14 Specifically, the majority of LSOAs (for instance, modal value) within Arun are categorised within decile 6 (for instance, within the least deprived 50 % of areas nationally) for both the overall IMD and the health deprivation and disability domain. The majority of LSOAs in Horsham and Mid Sussex are within decile 10 (for instance, within the least deprived 10% of areas nationally) for both the overall IMD and the health deprivation and disability domain. Across the Study Area as a whole, the majority of LSOAs are categorised in decile 10 for both the overall IMD and the health deprivation and disability domain.
- 28.6.15 When looking at average (mean) values for the overall IMD, LSOAs within Arun are categorised within the decile 6, LSOAs within Horsham are categorised within decile 8, and LSOAs within Mid Sussex are categorised within decile 9. Across the Study Area as a whole, the average overall IMD is categorised within decile 7.
- 28.6.16 When looking at average (mean) values for the health deprivation and disability domain, LSOAs within Arun are categorised within the decile 5, and LSOAs within both Horsham and Mid Sussex are categorised within decile 9. Across the Study Area as a whole, the average overall IMD is categorised within decile 8.

## Protected characteristics

- 28.6.17 Christianity is the most prevalent religion across the district Study Area. The second most prevalent religion within the district Study Area is "*no religion*". There is a lower proportion of the population in the district Study Area who are Hindu, Muslim and Sikh, compared to the county and national averages.
- 28.6.18 The majority of the district Study Area population are heterosexual. There is a lower proportion of the population living within the district Study Area who identify as gay/lesbian or bisexual compared to the county and national averages.
- 28.6.19 The majority of the district Study Area population is white, consistent with the county and national averages. The proportion of the district Study Area population who are Asian, black or other ethnicities is lower than the county and national averages.
- 28.6.20 The majority of the district Study Area population reported no disability or long term condition. The proportion of the population in the district Study Area who are disabled (limited a little) is equal to the county and national averages; the proportion of the population in the district Study Area who are disabled (limited a lot) is lower than the county and national averages; and the proportion of the population in the district Study Area who are not disabled but reported a long term condition which does not limit them is equal to the county average and higher than the national average.
- 28.6.21 The majority of people within West Sussex state that their gender identity is the same as sex registered at birth, whilst 5% chose not to answer. All other gender categories (for example, transexual, non-binary individuals) comprised <1% of the population each.

## Future baseline

- 28.6.22 Consistent with recent local and national trends, the health of the Study Area population is likely to improve over the lifetime of Rampion 2. This will be the case with or without Rampion 2.
- 28.6.23 While this is the case, any improvement is challenging to predict with high confidence and unlikely to be substantial. On this basis, it is considered appropriate (and precautionary) to use present-day statistics for the purpose of this assessment, offering a precautionary approach.

## 28.7 Basis for ES assessment

### Maximum design scenario

- 28.7.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance will not arise should any other development scenario (as described in [Chapter 4: The Proposed Development](#),

**Volume 2** of the ES (Document Reference: 6.4.4)) to that assessed within this Chapter be taken forward in the final scheme design.

- 28.7.2 The maximum parameters and assessment assumptions that have been identified to be relevant to human health are outlined in **Table 28-12** and are in line with the Project Design Envelope (**Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.4.4)).

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**Table 28-12 Maximum parameters and assessment assumptions for impacts on human health**

<b>Project phase and activity/impact</b>	<b>Maximum assessment assumptions</b>	<b>Justification</b>
<b>Construction</b>		
<b>Health effects from changes in air quality</b>	As defined in <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19)	Key outputs from <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19) (and associated modelling) have informed the human health assessment
<b>Health effects from changes in noise exposure</b>	As defined in <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21)	Key outputs from <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21) have informed the human health assessment
<b>Health effects from changes in vibration exposure</b>	As defined in <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21)	Key outputs from <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21) have informed the human health assessment
<b>Health effects from changes in transport nature and flow rate</b>	As defined in <b>Chapter 23: Transport, Volume 2</b> of the ES (Document Reference: 6.2.21)	Key outputs from <b>Chapter 23: Transport, Volume 2</b> of the ES (Document Reference: 6.2.23) have informed the human health assessment

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Health effects from changes in visual amenity</b>	As defined in <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18)	Key outputs from <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18) have informed the human health assessment
<b>Health effects from changes in exposure to land contamination</b>	As defined in <b>Chapter 24: Ground conditions, Volume 2</b> of the ES (Document Reference: 6.2.24)	Key outputs from <b>Chapter 24: Ground conditions, Volume 2</b> of the ES (Document Reference: 6.2.24) have informed the human health assessment
<b>Health effects from changes in opportunities for access for physical activity</b>	<p>Temporary construction-related land take as follows:</p> <ul style="list-style-type: none"> <li>● Agricultural land: 578.33ha (96.03% total temporary land take)</li> <li>● Non-agricultural land: 13.53ha (2.37% total temporary land take)</li> <li>● Urban land: 0.03ha (0.01%)</li> </ul> <p>The only permanent land take is associated with construction of the proposed Oakendene substation and Oakendene substation permanent access, and the existing National Grid Bolney substation extension works.</p>	The scale and nature of land take required for construction of the Proposed Development influences the potential use of such resources for physical activity
<b>Health effects from changes in socio-economic factors</b>	As defined in <b>Chapter 17: Socio-economics, Volume 2</b> of the ES (Document Reference: 6.2.17).	Key outputs from <b>Chapter 17: Socio-economics, Volume 2</b> of the ES (Document Reference: 6.2.17) have

Project phase and activity/impact	Maximum assessment assumptions	Justification
<p>informed the human health assessment</p>		
<p><b>Operation and Maintenance</b></p>		
<p><b>Health effects from changes in noise exposure</b></p>	<p>As defined in <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21)</p>	<p>Key outputs from <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21) have informed the human health assessment</p>
<p><b>Health effects from changes in exposure to EMF (landfall to the proposed Oakendene substation)</b></p>	<p>High Voltage Alternating Current (HVAC) of up to 275kV (represents worst-case compared to 150kV and 220kV cable solutions which would operate with four and three cable circuits, respectively)</p>	<p>The voltage of the electrical transmission infrastructure will affect the strength of the magnetic fields</p>
	<p>Two cable circuits (represents worst-case compared to 150kV and 220kV cable solutions which would operate with four and three cable circuits, respectively)</p>	<p>The interaction between magnetic fields from all four cable circuits needs to be considered within the assessment</p>
	<p>Three 150mm diameter single Power Cables installed in up to 250mm diameter ducts</p>	<p>The cable and duct parameters will inform any assessment of interaction between power cables and cable circuits</p>
	<p>Cable trench of 1.2m wide, with a minimum burial depth of 1.2m and minimum spacing of 5m between trenches</p>	<p>The trench parameters will inform any assessment of interaction between power cables and cable circuits</p>

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Health effects from changes in exposure to EMF (Oakendene Substation to the existing National Grid Bolney substation)</b>	Maximum current of 1,630 (A), occurring for the 275kV two cable solution	The maximum current will affect the maximum magnetic field strength
	HVAC of up to 400kV	The voltage of the electrical transmission infrastructure will affect the strength of the magnetic fields
	Two cable circuits	The interaction between magnetic fields from both cable circuits needs to be considered within the assessment
	Three 160mm diameter single core cables installed in up to 250mm diameter ducts	The cable and duct parameters will inform any assessment of interaction between power cables and cable circuits
	Cable trench of 1.2m wide, with a minimum burial depth of 1.2m and minimum spacing of 5m between trenches	The trench parameters will inform any assessment of interaction between power cables and cable circuits
<b>Health effects from changes in visual amenity</b>	As defined in <a href="#">Chapter 18: Landscape and visual impact, Volume 2</a> of the ES (Document Reference: 6.2.18)	Key outputs from <a href="#">Chapter 18: Landscape and visual impact, Volume 2</a> of the ES (Document Reference: 6.2.18) have informed the human health assessment



Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Decommissioning</b>		
<b>Health effects from changes in air quality</b>	As defined in <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19)	Key outputs from <b>Chapter 19: Air quality, Volume 2</b> of the ES (Document Reference: 6.2.19) (and associated modelling) have informed the human health assessment
<b>Health effects from changes in noise exposure</b>	As defined in <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21)	Key outputs from <b>Chapter 21: Noise and vibration, Volume 2</b> of the ES (Document Reference: 6.2.21) have informed the human health assessment
<b>Health effects from changes in transport nature and flow rate</b>	As defined in <b>Chapter 23: Transport, Volume 2</b> of the ES (Document Reference: 6.2.23)	Key outputs from <b>Chapter 23: Transport, Volume 2</b> of the ES (Document Reference: 6.2.23) have informed the human health assessment
<b>Health effects from changes in visual amenity</b>	As defined in <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18)	Key outputs from <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18) have informed the human health assessment
<b>Health effects from changes in exposure to land contamination</b>	As defined in <b>Chapter 24: Ground conditions, Volume 2</b> of the ES (Document Reference: 6.2.24)	Key outputs from <b>Chapter 24: Ground conditions, Volume 2</b> of the ES (Document Reference: 6.2.24) have informed the human health assessment

<b>Project phase and activity/impact</b>	<b>Maximum assessment assumptions</b>	<b>Justification</b>
<b>Health effects from changes in socio-economic factors</b>	As defined in <b>Chapter 17: Socio-economics, Volume 2</b> of the ES (Document Reference: 6.2.17)	Key outputs from <b>Chapter 17: Socio-economics, Volume 2</b> of the ES (Document Reference: 6.2.17) have informed the human health assessment

## Embedded environmental measures

- 28.7.3 As part of the Rampion 2 design process, a number of embedded environmental measures have been adopted to reduce the potential for impacts on human health. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to consultation.
- 28.7.4 These embedded environmental measures also include those that have been identified as good or standard practice and include actions that will be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and are set out in this ES.
- 28.7.5 **Table 28-13** sets out the relevant embedded environmental measures within the design and how these affect the human health assessment.



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**Table 28-13 Relevant human health embedded environmental measures**

<b>ID</b>	<b>Environmental measure proposed</b>	<b>Project phase measure introduced</b>	<b>How the environmental measures will be secured</b>	<b>Relevance to human health assessment</b>
<b>C-1</b>	The onshore cable route will be completely buried underground for its entire length where practicable.	Scoping	DCO requirement	The use of underground cabling shields against electric fields, reducing any potential for exposure.
<b>C-5</b>	Main rivers, watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by Horizontal Directional Drill (HDD) or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see C-17).	Scoping	<b>Outline Code of Construction Practice (CoCP)</b> (Document Reference: 7.2) and DCO requirement	HDD reduces surface disturbance, mitigating potential adverse impacts associated with visual impact and access to opportunities for physical activity. However, HDD operates 24 hours and so would cause noise disturbance during both day and night time periods.
<b>C-7</b>	Post construction, the work area will be reinstated to pre-existing conditions as far as reasonably practical in line with the Materials Management Plan (MMP) (C-69) and Defra 2009 Code of Construction Practice for the Sustainable Use of Soils on Construction Sites PB13298.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	The reinstatement of construction works areas will mitigate potential adverse impacts associated with visual impact and access to opportunities for physical activity.
<b>C-8</b>	During both construction and operation, vehicle maintenance and refuelling of machinery will be undertaken within	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	Measures to contain spillages and hazardous materials will mitigate the potential for land contamination.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
	<p>designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. These areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) will comply with industry good practice, be bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, or the local watercourses or sensitive land-based receptors. Such areas will be sited at least 10m from a watercourse and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage.</p>			
<b>C-14</b>	<p>Potential risks to human health from any unexpected ground contamination will be avoided by the use of Personal Protective Equipment (PPE) and by adopting appropriate working practices.</p>	Scoping	<p><b>Outline CoCP</b> (Document Reference: 7.2)</p>	<p>The use of PPE in the occupational environment (not accessible by the public) will protect the health of construction workers.</p>

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
C-19	The onshore cable will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled, and the reinstatement process commenced in as short a timeframe as practicable. At regular intervals (typically 600m – 1,000m) along the route joint bays/pits will be installed to enable the cable installation and connection process.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2) and DCO requirement	Reduce length of time for temporary land take, and associated impacts on access to opportunities for physical activity.
C-20	The typical construction working corridor will be 40m along the onshore cable corridor to minimise the construction footprint. At other discrete locations this may be expanded to accommodate working area for example for Horizontal Directional Drilling (HDD).	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	A reduced construction footprint mitigates potential adverse impacts associated with visual impact and access to opportunities for physical activity.
C-22	Core working hours for construction of the onshore components will be 0700 to 1900 Monday to Friday, and 0800 to 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the Outline CoCP.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	The limitation of construction working hours for the onshore component mitigates potential exposure to noise impacts during the night time period.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
C-24	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2016) guidance on the Assessment of Dust from Demolition and Construction 2016, version 1.1	PEIR	Outline CoCP (Document Reference: 7.2)	The implementation of best practice measures in relation to air quality management will reduce potential dust emissions during construction.
C-26	<p>Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers (or shrouds) and other suitable solutions will be applied.</p> <p>For HDD work sites near to noise sensitive receptors where predicted levels may exceed the BS 5228 thresholds of significance, mud pumps that operate overnight will be shrouded and the drill will be fitted with acoustic (i.e. high mass) panelling and louvres as well as engine silencers where diesel powered drills are used.</p>	Scoping	Outline CoCP (Document Reference: 7.2)	The use of acoustic barriers and other noise mitigating solutions reduces potential exposure to noise impacts during the day time period.
C-27	Following construction, construction compounds will be returned to previous conditions as far as reasonably possible.	Scoping	Outline Landscape and Ecology Management Plan (Document Reference: 7.10)	The reinstatement of construction compound areas will mitigate potential adverse impacts associated with visual impact and access to opportunities for physical activity.



ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
C-29	A depth of cover of 1.2m is assumed. Deeper trenches may be required at specific crossing locations (such as watercourses).	Scoping	<b>Outline Construction method statement</b> (Document Reference: 7.23)	The depth of trenches which comprise power cables will influence the strength of magnetic fields (and associated potential for public exposure) at the surface.
C-32	Signage and/or temporary public rights of way (PRoW) /footpath diversions will be provided during construction.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2), <b>Outline Public Rights of Way Management Plan</b> (Document Reference: 7.8)	Temporary ProW and footpath diversions will contribute to reducing short-term impacts on access to opportunities for physical activity.
C-33	An Outline CoCP will be adopted to minimise temporary disturbance to residential properties, recreational users and existing land users. It will provide details of measures to protect environmental receptors.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	Environmental pollution has the potential to influence human health. As such, mitigating impacts on the environment is protective of human health.
C-34	RED will identify opportunities for companies based or operating in the region to access supply chain for the Proposed Development.	Scoping	N/A	Income and employment are two of the most important wider determinants of health. Reducing leakage of socio-economic opportunities provides more

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
				concentrated associated health benefits.
C-35	RED will work with local partners and seek to maximise the ability of local people to access employment opportunities associated with the construction and operation of the Proposed Development.	Scoping	<b>Outline skills and employment strategy</b> (Document Reference: 7.24)	Income and employment are two of the most important wider determinants of health. Reducing leakage of socio-economic opportunities provides more concentrated associated health benefits.
C-106	Speed limits will be imposed on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna such as badgers, otters, bats and barn owls.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2)	Traffic management measures, such as speed limits, reduce potential impacts on health and wellbeing associated with risk of accidents and pedestrian amenity, fear and intimidation.
C-157	The proposed heavy goods vehicle (HGV) routing during the construction period to individual accesses will be developed to avoid major settlements such as Storrington, Cowfold, Steyning, Wineham, Henfield, Woodmancote and other smaller settlements where possible.	PEIR	<b>Outline Construction Traffic Management Plan (CTMP)</b> (Document Reference: 7.6)	Traffic management measures, such as routing away from major settlements, reduces exposure to any potentially adverse health and wellbeing impacts traffic will have on populated areas. In addition to risk of accidents and pedestrian amenity, fear and intimidation, this also

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
<b>C-158</b>	The proposed heavy goods vehicle (HGV) routing during the construction period to individual accesses will avoid the Air Quality Management Area (AQMA) in Cowfold where possible.	PEIR	<b>Outline CTMP</b> (Document Reference: 7.6)	includes exposure to traffic-related changes to noise and air quality.  Routing traffic away from existing AQMAs protects air quality in those sensitive areas and associated health impacts.
<b>C-159</b>	The proposed heavy goods vehicle (HGV) routing during the construction period to individual accesses will avoid the A24 through Findon as advised from the West Sussex County Council (WSSCC) Freight Action Plan where possible.	PEIR	<b>Outline CTMP</b> (Document Reference: 7.6)	Traffic management measures, such as specific routing away from certain areas or busy roads, reduces potential impacts on health and wellbeing associated with risk of accidents and pedestrian amenity, fear and intimidation.
<b>C-161</b>	The South Downs Way and the Downs Link Public Rights of Ways (ProWs) will be managed in a way that minimises any closures or diversions.	PEIR	<b>Outline Public Rights of Way Management Plan</b> (Document Reference: 7.8)	Minimising ProW and footpath diversions will contribute to reducing impacts on access to opportunities for physical activity.
<b>C-162</b>	Public Rights of Ways (PRoWs) that cross the onshore cable corridor will be managed or diverted over the shortest distance possible with potential to provide adjacent crossings.	PEIR	<b>Outline Public Rights of Way Management Plan</b> (Document Reference: 7.8)	Shortening the length of ProW and footpath diversions will contribute to reducing impacts on access to opportunities for physical activity.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
<b>C-166</b>	For non-horizontal directional drilling (HDD) crossings of the highway, one of the following solutions will be used: 1 - lay the cable in a trench, which will be excavated in phases to ensure at least one traffic lane is operational and controlled using temporary signals (although this approach cannot be used on single track parts of the highway); or 2 - provide a short road closure while the work is undertaken with a relevant diversion route.	PEIR	<b>Outline CTMP</b> (Document Reference: 7.6)	Traffic management measures reduce potential impacts on health and wellbeing associated with risk of severance, accidents and pedestrian amenity, fear and intimidation.
<b>C-167</b>	Any tanks and associated pipe work containing oils, fuels and chemicals will be double skinned and provided with leak detection equipment. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For hazardous chemicals, fuels or oils bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank capacity or 25% of the combined tank capacity, whichever it is the largest). Fuel storage will be in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 and other	PEIR	<b>Outline CoCP</b> (Document Reference: 7.2)	Measures to contain spillages and hazardous materials will mitigate the potential for land contamination.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
	Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding.			
<b>C-201</b>	Construction Traffic Management Plans (CTMP) will be developed in consultation with West Sussex County Council for stages of the works. These will be developed in accordance with the Outline CTMP and include the stage specific details for managing the impact of the construction traffic on the transport network.	PEIR	<b>Outline CTMP</b> (Document Reference: 7.6)	Traffic management measures reduce potential impacts on health and wellbeing associated with risk of accidents and pedestrian amenity, fear and intimidation.
<b>C-202</b>	Public Rights of Way Management Plan (PRoWMP) will be developed in consultation with West Sussex County Council for stages of the works. These will be developed in accordance with the Outline PRoWMP and include the stage specific details for managing the use of PRoWs during construction.	PEIR	<b>Outline Public Rights of Way Management Plan</b> (Document Reference: 7.8)	ProW and footpath management will contribute to reducing long-term impacts on access to opportunities for physical activity.
<b>C-231</b>	The detailed substation design will be built and operated such that the Rating levels (noise emissions plus any character correction) do not exceed the following	ES	<b>Design and Access Statement</b> (Document Reference: 5.8) and DCO requirement	Noise limits are set to be protective of the environment and human health. Therefore, mitigation of potential noise exposure from

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to human health assessment
	<p>noise levels at the private amenity space associated with the closest residential receptors:</p> <ul style="list-style-type: none"> <li>- Southlands, Kent Street, RH13 8BA (assessment location at OSGB East 523168.9635, North 122661.931): Daytime limit of 38 dB(A), night-time limit of 35 dB(A);</li> <li>- Westridge, Kent Street, RH13 8BB (assessment location at OSGB East 523193.0601, North 122661.931): Daytime limit of 35 dB(A), night-time limit of 35 dB(A);</li> <li>- Taintfield Farmhouse, Kings Lane, RH13 8BD (assessment location at OSGB East 522570.7123, North 122015.784): Daytime limit of 35 dB(A), night-time limit of 35 dB(A); and</li> <li>- Oakendene Manor, Bolney Road, RH13 8AZ (assessment location at OSGB East 522771.0714, North 122524.3422): Daytime limit of 39 dB(A), night-time limit of 35 dB(A).</li> </ul>			<p>substations will mitigate the potential for health and wellbeing impacts.</p>

- 28.7.6 Further detail on the environmental measures in **Table 28-13** is provided in the **Commitments Register** (Document Reference: 7.22) which sets out how and where particular environmental measures will be implemented and secured.

## 28.8 Methodology for ES assessment

### Introduction

- 28.8.1 The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5). The assessment methodology for human health for the ES is outlined in more detail below.

### Receptor sensitivity

- 28.8.2 Within a defined population, individuals will range in level of sensitivity due to a series of factors such as age, socio-economic deprivation and the prevalence of any pre-existing health conditions which could become exacerbated. These individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially) whereby they could experience disproportionate effects when compared to the general population.
- 28.8.3 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than for someone of working age who has good respiratory health. On the other hand, an individual who has been unemployed for a long period of time would benefit more from employment opportunities generated by the Proposed Development in comparison to an individual who is already employed.
- 28.8.4 The health sensitivity methodology criteria shown in **Table 28-14** has been used to inform the population-level assessment of significance.

**Table 28-14 Health sensitivity methodology criteria**

Category/level	Indicative criteria
<b>High</b>	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
<b>Medium</b>	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
<b>Low</b>	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
<b>Very low</b>	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

Source: IEMA Guide to Determining Significance for Human Health in EIA (IEMA, 2022b)

- 28.8.5 An extensive amount of baseline data has been collected in order to interpret local health circumstance. This information is detailed in **Appendix 28.1: Human health baseline, Volume 4** of the ES (Document Reference: 6.4.28.1) and summarised in **Section 28.6**. Overall, it is concluded that local health circumstance in the Study Area is generally good.
- 28.8.6 As such, when looking at the population in general, the existing burden of poor health is low. However, this does not exclude the probability that there will be individuals within a defined population who are particularly sensitive and could experience disproportionate effects.
- 28.8.7 To supplement this exercise, analysis was done on the overall IMD (2019) and specific 'health deprivation and disability' domain, the results of which are shown in **Figure 28.1, Volume 3** of the ES (Document Reference: 6.3.28) and **Figure 28.2, Volume 3** of the ES (Document Reference: 6.3.28) and summarised in **Table 28-15**.



- 28.8.8 Overall, the majority of sensitive receptors identified in **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18), **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19) and **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21) (which are consistent with receptors that are considered sensitive to human health effects) are located in areas which have medium levels of deprivation (deciles 4 to 7) or low levels of deprivation (deciles 8 to 10). Very few receptors are located in areas of high deprivation (deciles 1 to 3); as such, it is not considered necessary to analyse specific sub-populations as part of the overarching assessment of population health.

**Table 28-15 Vulnerable population analysis**

Deprivation decile	Air quality		Noise		LVIA		Overall	
	IMD	Health	IMD	Health	IMD	Health	IMD	Health
1	1%	1%	2%	2%	2%	2%		
2	1%	1%	0%	0%	3%	3%	5%	5%
3	0%	0%	0%	0%	1%	1%		
4	5%	10%	22%	16%	23%	19%		
5	48%	4%	46%	17%	31%	9%		
6	19%	7%	6%	6%	13%	2%	71%	50%
7	0%	23%	0%	18%	3%	19%		
8	23%	11%	16%	12%	16%	14%		
9	2%	23%	8%	14%	6%	15%	25%	45%
10	1%	21%	0%	16%	2%	15%		

- 28.8.9 Overall, the sensitivity of the population within the local Study Area is considered to be “**Low**”.

## Magnitude of impact

- 28.8.10 The health magnitude methodology criteria shown in **Table 28-16** has been used to inform the assessment of significance.

**Table 28-16 Health magnitude methodology criteria**

Category/level	Indicative criteria
<b>High</b>	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
<b>Medium</b>	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
<b>Low</b>	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
<b>Very low</b>	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Source: IEMA Guide to Determining Significance for Human Health in EIA (IEMA, 2022b)

## Significance of effect

- 28.8.11 The significance of an effect is determined based on the sensitivity/value of a receptor and the magnitude of an impact. The method employed for this assessment is presented in **Table 28-17**. Where a range of significance levels are presented, the final assessment for each effect is based upon professional judgement.
- 28.8.12 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

**Table 28-17 Significance matrix**

		Sensitivity			
		High	Medium	Low	Very Low
Magnitude	High	Major	Major/Moderate	Moderate/Minor	Minor/Negligible
	Medium	Major/Moderate	Moderate	Minor	Minor/Negligible
	Low	Moderate/Minor	Minor	Minor	Negligible
	Negligible	Minor/Negligible	Minor/Negligible	Negligible	Negligible

Source: IEMA Guide to Determining Significance for Human Health in EIA (IEMA, 2022b)

28.8.13 **Table 28-18** provides a description of each significance level. For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

**Table 28-18 Significance conclusion and reasoning related to public health**

Category/level	Indicative criteria
<b>Major (Significant)</b>	<p>The narrative explains that this is significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> <li>Changes, due to the Proposed Development, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect.</li> <li>Change, due to the Proposed Development, could result in a regulatory threshold or statutory standard being crossed (if applicable).</li> <li>There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that will result from the Proposed Development and changes to health outcomes.</li> <li>In addition, health priorities for the relevant Study Area are of specific relevance to the determinant of health or population group affected by the Proposed Development.</li> </ul>
<b>Moderate (Significant)</b>	<p>The narrative explains that this is significant for public health because (select as appropriate):</p>

Category/level	Indicative criteria
<b>Minor (Not Significant)</b>	<ul style="list-style-type: none"> <li>Changes, due to the Proposed Development, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views.</li> <li>Change, due to the Proposed Development, could result in a regulatory threshold or statutory standard being approached (if applicable).</li> <li>There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that will result from the Proposed Development and changes to health outcomes.</li> <li>In addition, health priorities for the relevant Study Area are of general relevance to the determinant of health or population group affected by the Proposed Development.</li> </ul> <p>The narrative explains that this is not significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> <li>Changes, due to the Proposed Development, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders.</li> <li>Change, due to the Proposed Development, will be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable).</li> <li>There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that will result from the Proposed Development and changes to health outcomes.</li> <li>In addition, health priorities for the relevant Study Area are of low relevance to the determinant of health or population group affected by the Proposed Development.</li> </ul>
<b>Negligible (Not Significant)</b>	<p>The narrative explains that this is not significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> <li>Changes, due to the Proposed Development, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect</li> </ul>

Category/level	Indicative criteria
	<p>size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders.</p> <ul style="list-style-type: none"> <li>• Change, due to the Proposed Development, will not affect a regulatory threshold, statutory standard or guideline (if applicable).</li> <li>• There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that will result from the Proposed Development and changes to health outcomes.</li> <li>• In addition, health priorities for the relevant Study Area are not relevant to the determinant of health or population group affected by the Proposed Development.</li> </ul>

## 28.9 Assessment of effects: Construction phase

### Health effects from changes in air quality

Magnitude of impact

#### *Introduction*

- 28.9.1 Several construction activities required for the Proposed Development have the potential to impact air quality. **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19) has been structured to assess the following:
- dust;
  - odour;
  - road traffic; and
  - construction equipment on site.
- 28.9.2 The health assessment follows the structure set out above.
- 28.9.3 While air quality objectives are set to protect the environment and human health, health effects may be experienced at the population level for concentrations below these limits, and on the basis of the available evidence, there may not be a concentration threshold below which no adverse health effects occur.
- 28.9.4 In some instances, the absolute change in air quality concentration may be large while remaining within air quality objectives. Where this is the case, a quantitative exposure response assessment has been undertaken to understand the wider impacts on air quality and associated impact on human health.

- 28.9.5 To quantitatively estimate the change in health outcomes associated with changes in exposure to air quality, concentration-response functions (CRFs) are applied with the absolute change in air quality (in  $\mu\text{g}/\text{m}^3$ ), population exposure estimates, and various baseline health data for the Study Area.
- 28.9.6 In order to estimate population exposure to changes in air quality as accurately as possible, air quality contours (representing various changes in air quality concentration) have been used to estimate the population living within each contour, and consequent exposure to such changes. Using this information, it is possible to calculate the impact on mortality and morbidity.

### *Dust*

- 28.9.7 There is potential for dust emissions associated with earthworks, construction activities and through trackout.
- 28.9.8 Following the implementation best practice measures dust emissions will be mitigated to a level which is negligible and not significant in air quality terms. This will be secured through an **Outline CoCP** (Document Reference: 7.2) and DCO requirement ensuring air quality management measures will be applied as described in IAQM Guidance On the Assessment of Dust From Demolition And Construction, Version 1.1 (C-24).
- 28.9.9 Overall, on the basis that dust emissions will be mitigated to a level which is considered negligible and not significant in air quality terms, the consequent magnitude of impact on health associated with dust will be **Negligible**.

### *Odour*

- 28.9.10 As shown in **Figure 19.3, Volume 3** of the ES (Document Reference: 6.3.19), Brook Barn Farm Landfill is the only historic landfill either within or in proximity to the proposed DCO Order Limits.
- 28.9.11 Brook Barn Farm Landfill took non-biodegradable wastes operating between 1996 – 2016. In addition, a small area east of the main Brook Barn Farm landfill area is shown as a landfill taking inert, industrial waste and operating between 1970 and 1975; this smaller area is mainly outside of the proposed DCO Order Limits but extends up to the proposed DCO Order Limits boundary at a potential access road location, and landfilled waste may extend beneath the proposed DCO Order Limits.
- 28.9.12 On the basis that Brook Barn Farm Landfill was authorised for non-biodegradable waste only, it is considered to have a small source odour potential. Taking into consideration factors such as distance and prevailing wind direction, the overall risk of odour exposure at nearby residential receptors on Battin Lane (200m east) and users of allotments (50m east) is negligible.
- 28.9.13 Overall, on the basis that the risk of odour emissions are considered to be negligible in air quality terms, the magnitude of impact on health (in a wellbeing and amenity context) will be **Negligible**.

### *Road traffic*

- 28.9.14 Traffic-related embedded mitigation measures include the use of speed limits and routing away from Air Quality Management Areas where possible (C-106 and C-158), which in addition to reducing risk of road collisions, also reduces impacts on air quality.
- 28.9.15 Overall, as stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), the maximum change in annual mean concentration associated with road traffic sources at any receptor will be:
- +1.59 $\mu\text{g m}^{-3}$  (at R37) for NO<sub>2</sub>;
  - +0.555 $\mu\text{g m}^{-3}$  (at R37) for PM<sub>10</sub>; and
  - +0.302 $\mu\text{g m}^{-3}$  (at R37) for PM<sub>2.5</sub>.
- 28.9.16 These impacts are considered to be negligible in air quality terms and annual mean concentrations will remain within air quality objective thresholds set to be protective of health.
- 28.9.17 Overall, the magnitude of impact on health associated with changes in air quality from road traffic will be **Negligible**.

### *Construction equipment on site*

- 28.9.18 The following construction activities and areas have been assessed for potential changes to local air quality:
- Oakendene substation;
  - open trenching;
  - HDD and landfall; and
  - National Grid Bolney substation extension works.
- 28.9.19 The changes in air quality and associated human health impacts are outlined in more detail below.

### *Oakendene substation*

- 28.9.20 Construction of the Oakendene substation will take up to three years. As stated in **Chapter 19: Air Quality, Volume 2** of the ES (Document Reference: 6.2.19), during this period, the maximum change in annual mean concentration associated with the Oakendene substation at any receptor will be:
- +12.11 $\mu\text{g m}^{-3}$  (at residential property H71) for NO<sub>2</sub>;
  - +0.24 $\mu\text{g m}^{-3}$  (at residential property H71) for PM<sub>10</sub>; and
  - +0.24 $\mu\text{g m}^{-3}$  (at residential property H71) for PM<sub>2.5</sub>.
- 28.9.21 These impacts are considered to be negligible in air quality terms and annual mean concentrations will remain within air quality objective thresholds set to be protective of health.

- 28.9.22 Due to the large absolute change in annual mean NO<sub>2</sub> concentration at residential property H71, as a precautionary measure, a population-level quantitative exposure response assessment has been undertaken.
- 28.9.23 The results of the quantitative assessment aid in understanding the wider changes in annual mean NO<sub>2</sub> concentration (beyond residential property H71) due to dispersion characteristics, and the associated health impacts across this wider population, in order to supplement the conclusions of the health assessment.
- 28.9.24 For the population living around the Oakendene substation construction site, the following health outcomes were assessed:
- annual natural cause mortality (aged 30+);
  - annual respiratory disease emergency hospital admissions; and
  - annual cardiovascular disease emergency hospital admissions.
- 28.9.25 The quantitative relationship between additional incidence or risk of a health outcome and long-term exposure to a pollutant is described by a concentration response function (CRF).
- 28.9.26 To quantify the health impact associated with changes in exposure to air quality, CRFs (for the health outcomes defined in the bullets above) are applied with the absolute change in air quality surrounding the construction area (provided from air quality modelling outputs as contours in µg m<sup>-3</sup>), population estimates (based on the area covered by each air quality contour), and various baseline health data for the study area.
- 28.9.27 The results indicate that the predicted changes in air quality over the whole three year construction period required for the Oakendene substation will lead to an effect equivalent to less than one death or hospital admission brought forward across the population studied. On this basis, the effect on health is not considered to be measurable.
- 28.9.28 Overall, taking into consideration the negligible and short-term nature of the changes in air quality associated with construction of the Oakendene substation, which would not result in any adverse health outcomes, the magnitude of impact on health will be **Negligible**.

### *Open trenching*

- 28.9.29 Open trenching will take place in various places along the approximately 38.8km length of the onshore temporary construction corridor. As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), a worst-case estimate of the impact at receptors located along the open trenching activity has been undertaken by modelling a simple straight-line 1km trench, with a width of 40m corresponding to the actual onshore cable temporary construction. Receptors have been placed immediately next to, and at various distances from, the boundary of the works area.
- 28.9.30 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), the maximum change in annual mean concentration associated with open trenching activities at any receptor will be:



- +1.1 $\mu\text{g m}^{-3}$  for NO<sub>2</sub>;
- +0.02 $\mu\text{g m}^{-3}$  for PM<sub>10</sub>; and
- +0.02 $\mu\text{g m}^{-3}$  for PM<sub>2.5</sub>.

28.9.31 These impacts are considered to be negligible in air quality terms and annual mean concentrations will remain within air quality objective thresholds set to be protective of health.

28.9.32 The onshore cable will be constructed in discrete sections; the trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced in as short a timeframe as practicable (C-19). While the exact durations of trenching activities are not known at this stage, any change in air quality at nearby receptors will be short-term in nature. As a result, no quantitative assessment is considered necessary.

28.9.33 Overall, taking into consideration the negligible and short-term nature of the changes in air quality associated with open trenching activities, the magnitude of impact on health will be **Negligible**.

### *Landfall*

28.9.34 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Application Document Reference: 6.2.19), the landfall works are assumed to require a temporary construction compound of 100m x 120m, with the bulk of the works lasting up to 24 months.

28.9.35 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), the maximum change in annual mean concentration associated with landfall activities at any receptor will be:

- +4.79 $\mu\text{g m}^{-3}$  (at residential property H08) for NO<sub>2</sub>;
- +0.12 $\mu\text{g m}^{-3}$  (at residential property H05) for PM<sub>10</sub>; and
- +0.11 $\mu\text{g m}^{-3}$  (at residential property H05) for PM<sub>2.5</sub>.

28.9.36 Moderate impacts in air quality terms (associated with NO<sub>2</sub> only) are predicted at both H08 and H05. While this is the case, annual mean concentrations at both receptors will remain within air quality objective thresholds set to be protective of health.

28.9.37 While construction activities at the landfall will last up to 24 months, they will still be considered short-term in nature. Furthermore, on the basis that maximum change in annual mean nitrogen dioxide concentration will be lower than that associated with the Oakendene substation, and construction activities at the landfall will be shorter in duration than those associated with the Oakendene substation, it is reasonable to assume that the associated impact on health will also be lower. As a result, no quantitative assessment is considered necessary.

28.9.38 Overall, taking into consideration the short-term nature of the changes in air quality associated with landfall activities, the magnitude of impact on health will be **Negligible**.

### *Trenchless crossings*

- 28.9.39 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Application Document Reference: 6.2.19), trenchless crossing construction compounds will typically be 75m x 50m in size. Construction works at each compound (a total of 27, as identified in **Appendix 4.1: Crossings schedule, Volume 4** of the ES (Document Reference 6.4.4.1))) range in duration from 4.7 weeks to 26 weeks, but typically about six weeks depending on the length of the trenchless crossing bore. While this is the case, an annual average concentration has been established for the purposes of assessing against air quality objective thresholds.
- 28.9.40 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), the maximum change in annual mean concentration around trenchless crossing sites at any receptor will be:
- +6.54 $\mu\text{g m}^{-3}$  (at residential property H68) for NO<sub>2</sub>;
  - +1.04 $\mu\text{g m}^{-3}$  (at residential property H68) for PM<sub>10</sub>; and
  - +0.12 $\mu\text{g m}^{-3}$  (at residential property H68) for PM<sub>2.5</sub>.
- 28.9.41 On the basis that construction works at each trenchless crossing site will typically last six weeks, any change in air quality at nearby receptors will be short-term in nature. As a result, no quantitative assessment is considered necessary.
- 28.9.42 Overall, taking into consideration the short-term nature of the changes in air quality associated with trenchless crossing activities, the magnitude of impact on health will be **Negligible**.

### *National Grid Bolney substation*

- 28.9.43 There are two types of infrastructure being considered for installation that will require installation as part of the Bolney substation extension works: Air Insulated Switchgear (AIS); or Gas Insulated Switchgear (GIS). Only one of the National Grid Bolney substation extension options (AIS or GIS) will be required in the final Proposed Development.
- 28.9.44 The temporary construction compound and the area for extension works required for either option will be located in a similar location with only the size of the extension works area being larger for the AIS option. Overall, construction of either option will take approximately 12 months to complete.
- 28.9.45 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), the maximum change in annual mean concentration associated with the National Grid Bolney substation extension works at any receptor will be:
- +3.60 $\mu\text{g m}^{-3}$  (at receptor H96) for NO<sub>2</sub>;
  - +0.04 $\mu\text{g m}^{-3}$  (at receptor H96) for PM<sub>10</sub>; and
  - +0.04 $\mu\text{g m}^{-3}$  (at receptor H96) for PM<sub>2.5</sub>.
- 28.9.46 These impacts are considered to be negligible in air quality terms and annual mean concentrations will remain within air quality objective thresholds set to be protective of health.

- 28.9.47 As construction activities at the National Grid Bolney substation will take approximately 12 months, they are considered short-term in nature. On the basis that construction activities at the National Grid Bolney substation and maximum change in annual mean concentration will be lower than that associated with Oakendene substation, it is reasonable to assume that the associated impact on health will also be lower. As a result, no quantitative assessment is considered necessary.
- 28.9.48 Overall, taking into consideration the negligible and short-term nature of the changes in air quality associated with construction of the National Grid Bolney substation, the magnitude of impact on health will be **Negligible**.

### Sensitivity or value of receptor

- 28.9.49 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the air quality environment.

### Significance of residual effect

- 28.9.50 The Rampion 2 commitments (as shown in **Table 28-13**) include the implementation of an **Outline CoCP** (Document Reference: 7.2) to minimise temporary disturbance to residential properties, recreational users and existing land users (C-33). Specifically, this includes dust management measures (C-24) and backfilling open trenches in as short a timeframe as practicable (C-19).
- 28.9.51 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health is **Negligible**. As such, the significance effect is **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in noise exposure

### Magnitude of impact

#### *Introduction*

- 28.9.52 An assessment of temporary construction noise for the different elements of the construction phase has been conducted in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21). These include:
- temporary noise effects from the construction, deconstruction, and operation of the temporary construction compounds (this assessment assumes that the construction of each will be up to 8 weeks, and the deconstruction will be up to 8 weeks. Each temporary construction compound will be in use for up to 3.5 years);
  - temporary noise effects from the construction works at the landfall and trenchless crossings at specific sections of the onshore cable route (drilling durations varied between 2 to 7 weeks for trenchless crossings and 18 weeks for landfall);

- temporary noise effects from onshore substation construction (up to 3.5 years) at Oakendene;
- temporary noise effects from construction of the existing National Grid Bolney substation extension works (up to 3 years);
- temporary noise effects from onshore cable installation, with the trenching quickly passing receptors (likely to be inaudible after an estimated duration of approximately 10 days);
- temporary noise effects from the construction and use of temporary and permanent accesses (this assessment assumes this is likely to be for a duration of under a month for construction of each access with the temporary accesses used ranging from a month to almost a year);
- temporary noise effects from construction road traffic noise (duration of roads used will be determined by the local requirements for access as the works progress);
- temporary noise effects from the construction of the existing National Grid Bolney substation extension; and
- temporary noise effects from offshore piling noise.

28.9.53 The health assessment follows the structure set out above.

*Temporary noise effects from the construction, operation, and deconstruction of the temporary construction compounds*

- 28.9.54 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), five temporary construction compounds will be set-up for welfare and logistics purposes. The construction, operation and deconstruction of the temporary construction compounds will result in temporary noise impacts. The construction of the temporary construction compounds is anticipated to last up to 8 weeks, with the compounds in use up to a maximum of 3.5 years and then the deconstruction lasting approximately 8 weeks.
- 28.9.55 To mitigate noise impacts associated with construction, operation and deconstruction of the temporary construction compounds, screening will be applied where practicable and/or necessary to block line of sight between noise sensitive receptors and the main noise emitters on the compound construction where this is necessary for avoiding significant noise effects (C-26).
- 28.9.56 The results for the worst-case level shows that exceedances of the 65 dB threshold value (daytime lowest observed adverse effect level (LOAEL)) would occur at five of the 19 identified receptors (Crookthorn Lane, Washington Paddocks Caravan Park, Southlands, 1 Oakendene Farm and Coopers Cottage), with levels in excess of 20 dB over those levels at two locations. While this is the case, it is unlikely that the higher levels of noise from construction or operation of the works would be at such levels for more than one month.
- 28.9.57 Overall, on the basis that exceedances of the LOAEL would be temporary in nature (unlikely to occur for more than one month), the magnitude of impact on human health would be **Negligible**.

### *Temporary noise effects from the landfall works and trenchless crossings*

- 28.9.58 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), trenchless crossing operations are unable to be temporarily halted and therefore, works will need to continue for 24 hours a day until completion. As such, there is potential for health and wellbeing effects during the daytime and night time periods. While this is the case, drilling activities would be transient in nature, and the duration would be temporary, ranging from between 1.7 and 18 weeks (with an average duration of 3.3 weeks across all trenchless crossing operations).
- 28.9.59 To mitigate noise impacts associated with trenchless crossing operations, screening will be applied where practicable and/or necessary to block line of sight between noise sensitive receptors and the main noise emitters on the compound construction where this is necessary for avoiding significant noise effects (C-26). A 5 to 10 dB reduction in noise would be achieved depending on the type of barrier used.
- 28.9.60 Following the implementation of such mitigation measures, the daytime LOAEL of 65dB  $L_{Aeq,16hr}$  will not be exceeded at the vast majority of identified noise sensitive receptors (with the exception of two receptors). While the night time LOAEL of 45dB  $L_{Aeq,8hr}$  will be exceeded, it should be reiterated that trenchless crossing operations would be temporary and transient in nature, thereby limiting the potential for health and wellbeing effects which would require long-term exposure to changes in the noise environment.
- 28.9.61 While trenchless crossing operations would exceed the daytime and night time LOAEL in some circumstances, on the basis that works would be transient and temporary in nature (only occurring for an average of 3.3 weeks), the magnitude of impact on human health would be **Low**.

### *Temporary noise effects from onshore (Oakendene) substation construction*

- 28.9.62 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), to establish a worst-case noise impacts associated with construction of the onshore substation, noise predictions were undertaken assuming all construction plant is concurrently operating at the closest approach of the onshore substation site to the NSR.
- 28.9.63 In all instances, the predicted noise level is below the daytime LOAEL and SOAEL and is not considered to be significant in noise terms. As a result, the resultant magnitude of impact on human health would be **Negligible**.

### *Temporary noise effects from extension works at the existing National Grid Bolney substation*

- 28.9.64 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), the extension to the existing Bolney substation will result in noise levels which are below the BS 5228 threshold noise level which is set to be protective of the environment and human health in all instances and is not considered to be significant in noise terms.

- 28.9.65 As a result, the resultant magnitude of impact on human health would be **Negligible**.

*Temporary noise effects from onshore cable installation (trenched)*

- 28.9.66 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), the onshore cable will extend for approximately 38.8km in length within a standard onshore temporary cable corridor of 40m. The onshore cable route will pass sensitive noise receptors resulting in temporary noise impacts. These noise impacts would be transient in nature, whereby is currently anticipated that the entire temporary construction works will move at a speed of 35m per day.
- 28.9.67 While noise levels of above 75dB could be experienced at noise sensitive receptors, due to the transient nature of construction activities, worst-case noise levels would only be experienced for a maximum of two days. As a result, this would limit the potential for adverse health and wellbeing effects to manifest.
- 28.9.68 Overall, due to the transient and temporary nature of the potential noise impacts, the resultant magnitude of impact on human health would be **Negligible**.

*Temporary noise effects from construction and use of temporary and permanent accesses*

- 28.9.69 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), access to the onshore temporary construction corridor will be afforded via construction accesses from existing roads.
- 28.9.70 The construction of temporary and permanent accesses will result in temporary noise effects at noise sensitive receptors as the access works pass receptors within close proximity. It is anticipated that the worst-case noise levels when the works are very close to a sensitive noise receptor (within 20m) will be for a maximum of two days. Individual accesses are expected to be completed within one month of commencing work.
- 28.9.71 During use of the accesses, based on proposed traffic volumes, it is currently estimated that peak flows on all accesses will not exceed three HGVs per hour.
- 28.9.72 While noise levels of above the threshold value could be experienced at noise sensitive receptors, due to the transient nature of construction activities, worst-case noise levels would only be experienced for a maximum of two days. As a result, this would limit the potential for adverse health and wellbeing effects to manifest.
- 28.9.73 Overall, due to the transient and temporary nature of the potential noise impacts, the resultant magnitude of impact on human health would be **Negligible**.

*Temporary noise effects from construction road traffic noise*

- 28.9.74 As detailed in **Chapter 21: Noise and vibration** of the ES (Document Reference: 6.2.21), the majority of road links would experience an increase in noise levels of less than 1dB, which is not considered significant in noise terms.

28.9.75 The following road links that would exceed a change in noise level of more than 1dB are:

- B2135, South of Ashurst (+2.4dB);
- B2116 Partridge Green Road (+1.6dB);
- A281, South of Cowfold (+2.1dB);
- Wineham Lane, South of A272 (+2.4dB); and
- B2116, Henfield Road, Albourne (+2.2dB).

28.9.76 All of the above changes in noise exposure are also not considered to be significant in noise terms.

28.9.77 On this basis, the resultant magnitude of impact on human health would be **Negligible**.

#### *Temporary noise effects from offshore piling noise*

28.9.78 The offshore turbine array is located approximately 13km from the nearest shoreline and corresponding noise sensitive receptors.

28.9.79 The worst-case noise level predicted at the nearest onshore noise sensitive receptor to the offshore piling is 34 dB, which is not considered to be significant in noise terms.

28.9.80 On this basis, the resultant magnitude of impact on human health would be **Negligible**.

#### Sensitivity or value of receptor

28.9.81 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the noise environment.

#### Significance of residual effect

28.9.82 Best practice measures (C-33) and screening (C-26) would be implemented where applicable to reduce potential changes in noise exposure.

28.9.83 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health ranges from **Negligible** to **Low**. As such, the significance effect is **Negligible** to **Minor adverse**, which is **Not Significant** in EIA terms.

## Health effects from changes in vibration exposure

#### Magnitude of impact

28.9.84 As detailed in **Chapter 21: Noise and vibration** of the ES (Document Reference: 6.2.21), it is unlikely that the construction and operation of the construction compounds are unlikely to result in temporary vibration effects. Similarly, it is unlikely that activities during the construction of the onshore substation will give

rise to significant effects from vibration. As a result the potential for vibration relating to these project elements have not been considered further.

- 28.9.85 **Chapter 21: Noise and vibration** of the ES (Document Reference: 6.2.21) assesses potential changes in vibration from the following elements of the construction phase:
- temporary vibration effects from the construction works at the landfall and trenchless crossings at specific sections of the cable route (durations varied between 2 to 7 weeks for major crossings and 26 weeks at landfall); and
  - temporary vibration effects from construction road traffic.
- 28.9.86 An exceedance of the 0.3mm/s Peak Particle Velocity (PPV) threshold suggests that vibration might be just perceptible in residential environments. This threshold is set to be protective of the environment and human health.
- 28.9.87 As detailed in **Chapter 21: Noise and vibration** of the ES (Document Reference: 6.2.21), there is potential for vibration effects from the landfall and trenchless crossing works due to the HDD. Specifically, a total of six receptors may experience an exceedance above the 0.3mm/s PPV. As previously mentioned, drilling activities would be transient in nature, and the duration would be temporary, ranging from between 1.7 and 18 weeks (with an average duration of 3.3 weeks across all trenchless crossing operations).
- 28.9.88 There is also potential for vibration effects associated with HGVs travelling over irregularities, whereby at 30 mph, any residence within 2m of the irregularity would experience a significant change and at 50mph, any residence within 5m of the irregularity would experience a significant change. Other receptors further away could still experience vibration from HGVs travelling over irregularities, but this would not be considered significant. Such changes would be temporary and intermittent in nature.
- 28.9.89 Overall, considering the temporary nature of potential changes in vibration, the resultant magnitude of impact on human health would be **Negligible**.

#### Sensitivity or value of receptor

- 28.9.90 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the noise environment.

#### Significance of residual effect

- 28.9.91 Best practice measures (C-22 and C-33) would be implemented where applicable to reduce potential changes in noise exposure.
- 28.9.92 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health is **Negligible**. As such, the significance effect is **Negligible**, which is **Not Significant** in EIA terms.



## Health effects from changes in transport nature and flow rate

### Introduction

- 28.9.93 The following environmental effects that can occur as a result of traffic associated with the Proposed Development (outlined in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23)) are considered relevant to the assessment of human health:
- severance: the separation of people from places and other people and places or the impediment of pedestrian access to essential facilities;
  - pedestrian amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width / separation from traffic;
  - pedestrian delay: the ability of people to crossroads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions of the Proposed Development. Consideration will also be given to the effects on ProW users due to the closure and diversion of ProWs;
  - fear and intimidation: these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths; and
  - accidents and safety: the risk of accidents occurring where the Proposed Development is expected to produce a change in the character of traffic.
- 28.9.94 Traffic management measures listed in **Table 28-13** (such as C-106, C-157, C-158, C-159, C-166 and C-201) seek to reduce the impact from construction traffic on the above, and associated impact on health and wellbeing.
- 28.9.95 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), the three highway links that require detailed environmental assessment are outlined in **Table 28-19**.

**Table 28-19 Highway links requiring detailed assessment**

Link no	Highway link	Description	Percentage increase (total vehicles)	Percentage increase (HGVs)
3	Ford Road	The highway link is a two-way single lane carriageway in south Arundel with properties directly fronting the road and footways.	1.6%	11.7%
13	A24/A27 Offington	The highway link is a two-way single lane carriageway north of Salvington with properties directly fronting the road with footways.	0.4%	10.8%
26	Wineham Lane, South of the A272	The highway link is a two-way single lane carriageway at Cowfold with properties directly fronting the road and footways.	3.2%	71.6%

28.9.96 Link 26 (Wineham Lane, South of the A272) is subject to Guidelines for the Environmental Assessment of Road Traffic (GEART) rule 1 (Institute of Environmental Assessment (IEA) (1993)), whereby an increase of 30% constitutes the need for detailed assessment. Link 3 (Ford Road) and Link 13 (A24/A27, Offington (Warren Road)) are subject to GEART rule 2, whereby an increase of 10% constitutes the need for detailed assessment.

## Magnitude of impact

### *Link 3 – Ford Road*

#### *Severance*

28.9.97 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), an increase of 306 HGVs (equating to a 11.7% increase compared to baseline traffic flows) will result in a negligible magnitude of change and will not result in significant traffic effects. Furthermore, the change will be short-term in nature.

28.9.98 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### *Pedestrian amenity, delay and fear and intimidation*

- 28.9.99 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23),
- 28.9.100 Ford Road does not have footway provision along its entire length. A number of ProW branch off from Ford Road along its route; as a result, pedestrians may need to cross the road.
- 28.9.101 During the peak of the construction phase, it is anticipated that an additional HGV will be generated every 14 minutes on the highway link. This will be a short term impact and is not considered to be perceptible to pedestrians wishing to cross the road, and will not result in significant traffic effects.
- 28.9.102 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### *Accidents and safety*

- 28.9.103 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), Ford Road has an accident rate of 0.09 per million vehicle kilometres which is below the average for a rural other road (0.19).
- 28.9.104 During the peak of the construction phase, it is anticipated that an additional HGV will be generated every 14 minutes on the highway link. This will be a short-term impact which in the context of the existing accident rate will not result in a significant effect.
- 28.9.105 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### *Link 13 – A24/A27, Offington (Warren Road)*

#### *Severance*

- 28.9.106 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), an increase of 118 HGVs (equating to a 10.8% increase compared to baseline traffic flows) will result in a negligible magnitude of change and will not result in significant traffic effects. Furthermore, the change will be short-term in nature.
- 28.9.107 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### *Pedestrian amenity, delay and fear and intimidation*

- 28.9.108 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), the A24/A27 has footways on both sides. A number of side roads branch off from the highway link along its route, which in turn provide for pedestrians in this urban location.
- 28.9.109 During the peak of the construction phase, it is anticipated that an additional HGV will be generated every 10 minutes on the highway link. This will be a short term

impact and is not considered to be perceptible to be perceptible to pedestrians withing to cross the road, and will not result in significant traffic effects.

- 28.9.110 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

#### *Accidents and safety*

- 28.9.111 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), the A24/A27 has an accident rate of 0.30 per million vehicle kilometres which is below the average for an urban A road (0.42).
- 28.9.112 During the peak of the construction phase, it is anticipated that an additional HGV will be generated every 10 minutes on the highway link. This will be a short-term impact which in the context of the existing accident rate will not result in a significant effect.
- 28.9.113 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

#### *Link 26 – Wineham Lane, South of the A272*

#### *Severance*

- 28.9.114 Wineham Lane has a very low baseline of HGVs across 24 hours of 17 HGVs; therefore, even a small increase in absolute terms of 12 two-way HGVs a day at the peak leads to a high percentage impact of 71.6%.
- 28.9.115 Based on a 07:00 – 19:00 HGV workday (12 hours), 12 two-way HGVs a day equates to approximately one additional HGV per hour. This will be a short-term impact which is considered negligible and will not result in a significant effect in traffic terms.
- 28.9.116 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

#### *Pedestrian amenity, delay and fear and intimidation*

- 28.9.117 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), Wineham Lane in this location has no footways, formal crossings of the road and there are no desire lines for pedestrians to cross the road.
- 28.9.118 While the percentage increase in HGVs during peak construction compared to baseline traffic flows is high (71.6%), there are low HGV flows per day at the peak of the construction phase (25 HGVs per day using peak week, 41 HGVs per day using section-based peak week). Overall, and combined with the lack of pedestrian infrastructure and desire lines, this will be a short-term impact which will result in a negligible magnitude of change in traffic terms, and will not result in significant effects.
- 28.9.119 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### *Accidents and safety*

- 28.9.120 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), Wineham Lane has an accident rate of 0.41 per million vehicle kilometres which is slightly above the average for a rural other road (0.19).
- 28.9.121 During the section-based peak week of the construction phase, the 41 additional HGV movements will be short-term in nature, and will not result in a significant effect in the context of the existing accident rate.
- 28.9.122 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

### Sensitivity or value of receptor

- 28.9.123 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the traffic environment.

### Significance of residual effect

- 28.9.124 Following the implementation of traffic management measures listed in **Table 28-13** (such as C-106, C-157, C-158, C-159, C-166 and C-201) in the majority of instances, the magnitude of impact on human health is considered to be **Negligible**. The exception to this is from severance on Link 18 – B2135, North of A283, whereby the magnitude of impact is considered to be **Low**.
- 28.9.125 As receptor sensitivity is considered to be **Low** in all instances, the overall significance effect on human health is of **Negligible**, which is **Not Significant** in EIA terms.

## **Health effects from changes in visual amenity**

### Introduction

- 28.9.126 Of relevance to health and wellbeing, **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18) have assessed visual effects on the following:
- settlements; and
  - recreational routes.
- 28.9.127 The visual assessment relating to transport routes has been excluded on the basis that any impacts while travelling by rail or road would not impact health and wellbeing.
- 28.9.128 The visual assessment relating to recreational and tourist destinations has also been excluded on the basis that the only affected recreational and tourist destinations identified are caravan parks, a camp site and a beach, the views from which would not impact health and wellbeing.
- 28.9.129 The remainder of this section summarises the construction phase visual changes, and the potential for this to impact health and wellbeing.

## Magnitude of impact

### *Oakendene substation*

- 28.9.130 Cowfold (located approximately 1.1km west of Oakendene substation) is the only settlement which has been assessed to establish the likely changes in visual amenity associated with construction of Oakendene substation. However, the settlement is largely contained and surrounded by woodland blocks or groups of trees in all directions. Overall, construction works will not be visible from any part of Cowfold village due to screening from intervening landform and the layering effect of intervening vegetation, even in the winter. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.9.131 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers/cyclists/horse riders/joggers/others) on the following recreational routes:
- ProW 1786 between east of Taintfield Wood and A272;
  - ProW 1788 between west of Taintfield Wood Oakendene Industrial Estate; and
  - ProW 1775 and 1777 near Eastlands Farm.
- 28.9.132 While construction of the Oakendene substation will not be visible from ProW 1775 and 1777 near Eastlands Farm, there would be significant changes to the visual environment from sections of recreational routes ProW 1786 and 1788 where construction works associated with the building of the onshore substation components will be partially visible through gaps and above intervening vegetation.
- 28.9.133 Overall, while construction works would be visible from some recreational routes, the impact on visual amenity would only be temporary due to the transient use of such routes. Furthermore, as the visual impacts are not anticipated to deter recreational users from using those specific or similar routes. As such, the magnitude of impact on health and wellbeing will be **Negligible**.

### *Existing National Grid Bolney substation extension*

- 28.9.134 No settlements will have views of the Bolney substation extension works.
- 28.9.135 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers/cyclists/horse riders/joggers/others) on the following recreational routes:
- ProW 1T / 36Bo between Wineham Lane and Coombe House; and
  - ProW 8T / 34Bo between Bob Lane and Coombe House.
- 28.9.136 The temporary construction compound associated with the Bolney substation extension will be visible from ProW 1T / 36Bo for approximately 350m. For this section of the route, the change in the visual environment would be significant. However, there would be no significant change in the visual environment for the remainder of the route. While construction works would be visible from some of the

route, the impact on visual amenity would only be temporary due to the transient use of such routes. As such, this is not anticipated to deter recreational users from using those specific or similar routes, and the magnitude of impact on health and wellbeing will be **Negligible**.

- 28.9.137 There will be filtered views of very limited construction works from ProW 8T / 34Bo associated with the building of the onshore substation components through gaps in the trees and hedgerows. Neither winter or summer views from this ProW would significantly change the visual environment. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.

### *Onshore cable corridor*

- 28.9.138 The onshore cable corridor will be approximately 40m wide, comprising perimeter stock fencing, open cut cable installation with internal haul road, associated construction machinery and soil storage. The trenchless crossing construction compounds will be used for material / equipment storage, some welfare facilities, and trenchless crossing activities. In addition the main construction compounds at Climping and Washington will contain concrete batching plants to height of 20m.
- 28.9.139 Routing of the onshore cable corridor has sought to avoid settlements and many of the settlements have a degree of perimeter screening from mature vegetation. As a result, no settlements will experience significant views of the onshore cable corridor during the construction period.
- 28.9.140 As detailed in [Chapter 18: Landscape and visual impact, Volume 2](#) of the ES (Document Reference: 6.2.18), the views and visual amenity of relatively short sections of approximately 47 of the recreational routes will be significantly affected by the onshore cable corridor during the construction period. In addition, the views from up to four long-distance recreational routes (i.e. National Trails, Sustrans NCRs and Open Access Land, a number of which are overlapped) will be significantly affected by the onshore cable corridor during the construction period.
- 28.9.141 While construction works would be visible from several recreational routes, most of the affected routes will be crossed by the onshore cable corridor and the geographical extent of the effects will often be limited to short section of the route directly affected by the crossing and/or the removal of associated vegetation along the route. As such, this is not anticipated to deter recreational users from using those specific or similar routes, and the magnitude of impact on health and wellbeing will be **Negligible**.

### *Seascape*

- 28.9.142 Construction phase effects on views and visual amenity will occur as a result of the construction activities, including laying new offshore export cables to shore; the presence of jack-up vessels and/or heavy lift vessels during the construction phase for the installation of foundations substructures and WTGs; windfarm service vessels and accommodation vessels; and partially constructed offshore elements; all which may combine to alter the views and visual amenity through visibility of these changes.

- 28.9.143 The residual effects arising as a result of the construction of the offshore elements of Rampion 2 are assessed as being of the same magnitude and significance on all viewpoints and visual receptors as those arising due to their operation and maintenance. As such, refer to **Section 28.10** for this.

#### Sensitivity or value of receptor

- 28.9.144 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the visual environment.

#### Significance of residual effect

- 28.9.145 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health is **Negligible**. As such, the significance effect is **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in exposure to land contamination

### Introduction

- 28.9.146 Construction activities that involve breaking the ground surface and disturbing soil and perched groundwater have the potential to influence human health as a result of exposure to contaminants via a range of exposure modes (dermal contact, ingestion and inhalation).
- 28.9.147 The following assessment sections in **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24) are relevant to human health:
- mobilisation of contamination from construction activities located on, or adjacent to landfills and other potentially contaminated sites;
  - build-up of ground gases from construction activities located on, or adjacent to landfills and other potentially contaminated sites; and
  - accidental spillages and leaks impacting controlled waters during construction activities.
- 28.9.148 The health assessment follows the structure set out above.

### *Mobilisation of contamination from construction activities located on, or adjacent to landfills and other potentially contaminated sites*

- 28.9.149 As stated in **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24), most of the onshore cable corridor and onshore substation sites are located on land where there is not anticipated to be a significant risk from the presence of land contamination. However, there are potential sources of contamination that have the potential to have an impact on human health receptors.
- 28.9.150 Of the nine potential sources of contamination identified in the desk study (**Appendix 24.1: Phase 1 geo-environmental desk study, Volume 4** of the ES (Document Reference: 6.4.24.1)), only Brook Barn Farm constitutes a risk to



human health receptors from encountering contaminated land. Brook Barn Farm is a historical landfill site, whereby the onshore cable corridor will pass through the eastern-most part and through an area of infilled ground to the northeast of the landfill. The onshore cable corridor does not pass through the other eight potential sources of contamination identified in the desk study.

- 28.9.151 The embedded environmental measures listed in **Table 28-13** include control measures to limit potential risks to human health from any unexpected contamination (C-14) and for management of potentially contaminated soils excavated during trenching to prevent generation of dusts and leaching of contamination (C-24).
- 28.9.152 The implementation of these embedded environmental measures will limit the risk of contamination during construction, resulting in no significant effects to human health receptors in ground condition terms.
- 28.9.153 On the basis that there will be no significant effects in ground conditions terms, the resultant magnitude of impact on health will be **Negligible**.

*Build-up of ground gases from construction activities located on, or adjacent to landfills and other potentially contaminated sites*

- 28.9.154 Embedded environmental measure C-14 (**Table 28-13**) includes for management of unexpected ground contamination by adopting appropriate working practices and as such measures will be in place to amend the design of the onshore cable corridor should ground gas be encountered during construction.
- 28.9.155 The only identified potential source of contamination that is likely to generate ground gases that could build up in the onshore cable corridor trenches, and thus be affected by Rampion 2, is the Brook Barn Farm historical landfill site. The desk study (**Appendix 24.1: Phase 1 geo-environmental desk study**, Volume 4 of the ES (Document Reference: 6.4.24.1)) information suggests that this historical landfill was backfilled using inert material, which will have a low potential for ground gas generation. Therefore, the likelihood of build-up of ground gases is considered to be unlikely, with the overall effect not considered to be significant in ground condition terms.
- 28.9.156 On the basis that there will be no significant effects in ground conditions terms, the resultant magnitude of impact on health will be **Negligible**.

*Accidental spillages and leaks impacting controlled waters during construction activities*

- 28.9.157 The temporary construction compounds associated with the onshore cable corridor and Oakendene substation, as well as the trenchless crossings, will require the storage of fuels including the refuelling of plant and machinery. These have the potential to cause fuel losses either as a result of loss of bulk containment or from minor leaks/spills. Potential spillages and leaks could impact human health as they have the potential to cause contamination of groundwater or surface water, or construction workers could be at risk via direct contact with the spillage.

- 28.9.158 Embedded environmental measures to limit the potential for accidental spillages and leaks during construction include C-8 and C-167 (**Table 28-13**). These measures also include actions to reduce the severity of a spillage.
- 28.9.159 The drilling fluids used during trenchless crossings are not classified as environmentally hazardous and do not contain groundwater hazardous substances. As a result, any spillage and subsequent risk to human health will be mild at worst.
- 28.9.160 Following the implementation of embedded environmental measures, the overall risk of spillages will be unlikely, with the overall effect not considered to be significant in ground condition terms.
- 28.9.161 On the basis that there will be no significant effects in ground conditions terms, the resultant magnitude of impact on human health will be **Negligible**.

#### Sensitivity or value of receptor

- 28.9.162 The sensitivity of the population living within the Study Area is considered to be Low, reflecting that the population are not considered to be particularly sensitive to changes in the land environment.

#### Significance of residual effect

- 28.9.163 Following the implementation of embedded environmental measures listed in **Table 28-13** (such as C-8, C-14, C-24, C-167) the magnitude of impact on human health from all aspects of ground conditions assessed are **Negligible**. In the context of a Low sensitivity receptor, the significance of the residual effect is considered to be **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in access to opportunities for physical activity

#### Magnitude of impact

- 28.9.164 Onshore cable construction will require temporary land take throughout the construction phase. However, in order to mitigate temporary impacts on land access within the proposed DCO Order Limits (for example C-7, C-19, C-20 and C-27), the onshore cable will be constructed in discrete sections: the trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced in as short a timeframe as practicable.
- 28.9.165 The only permanent land take is associated with construction of the proposed Oakdene substation and Oakdene substation permanent access, and the existing National Grid Bolney substation extension works. However, this infrastructure does not impact ProW or open space and therefore would not cause any permanent impacts and so has been excluded from assessment.
- 28.9.166 As detailed in **Chapter 20: Soils and agriculture, Volume 2** of the ES (Document Reference: 6.2.20), the onshore cable corridor is generally routed through agricultural land. Overall, a total of 578.33ha of agricultural land will be temporarily required for construction of the onshore cable. This accounts for a total of 96.03%

of all land within the proposed DCO Order Limits. On the basis that this land is used for agricultural practice and is therefore not publicly accessible, the temporary loss of agricultural land will not result in any adverse impacts on opportunities for physical activity.

- 28.9.167 A total of 13.53ha of non-agricultural land (2.37% of all land within the proposed DCO Order Limits) will be temporarily required for construction of the onshore cable. As detailed in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17), the following recreational land falls within the proposed DCO Order Limits:
- Sullington Hill (Open Access Land);
  - Bines Green Common (Open Access Land);
  - Washington Recreation Ground;
  - Jockey's Meadow; and
  - Climping Beach SSSI (West Beach LNR).
- 28.9.168 The above recreational areas will all be crossed by HDD and so there will be no direct interruption to access during the works, however, there may be a temporary impact on amenity during HDD activities. While this is the case, due to the presence of reasonable and accessible alternative recreation spaces, this will not result in any adverse impacts on opportunities for physical activity.
- 28.9.169 A total of 0.03ha of urban land (0.01% of all land within the proposed DCO Order Limits), occurring at the western extent of Littlehampton, will be temporarily required for construction of the onshore cable. This temporary loss of land is minimal; furthermore, due to the urban nature of the land, the temporary loss will have no impact on access to opportunities for physical activity.
- 28.9.170 As detailed in the **Outline Public Rights of Way Management Plan** (Document Reference: 7.8), the construction of the onshore elements of the Proposed Development may affect 60 ProW including 38 Footpaths, 21 Bridleways, and 1 Restricted Byway. Of the 60 ProW (62 ProW including repeated 2092 and 2519), two cross the onshore cable corridor twice and 10 will not be affected due to the trenchless crossings of the River Arun, rail network, A and B roads and other sensitive environments. Consequently, only 50 ProW will be impacted by the Proposed Development. It should be noted that no ProW will be permanently affected by the Proposed Development.
- 28.9.171 Overall, on the basis that construction land take will generally be temporary in nature (except from any permanent features such as the proposed Oakendene substation and Oakendene substation permanent access, the existing National Grid Bolney substation extension works, the operational accesses, the joint bay locations, and the onshore substation drainage and landscaping – all of which would not ProW or open space), and where land is publicly accessible there will be comparable and accessible alternative resources to use for physical activity, the consequent magnitude of impact on health will be **Negligible**.

### Sensitivity or value of receptor

- 28.9.172 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the air quality environment.

### Significance of residual effect

- 28.9.173 The Rampion 2 commitments (as shown in **Table 28-13**) include mitigation of temporary impacts on land access within the proposed DCO Order Limits (for example C-7, C-19, C-20 and C-27). In all instances, receptor sensitivity is considered to be **Low**, and the magnitude is **Negligible**. The resultant significance of effect is of **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in socio-economic factors

### Magnitude of impact

- 28.1.1 Construction of the Proposed Development will have a beneficial impact on socio-economic factors. The following assessment sections in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17) are relevant to human health:
- employment; and
  - Gross Value Added (GVA).
- 28.1.2 The health assessment follows the structure set out above.

### *Employment*

- 28.1.3 Having consistent income and being in long-term employment are two of the most important wider determinants of health. The construction phase of Rampion 2 will offer a number of job opportunities, primarily within the manufacturing and engineering, construction, transport and professional services.
- 28.1.4 As stated in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17), and shown in **Table 28-20**, the majority of direct and indirect full-time equivalent (FTE) employment opportunities generated by Rampion 2 will be diffuse across the UK rather than locally within Sussex.

**Table 28-20 Employment generated by Rampion 2**

	UK study area	Sussex study area
<b>Direct (FTEs)</b>	2,270	70
<b>Indirect (FTEs)</b>	1,790	10
<b>Total (FTEs)</b>	4,060	80

- 28.1.5 At the UK level, total employment supported by construction of the Proposed Development is estimated to average around 4,060 FTE jobs per annum. Broken down into direct and indirect employment, this equates to 2,270 and 1,790 FTE jobs per annum respectively.
- 28.1.6 At the Sussex level, total employment supported by construction of the Proposed Development is estimated to average around 80 FTE jobs per annum. Broken down into direct and indirect employment, this equates to 70 and 10 FTE jobs per annum respectively. This represents just 2% of the UK figure.
- 28.1.7 As total UK employment stands in the region of 25.5 million FTE employees, the additional 4,040 FTE jobs supported by the construction of Rampion 2 is estimated to represent less than 0.02% of this current baseline. Similarly, in Sussex, the 80 FTE jobs per annum supported throughout construction of the Rampion 2 are anticipated to constitute a small increase over the current baseline.
- 28.1.8 Overall, on the basis that the employment opportunities supported by Rampion 2 will be small compared to baseline employment and the majority of employment opportunities will not be local to Sussex, the benefit to population health will be imperceptible. Furthermore, job opportunities will be short-term in nature. While this is the case, these job opportunities will provide health benefits at the individual level. As a result, the magnitude of impact on health will be **Negligible** (beneficial).

### Gross Value Added

- 28.1.9 Employment generated by the construction of Rampion 2 will also contribute to the size and overall productivity of the national and local economies. As shown in **Table 28-21**, it is estimated that construction activity will contribute in the region of £234 million Gross Value Added (GVA) per annum, totalling to £936 million over the Proposed Development's anticipated four-year construction programme. Of this, an estimated £16 million GVA (around £4.1 million per annum, or 7% of the total GVA) is anticipated to be generated by Sussex-based businesses engaged with the Rampion 2 supply chain.
- 28.1.1 With the size of the national economy measured as £1,950 billion GVA, it is estimated that the Proposed Development's annual contribution (of £234 million GVA per annum) to the national economy will represent an increase of just under 0.02% over the 2020 annual baseline.

**Table 28-21 GVA generated by Rampion 2**

	UK study area	Sussex study area
<b>GVA per annum (£m)</b>	234.0	4.1
<b>Total GVA (£m)</b>	936.1	16.4

- 28.1.2 As with employment, most GVA generated by Rampion 2 will be diffuse across the UK rather than local to Sussex, with the benefit to population health will be imperceptible. As a result, the magnitude of impact on health will be **Negligible** (beneficial).

### Sensitivity or value of receptor

- 28.1.3 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the socio-economic environment.

### Significance of residual effect

- 28.1.4 The Rampion 2 commitments (as shown in **Table 28-13**) highlight RED's commitment to encourage, and where possible increase local and national sourcing by supporting businesses to access supply chain opportunities (C-34), whilst at the same time working with local partners to maximise the ability of local people to access employment opportunities associated with the construction of Rampion 2 (C-35).
- 28.1.5 As the sensitivity of the receptor is assessed as **Low** and the magnitude of impacts are assessed as **Negligible**, the effect of Rampion 2 on the receptor is **Negligible**, which is **Not Significant** in EIA terms.

## 28.10 Assessment of effects: Operation and maintenance phase

### Health effects from changes in noise exposure

#### Magnitude of impact

- 28.10.1 An assessment of the operational noise generated by the Oakendene substation has been conducted in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21). A total of four noise sensitive receptors have been identified, all of which are residential in nature.
- 28.10.2 On the basis that the Oakendene substation will operate for a 24-hour period, there is potential for health and wellbeing impacts associated with changes in noise exposure during the day (0700-2300) and night time (2300-0700) periods. Any change in noise exposure will be long-term in nature.
- 28.10.3 As detailed in **Chapter 21: Noise and vibration, Volume 2** of the ES (Document Reference: 6.2.21), during the daytime period, there would be no change in ambient sound level at all receptors. During the night time period, the maximum change in ambient sound level will be 0.1dB  $L_{Aeq,T}$ , with all other receptors experiencing no change in ambient sound level. This change is considered to be below the "no observed adverse effect level" (NOAEL) (MHCLG, 2019), which is described as noise exposure below which no effect at all on health or quality of life can be detected.
- 28.10.4 On the basis that changes in noise exposure during the day and night time periods will be below the NOAEL, the associated magnitude of impact on health will be **Negligible**.

### Sensitivity or value of receptor

- 28.10.5 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the noise environment.

### Significance of residual effect

- 28.10.6 The magnitude of impact on human health from long-term changes in noise exposure will be **Negligible**. In the context of a Low sensitivity receptor, the significance of the residual effect is considered to be **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in exposure to EMF

### Magnitude of impact

- 28.10.7 The proposed transmission infrastructure will comprise buried onshore cables in a single corridor of approximately 38.8km in length. From the landfall to the proposed Oakendene substation, the export cable circuits will be High Voltage Alternating Current (HVAC), with a voltage of up to 275kV. From the proposed Oakendene substation to the existing National Grid Bolney substation, the export cable circuits will be HVAC, with a voltage of up to 400kV.
- 28.10.8 As shown in **Table 28-22**, the up to 275kV cable system along the onshore cable route will comprise between two and four cable circuits in separate trenches with two circuits representing the worst-case scenario. Each trench will comprise three 150mm diameter single Power Cables installed in up to 250mm diameter ducts. The cable trench will be 1.2m wide, with a minimum burial depth of 1.2m. As stated in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4), the three cables within both of the circuit trenches will be laid in a trefoil formation.
- 28.10.9 The 400kV cable system between the new onshore substation at Oakendene and the existing National Grid Bolney substation will comprise two cable circuits in separate trenches. Each trench will comprise three 160mm diameter single core cables installed in up to 250mm diameter ducts. The cable trench will be 1.2m wide, with a minimum burial depth of 1.2m. As stated in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4), the three cables within both of the circuit trenches will be laid in a trefoil formation.

**Table 28-22 Proposed transmission infrastructure parameters**

	<b>150kV</b>	<b>220kV</b>	<b>275kV</b>	<b>400kV</b>
<b>Circuits</b>	4	3	2	2
<b>MVA per circuit (MVA)</b>	353	471	706	706
<b>Current (A)</b>	1,358	1,235	1,482	1,019
<b>Contingency</b>	10%	10%	10%	10%
<b>Max current (A)</b>	1,494	1,358	1,630	1,121

- 28.10.10 The CoP states that compliance with the public exposure guidelines set to protect health is assumed for transmission infrastructure operated at 132kV or less, without the need for more detailed assessment, on the basis of evidence published by the Energy Networks Association (ENA) showing that by design such infrastructure is not capable of causing exceedance of the public exposure guideline limits.
- 28.10.11 On the basis that the proposed transmission infrastructure is >132kV (varying between a minimum of 150kV to a maximum of 400kV), a detailed assessment is required in this instance.
- 28.10.12 The detailed assessment considered the worst-case scenario (i.e. the highest magnetic field strength emitted from the cables) by considering the phasing configuration for each of the cores within the circuits which generated the maximum field strength.

*Up to 275kV (landfall to proposed Oakendene substation)*

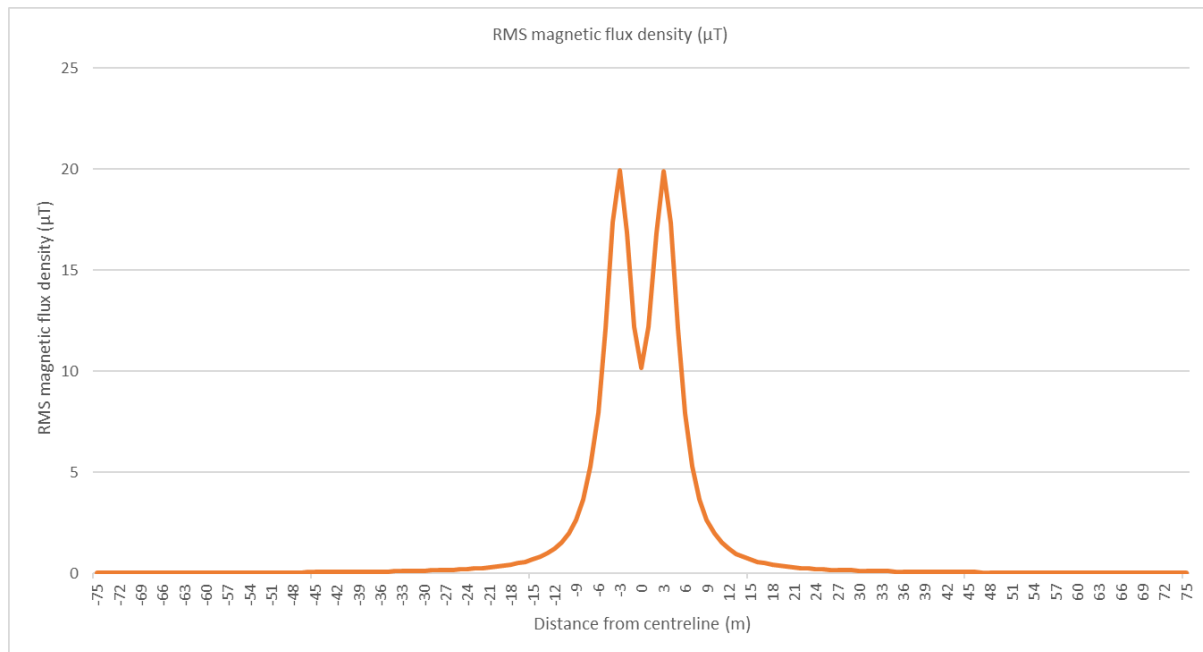
- 28.10.13 The following landfall to proposed Oakendene substation cable arrangements defined in **Table 28-22** underwent an initial assessment to identify which would result in the highest magnetic field strength (i.e. worst-case scenario) prior to detailed assessment:
- 150kV cable system (comprised of four circuits);
  - 220kV cable system (comprised of three circuits); and
  - 275kV cable system (comprised of two circuits).
- 28.10.14 It was concluded that the maximum calculated magnetic field strength would occur for the 275kV cable arranged in two circuits. As such, the detailed assessment is based on the following parameters:
- a maximum current of 1,630 (A);



- a height of 1m above ground level as per the CoP;
- trench spacing between the two circuits of 5m from the centrelines of the two circuits; and
- the “distance from centreline” being the centre point of the two circuits.

28.10.15 As shown in **Graphic 28-1**, the maximum calculated magnetic field strength associated with the 275kV cable will be 19.9 $\mu$ T, which equates to approximately 6% of the CoP 360 $\mu$ T public exposure guideline limit for the protection of health. Furthermore, the field strength quickly decreases with distance.

### Graphic 28-1 Magnetic field strength from the 275kV HVAC underground cables



28.10.16 On the basis that the maximum calculated magnetic field strength produced by the 275kV cable is well below the CoP 360 $\mu$ T public exposure guideline limit set to protect health, the magnitude of impact on human health will be **Negligible**.

28.10.17 Potential exposure to electric fields is removed through embedded environmental measures as the onshore cable route is proposed to be completely buried underground (C-1 in **Table 28-13**); as such any potential receptors would be shielded against electric fields reducing any potential for exposure.

#### *400kV (proposed Oakendene substation to existing National Grid Bolney substation)*

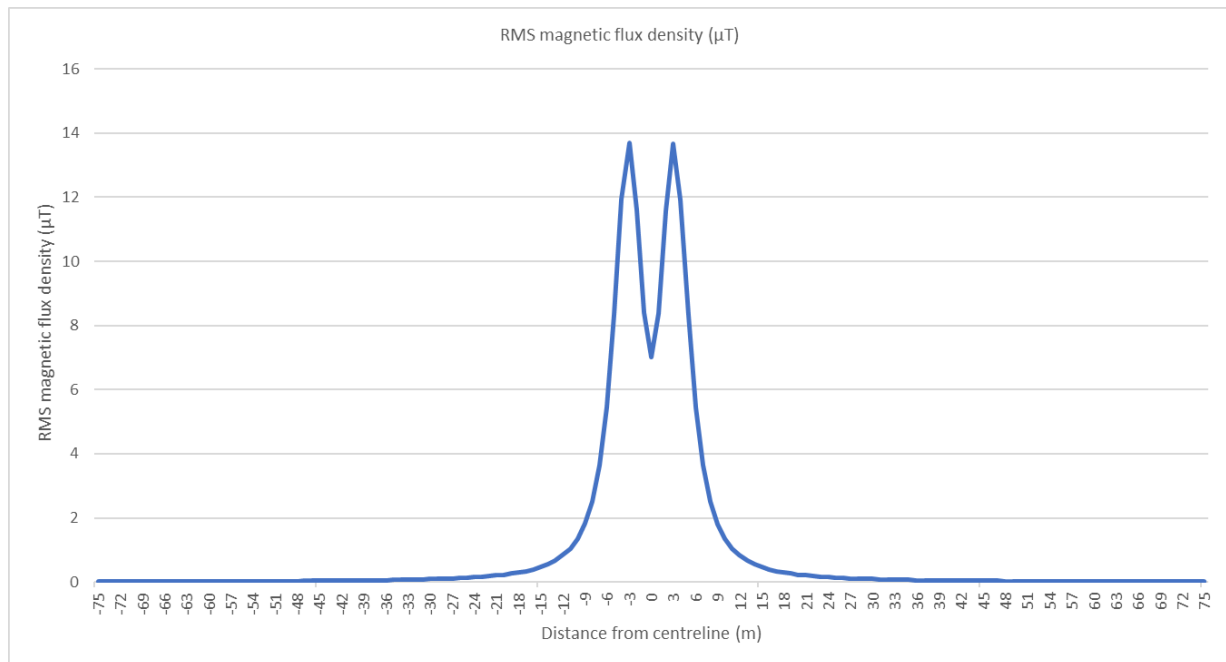
28.10.18 The maximum calculated magnetic field strength for the 400kV cable from the proposed Oakendene substation to existing National Grid Bolney substation is based on the following parameters:

- a maximum current of 1,121 (A);
- a height of 1m above ground level as per the CoP;
- trench spacing between the two circuits of 5m from the centrelines of the two circuits; and

- the “distance from centreline” being the centre point of the two circuits.

28.10.19 As shown in **Graphic 28-2**, the maximum calculated magnetic field strength associated with the 400kV cable will be 13.7 $\mu$ T, which equates to approximately 4% of the CoP 360 $\mu$ T public exposure guideline limit for the protection of health. Furthermore, the field strength quickly decreases with distance.

### Graphic 28-2 Magnetic field strength from the 400kV HVAC underground cables



- 28.1.6 On the basis that the maximum calculated magnetic field strength produced by the 400kV cable is well below the CoP 360 $\mu$ T public exposure guideline limit set to protect health, the magnitude of impact on human health will be **Negligible**.
- 28.1.7 Potential exposure to electric fields is removed through embedded environmental measures as the onshore cable route is proposed to be completely buried underground (C-1 in **Table 28-13**); as such any potential receptors would be shielded against electric fields reducing any potential for exposure.

#### Sensitivity or value of receptor

- 28.10.20 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the EMF environment.

#### Significance of residual effect

- 28.10.21 **Table 28-13** sets out the relevant embedded environmental measures within the design and how these affect the human health assessment. The embedded environmental measures include:
- the onshore cable route being completely buried underground (C-1) which shield against electric fields and remove the exposure pathway to any potential receptors;

- a depth cover of 1.2m (C-29) which will influence the strength of magnetic fields and reduce exposure to any potential receptors at the surface; and
- adherence to the **Outline CoCP** (Document Reference: 7.2) (C-33).

28.10.22 The magnitude of impact on human health from potential exposure EMF for both the 275kV and 400kV infrastructure is **Negligible**. In the context of a Low sensitivity receptor, the significance of the residual effect is considered to be **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in visual amenity

### Introduction

- 28.10.23 Of relevance to health and wellbeing, **Chapter 18: Landscape and visual impact** of the ES (Document Reference: 6.2.18) have assessed visual effects on the following:
- settlements; and
  - recreational routes.
- 28.10.24 The visual assessment relating to transport routes has been excluded on the basis that any impacts while travelling by rail or road would not impact health and wellbeing.
- 28.10.25 The visual assessment relating to recreational and tourist destinations has also been excluded on the basis that the only affected recreational and tourist destinations identified are caravan parks, a camp site and a beach, the views from which would not impact health and wellbeing.
- 28.10.26 The remainder of this section summarises the operational and maintenance phase visual changes (Years 1, 5 and 10), and the potential for this to impact health and wellbeing.

### Magnitude of impact

#### *Oakendene substation*

- 28.10.27 In Years 1, 5 and 10, the onshore substation will not be visible from any part of Cowfold village due to screening from intervening landform and the layering effect of intervening vegetation, even in the winter. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.10.28 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers/cyclists/horse riders/joggers/others) on the following recreational routes:
- ProW 1786 between east of Taintfield Wood and A272;
  - ProW 1788 between west of Taintfield Wood Oakendene Industrial Estate; and
  - ProW 1775 and 1777 near Eastlands Farm.

- 28.10.29 Operation of the Oakendene substation will not be visible from ProW 1775 and 1777 near Eastlands Farm. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.10.30 In relation to ProW 1788, the main components of the onshore substation that will be visible between Taintfield Wood up to the southern end of the Industrial Estate through gaps in intervening vegetation beyond the pond include some of the substation busbars and the access track at approximately 321m distance. However, parts of Taintfield Wood, and surrounding field boundary vegetation, which is retained, provide some mitigation in the form of visual containment thereby limiting the overall visibility of the onshore substation from the route. There will be no visibility of the onshore substation beyond Oakendene Industrial Estate. Furthermore, the native wet woodland within and around the attenuation basin will be established between approximately 2-5m (Year 5) and 4-8m (Year 10), dependent on species, along with the growth of existing vegetation which will further screen parts of the onshore substation. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.10.31 Significant changes to the visual environment will be limited to sections of recreational route ProW 1786 (in Year 1 and Year 5) where the onshore substation and its components will be partially visible. By Year 10, the native wet woodland and scrub will be well established between approximately 4-8m, which will further screen parts of the onshore substation from the route. As a result, changes to the visual environment will only occur during winter. Overall, while the Oakendene substation would be visible from ProW 1786, the impact on visual amenity would only be temporary due to the transient use of such routes. As such, this is not anticipated to deter recreational users from using those specific or similar routes, and the magnitude of impact on health and wellbeing will be **Negligible**.

### *Existing National Grid Bolney substation extension*

- 28.10.32 No settlements will have views of the Bolney substation extension works.
- 28.10.33 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers/cyclists/horse riders/joggers/others) on the following recreational routes:
- ProW 1T / 36Bo between Wineham Lane and Coombe House; and
  - ProW 8T / 34Bo between Bob Lane and Coombe House.
- 28.10.34 The onshore substation will not be visible from any part of ProW 1T / 36Bo (Years 1, 5 and 10) due to a combination of screening from intervening vegetation and infrastructure associated with the National Grid Bolney substation. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.10.35 From ProW 8T / 34Bo, there will be filtered views of the onshore substation (GIS or AIS option) through gaps in the trees and hedgerows in Year 1. These views will be experienced mainly in winter, reducing in the summer. Overall, both summer and winter views in Year 1 would not significantly change the visual environment. In Year 5 and 10, vegetation will be further established but filtered

views in winter may remain (albeit, not significantly changing the visual environment). On this basis, the magnitude of impact on health and wellbeing is **Negligible**.

### *Onshore cable corridor*

- 28.10.36 During the operation and maintenance phase, the cables will be buried underground and operational and maintenance activities. As a result, the visual assessment in **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18) has considered the possibility that residual effects arising from the construction phase involving the loss and subsequent replanting / establishment of vegetation may result in significant effects on views and visual amenity experienced by people in the landscape during Years 1, 5 and 10, post construction.
- 28.10.37 During Year 1, the loss of vegetation and its subsequent replanting will appear as noticeable changes to localised and mainly short range views from ProW that cross the route of the onshore cable corridor. Specifically, a short section of the Sustrans NCR 223 / Downs Link and short sections of 20 ProW (out of approximately 114 ProW or groups of ProW).
- 28.10.38 During Year 5, while new areas of planting will be established, there will be a notable difference between the existing mature vegetation and the newly established planting. These visual effects are most likely to be experienced by walkers, cyclists and horse riders on ProWs that cross the route of the onshore cable corridor. Significant visual effects at Year 5 affect 16 ProW.
- 28.10.39 During Year 10, all planting will be well established and able to continue to grow through to maturity. While differences between new hedge planting in comparison to the existing, mature hedges will be less noticeable, there will remain a noticeable difference between new tree planting and mature trees at Year 10. This will occur in at least three locations along ProW, but is not considered significant in visual terms.
- 28.10.40 Overall, while some significant visual effects remain, this is not anticipated to deter recreational users from using those specific or similar routes. As such, the magnitude of impact on health and wellbeing is **Negligible**.

### *Seascape*

- 28.10.41 As detailed in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15), the presence of turbines would be visible from widespread areas, comprising:
- South Downs National Park;
  - West Sussex South Coast Plain;
  - East Sussex and the City of Brighton & Hove;
  - Hampshire and the Solent; and
  - Isle of Wight – not significant in all instances.

- 28.10.42 Whilst changes in the visual environment range from not significant to significant, ultimately, in a health and wellbeing context any change in visual amenity associated with the presence number e of wind turbines is not anticipated to alter the behaviours of individuals living within affected settlements or those who use affected recreational routes. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.

#### Sensitivity or value of receptor

- 28.10.43 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the visual environment.

#### Significance of residual effect

- 28.10.44 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health is **Negligible**. As such, the significance effect is **Negligible**, which is **Not Significant** in EIA terms.

## 28.11 Assessment of effects: Decommissioning phase

### Health effects from changes in air quality

#### Magnitude of impact

- 28.11.1 As stated in **Chapter 19: Air quality, Volume 2** of the ES (Document Reference: 6.2.19), given that the decommissioning plan is to reverse the construction phase for above-ground structures, and to leave underground structures in situ, it is expected that changes in air quality associated with decommissioning traffic and on site equipment will be less than during the construction phase.
- 28.11.2 There is the potential for dust emissions, primarily associated with demolition of several structures forming the onshore substation, the existing National Grid Bolney substation extension and through trackout (conservatively assumed that there will be at most 10-50 HDV movements per day).
- 28.11.3 However, as per the construction phase, following the implementation best practice measures dust emissions will be mitigated to a level which is negligible and not significant in air quality terms. This will be secured through an **Outline CoCP** (Document Reference: 7.2) and DCO requirement ensuring air quality management measures will be applied as described in IAQM Guidance On the Assessment of Dust From Demolition And Construction, Version 1.1 (C-24).
- 28.11.4 As a result, the magnitude of impact on human health associated with potential changes in air quality associated with all decommissioning activities will be **Negligible**.

### Sensitivity or value of receptor

- 28.11.5 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the air quality environment.

### Significance of residual effect

- 28.11.6 On the basis that receptor sensitivity is considered to be **Low**, and the magnitude is **Negligible**. The significance of effect is **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in noise exposure

### Magnitude of impact

- 28.11.7 The assessment for the decommissioning phase considers potential significant effects from the decommissioning of the onshore substation only.
- 28.11.8 It is assumed that the majority of the activities associated with the decommissioning phase of the onshore substation construction will be similar to the activities associated with the onshore substation construction phase. For this reason, noise impacts and associated health and wellbeing impacts would be similar to those reported in the construction assessment.
- 28.11.9 As per the construction phase assessment, in all instances, the predicted noise level is below the daytime LOAEL and SOAEL and is not considered to be significant in noise terms. As a result, the resultant magnitude of impact on human health would be **Negligible**.

### Sensitivity or value of receptor

- 28.11.10 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the noise environment.

### Significance of residual effect

- 28.11.11 On the basis that receptor sensitivity is considered to be **Low**, and the magnitude is **Negligible**. The significance of effect is **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in transport nature and flow rate

### Magnitude of impact

- 28.11.12 As detailed in **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23), the only affected highway link associated with decommissioning of onshore works (specifically, the Oakendene substation) will be Highways Link 27 (A272, West of A23).

- 28.11.13 As per the construction phase, traffic management measures listed in **Table 28-13** (such as C-106, C-157, C-158, C-159, C-166 and C-201) seek to reduce the impact from decommissioning traffic, and associated impact on health and wellbeing.
- 28.11.14 The percentage change in total vehicles and HGVs due to decommissioning activities on Link 27 will be 0.3% and 0.6%, respectively. This change is way below the threshold for detailed assessment (which will be an increase of 30% in this instance) and will not result in any significant traffic impacts.
- 28.11.15 On the basis that there will be no significant traffic effects, the resultant magnitude of impact on human health will be **Negligible**.

#### Sensitivity or value of receptor

- 28.11.16 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the traffic environment.

#### Significance of residual effect

- 28.11.17 Following the implementation of embedded traffic management measures listed in **Table 28-13** (such as C-106, C-157, C-158, C-159, C-166 and C-201), the magnitude of impact on human health is considered to be **Negligible**. In the context of a **Low** sensitivity receptor, the significance of the residual effect is considered to be **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes in visual amenity

### Introduction

- 28.11.18 Of relevance to health and wellbeing, **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18) have assessed visual effects on the following:
- settlements; and
  - recreational routes.
- 28.11.19 The visual assessment relating to transport routes has been excluded on the basis that any impacts while travelling by rail or road would not impact health and wellbeing.
- 28.11.20 The visual assessment relating to recreational and tourist destinations has also been excluded on the basis that the only affected recreational and tourist destinations identified are caravan parks, a camp site and a beach, the views from which would not impact health and wellbeing.
- 28.11.21 The remainder of this section summarises the decommissioning phase visual changes, and the potential for this to impact health and wellbeing.



## Magnitude of impact

### *Oakendene substation*

- 28.11.22 Decommissioning works associated with the onshore substation will not be visible from any part of Cowfold village due to screening from intervening landform and the layering effect of intervening vegetation, even in the winter. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.
- 28.11.23 While decommissioning of the Oakendene substation will not be visible from ProW 1775 and 1777 near Eastlands Farm, they will be partially visible from the affected ProWs as the native wet woodland and existing hedgerow and scrub will be well established. While this is the case, the change in visual environment will not be significant. As a result, there is no potential for adverse impacts on visual amenity and associated health and wellbeing impacts. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.

### *Existing National Grid Bolney substation extension*

- 28.11.24 No settlements will have views of the Bolney substation extension works.
- 28.11.25 Should the decommissioning compound be located in the same place as the temporary construction compound associated with the Bolney substation extension, it will be visible from ProW 1T / 36Bo for approximately 350m. For this section of the route, the change in the visual environment would be significant. However, there would be no significant change in the visual environment for the remainder of the route. While construction works would be visible from some of the route, the impact on visual amenity would only be temporary due to the transient use of such routes. As such, this is not anticipated to deter recreational users from using those specific or similar routes, and the magnitude of impact on health and wellbeing will be **Negligible**.
- 28.11.26 Decommissioning works associated with the existing National Grid Bolney substation extension will be barely visible from ProW 8T / 34Bo as the existing field boundary vegetation in the middle distance will be very well established. On this basis, the magnitude of impact on health and wellbeing is **Negligible**.

### *Seascape*

- 28.11.27 Decommissioning phase effects on views and visual amenity will occur as a result of the construction activities, including laying new offshore export cables to shore; the presence of jack-up vessels and/or heavy lift vessels during the construction phase for the installation of foundations substructures and WTGs; windfarm service vessels and accommodation vessels; and partially constructed offshore elements; all which may combine to alter the views and visual amenity through visibility of these changes.
- 28.11.28 The residual effects arising as a result of the decommissioning of the offshore elements of Rampion 2 are assessed as being of the same magnitude and

significance on all viewpoints and visual receptors as those arising due to their operation and maintenance. As such, refer to **Section 28.10** for this.

#### Sensitivity or value of receptor

- 28.1.8 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the visual environment.

#### Significance of residual effect

- 28.1.9 In all instances, receptor sensitivity is considered to be **Low**, and the magnitude of impact on human health is **Negligible**. As such, the significance effect is **Negligible**, which is **Not Significant** in EIA terms.

### Health effects from changes in exposure to land contamination

#### Magnitude of impact

- 28.11.29 As detailed in **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24), onsite disassembly of equipment and demolition of structures will have greatest potential for soil or groundwater contamination (with associated risks to human health) due to spills, leaks and waste generated.
- 28.11.30 As detailed in embedded environmental measure C-239 (**Table 28-13**) the decommissioning phase will be subject to a decommissioning plan, approved by the Local Authority, including similar environmental measures to those for the construction phase of Rampion 2.
- 28.1.10 Overall, ground condition impacts will be no greater than those identified for the construction phase are expected for the decommissioning phase. As such, the resultant magnitude of impact on health will not differ from the construction phase and is classified as **Negligible**.

#### Sensitivity or value of receptor

- 28.1.11 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in the land environment.

#### Significance of residual effect

- 28.1.12 The magnitude of impact on human health from potential exposure to land contamination is **Negligible**. In the context of a **Low** sensitivity receptor, the significance of the residual effect is considered to be **Negligible**, which is **Not Significant** in EIA terms.

## Health effects from changes to socio-economic factors

### Magnitude of impact

- 28.11.31 As stated in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference: 6.2.17), it is assumed that the magnitude of impact for all effects considered will mirror (but is likely to be lower than) the magnitude relating to the Proposed Development's construction phase.
- 28.11.32 As a result, the magnitude of impact on health relating to employment and GVA will be **Negligible**.

### Sensitivity or value of receptor

- 28.1.13 The sensitivity of the population living within the Study Area is considered to be **Low**, reflecting that the population are not considered to be particularly sensitive to changes in socio-economic factors.

### Significance of residual effect

- 28.1.14 As the sensitivity of the receptor is assessed as **Low** and the magnitude of impacts are assessed as **Negligible**, the effect of Rampion 2 on the receptor is **Negligible**, which is **Not Significant** in EIA terms.

## 28.12 Assessment of cumulative effects

### Approach

- 28.12.1 A cumulative effects assessment (CEA) examines the combined impacts of Rampion 2 in combination with other developments on the same single receptor or resource and the contribution of Rampion 2 to those impacts. The overall method followed in identifying and assessing potential cumulative effects in relation to the onshore environment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and **Appendix 5.3: Cumulative effects assessment detailed onshore search and screening criteria, Volume 4** of the ES (Document Reference: 6.4.5.3).
- 28.12.2 The onshore screening approach follows the Planning Inspectorate's Advice Note Nine (Planning Inspectorate, 2018) and Advice Note Seventeen (Planning Inspectorate, 2019) which is an accepted process for Nationally Significant Infrastructure Projects (NSIPs) and follows the four-stage approach set out in the guidance.

### Cumulative effects assessment

- 28.12.3 For human health, a Zone of Influence (ZOI) has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The human health ZOI differs for each health determinant and is consistent with the ZOI used for each inter-related technical cumulative assessment that is used to inform the human health cumulative assessment.

- 28.12.4 A short list of ‘other developments’ that may interact with the Rampion 2 ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4) and on **Figure 5.4.2 to 5.4.4, Volume 4** of the ES (Document Reference: 6.4.5.4). This list has been generated applying criteria set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and **Appendix 5.3: Cumulative effects assessment detailed onshore search criteria, Volume 4** of the ES (Document Reference: 6.4.5.3) and has been collated up to the finalisation of the ES through desk study, consultation and engagement.
- 28.12.5 Only those ‘other developments’ in the short list that fall within the human health ZOI have the potential to result in cumulative effects with the Proposed Development on human health. All ‘other developments’ falling outside the human health ZOI are excluded from this assessment. The following types of ‘other development’ have the potential to result in cumulative effects on human health.
- Other developments that could result in an environmental and/or socio-economic change that is additive to the effects associated with the Proposed Development.
  - Other developments that result in EMF which are located within 30m of transmission infrastructure (onshore cable corridor, Oakendene substation and existing National Grid Bolney substation extension) associated with the Proposed Development.
- 28.12.6 A tiered approach to the CEA has been set out in **Table 5-6 in Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and can be summarised as follows:
- Tier 1: developments under construction, permitted applications, and submitted applications;
  - Tier 2: Other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has been submitted; and
  - Tier 3: Other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has not been submitted, or where developments are identified in Development Plans or other plans as appropriate.
- 28.12.7 On the basis of the above, the ‘other developments’ that are scoped into the human health CEA are outlined in **Table 28-23 to Table 28-27**.
- 28.12.8 Relevant cumulative developments have been identified for each health determinant assessed.
- 28.12.9 It should be noted that no transport projects have been included on the basis that, consistent with best practice, cumulative traffic flows have been assessed within the main assessment.
- 28.12.10 Similarly, no ground conditions projects have been included on the basis that, as stated in **Chapter 24: Ground conditions, Volume 2** of the ES (Document Reference: 6.2.24), even where construction and operation of ‘other developments’ overlaps with construction of Rampion 2, none of the receptors

identified for assessment are likely to experience a significant effect cumulatively with the 'other developments'.



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**Table 28-23 Developments considered as part of the human health CEA (air quality)**

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
11	Leisure Golf course including associated buildings and infrastructure	Bognor Regis Golf Club	M/16/22/PL	Application pending a decision: submitted 11/02/2022	High	1	457
13 / 14 / 63	Mixed Use 300 dwellings and ancillary infrastructure	Land at Climping Arun Local Plan (2018) Reference Site SD10 Policy H SP2c	CM/48/21/RES / CM/1/17/OUT / Local Plan site (SD10)	Application pending a decision: submitted 31/08/2021 / Application approved (after appeal) 28/09/2018 / Allocated in Local Plan	High	1	Within proposed DCO Order Limits
16	Mixed Use Demolition of existing treatment works and	Land west of Bridge Road Roundabout	LU/238/20/OUT	Application approved 22/04/2022	High	1	146

<sup>1</sup> ID reference as stated in Table 2-1 in [Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4](#) of the ES (Document Reference: 6.4.5.4) and on [Figures 5.4.2 to 5.4.4, Volume 4](#) of the ES (Document Reference: 6.4.5.4).

<sup>2</sup> [Chapter 5: Approach to the EIA, Volume 2](#) of the ES (Document Reference: 6.2.5) sets out the full definitions of the tiers.

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
	redevelopment to provide up to 105 homes						
17	Industrial (waste) Change of use of existing hangar building from industrial / storage to a combined heat and power plant	Rudford Industrial Estate	WSCC/015/22	Application pending a decision: submitted 10/06/2022	High	1	375
21	Energy generation (solar) Installation of a Solar Photovoltaic (PV) generation system.	HM Prison Ford Road	F/16/21/PL	Application approved 23/11/2021	High	1	199
32	Mixed use development 600 dwellings and multi- functional green infrastructure	Development of land at Courtwick	LU/355/10/	Application approved 23/02/12	High	1	Within proposed DCO Order Limits



ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
36	Mixed Use 160 dwellings with public open space	Land off Arundel Road	A/122/19/OUT	Application approved 17/03/2020	High	1	211
39	Industry (resource extraction)  The continued winning, working and processing of sand from the existing Rock Common Quarry.	Rock Common Quarry	WSCC/028/21	Application pending a decision: submitted 14/07/2021	High	1	Within proposed DCO Order Limits
42	Industry (resource extraction)  Continuation of working the mineral (sand extraction), but with an enhanced restoration scheme for nature conservation and informal recreation	Sandgate Park Quarry	WSCC/044/18/SR	Application approved 08/01/2020	High	1	79

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
49	Energy storage Battery Energy Storage Facility at Bolney	Battery Energy Storage Facility at Bolney #2	DM/21/2276	Application pending a decision: submitted 14/06/2021	High	1	59
51	Energy storage Proposed energy storage system and associated equipment	Ghyll Farm	DM/20/2554	Negative screening decision (EIA not required): decision 06/08/2020	Low	3	Within proposed DCO Order Limits
54	Energy generation (solar) Solarvoltaic panels and associated infrastructure	Land at Coombe Farm	DM/15/0644	Application approved 17/02/2017	High	1	21
56	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm #4	DM/23/0769	Application pending a decision: submitted 20/03/2023	High	1	Within proposed DCO Order Limits
57	Utilities infrastructure (energy)	Grid Stability Infrastructure at the existing National	DM/21/4285	Negative screening decision (EIA not required): decision 14/01/2022	Low	3	Within proposed DCO Order Limits

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
	Grid stability infrastructure	Grid Bolney Substation					
<b>59</b>	Highways Creation of a 1.1km highway, with shared cycleway and footway	Lyminster Bypass	WSCC/049/18/LY	Application approved 09/05/2019	High	1	Within proposed DCO Order Limits

**Table 28-24 Developments considered as part of the human health CEA (noise)**

<b>ID<sup>1</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>2</sup></b>	<b>Distance to Rampion 2</b>
<b>13 / 14 / 63</b>	Mixed Use 300 dwellings and ancillary infrastructure	Land at Climping  Arun Local Plan (2018) Reference Site SD10  Policy H SP2c	CM/48/21/RES / CM/1/17/OUT / Local Plan site (SD10)	Application pending a decision: submitted 31/08/2021 / Application approved (after appeal) 28/09/2018 / Allocated in Local Plan	High	1	Within proposed DCO Order Limits
<b>60</b>	Mixed use  Proposed site that could provide up to 1,000 dwellings.	Littlehampton	LEGA/SD4  Site at West Bank (Policy H SP2b)	Allocated in Local Plan – No application at present.	Low	3	552
<b>W48</b>	Offshore windfarm	Rampion Offshore Wind Farm (Rampion 1)	EN010032	Operational	High	1	Adjacent to offshore element of the proposed DCO Order Limits

**Table 28-25 Developments considered as part of the human health CEA (socio-economics)**

<b>ID<sup>1</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>2</sup></b>	<b>Distance to Rampion 2 (m)</b>
<b>5</b>	Utilities infrastructure (energy)  High voltage direct current marine and underground electric power transmission link	AQUIND Connector	EN020022	DCO granted (following appeal) 09/03/2023	High	1	34,446
<b>7</b>	Utilities infrastructure (other)  97km of new steel pipeline	Southampton to London Pipeline Project	EN070005	DCO granted 07/10/2020	High	1	44,805
<b>26</b>	Highways	Ford Circular Technology Park	WSCC/027/18/F	Application approved 15/08/2019	High	1	967

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
	Construction of a new access road						
54	Energy generation (solar)  Solarvoltaic panels and associated infrastructure	Land at Coombe Farm	DM/15/0644	Application approved 17/02/2017	High	1	21

**Table 28-26 Developments considered as part of the human health CEA (visual)**

<b>ID<sup>1</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>2</sup></b>	<b>Distance to Rampion 2 (m)</b>
<b>1</b>	Highways A new dual carriageway bypass	A27 Arundel Bypass	TR010045	Pre-application: Scoping Opinion published 14/04/2010	Medium	2	892
<b>13 / 14 / 63</b>	Mixed Use 300 dwellings and ancillary infrastructure	Land at Climping Arun Local Plan (2018) Reference Site SD10 Policy H SP2c	CM/48/21/RES / CM/1/17/OUT / Local Plan site (SD10)	Application pending a decision: submitted 31/08/2021 / Application approved (after appeal) 28/09/2018 / Allocated in Local Plan	High	1	Within proposed DCO Order Limits
<b>34 / 62</b>	Residential 84 dwellings and supporting infrastructure	Land at Dappers Lane / Arun Local Plan site SD9	A/76/20/PL / Arun Local Plan - reference site SD9: Angmering North (Policy H SP2c)	Application approved 09/02/2021	High	1	551
<b>50</b>	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm #3	DM/22/3228	Negative screening decision (EIA not required): decision 18/11/2022	Low	3	293

ID <sup>1</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>2</sup>	Distance to Rampion 2 (m)
51	Energy storage Proposed energy storage system and associated equipment	Ghyll Farm	DM/20/2554	Negative screening decision (EIA not required): decision 06/08/2020	Low	3	Within proposed DCO Order Limits
54	Energy generation (solar) Solarvoltaic panels and associated infrastructure	Land at Coombe Farm	DM/15/0644	Application approved 17/02/2017	High	1	21
56	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm #4	DM/23/0769	Application pending a decision: submitted 20/03/2023	High	1	Within proposed DCO Order Limits
57	Utilities infrastructure (energy) Grid stability infrastructure	Grid Stability Infrastructure at the existing National Grid Bolney Substation	DM/21/4285	Negative screening decision (EIA not required): decision 14/01/2022	Low	3	Within proposed DCO Order Limits
59	Highways Creation of a 1.1km highway, with shared cycleway and footway	Lyminster Bypass	WSCC/049/18/LY	Application approved 09/05/2019	High	1	Within proposed DCO Order Limits



**Table 28-27 Developments considered as part of the human health CEA (EMF)**

<b>ID<sup>1</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>2</sup></b>	<b>Distance to Rampion 2 (m)</b>
<b>51</b>	Energy storage Proposed energy storage system and associated equipment	Ghyll Farm	DM/20/2554	Negative screening decision (EIA not required): decision 06/08/2020	Low	3	Within proposed DCO Order Limits
<b>52</b>	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm #2	DM/22/0807	Negative screening decision (EIA not required): decision 29/03/2022	Low	3	Within proposed DCO Order Limits
<b>53</b>	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm	DM/21/1668	EIA Not Required 25/05/2021	Low	3	Within proposed DCO Order Limits
<b>54</b>	Energy generation (solar) Solarvoltaic panels and associated infrastructure	Land at Coombe Farm	DM/15/0644	Application approved 17/02/2017	High	1	21
<b>56</b>	Energy storage Battery Energy Storage Facility	Battery Energy Storage System at Coombe Farm #4	DM/23/0769	Application pending a decision: submitted 20/03/2023	High	1	Within proposed DCO Order Limits

<b>ID<sup>1</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>2</sup></b>	<b>Distance to Rampion 2 (m)</b>
<b>57</b>	Utilities infrastructure (energy) Grid stability infrastructure	Grid Stability Infrastructure at the existing National Grid Bolney Substation	DM/21/4285	Negative screening decision (EIA not required): decision 14/01/2022	Low	3	Within proposed DCO Order Limits

28.1.15 The CEA for human health is set out in **Table 28-28**.



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**Table 28-28 Cumulative effects assessment for human health**

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
1	A27 Arundel Bypass project	TR010045	<p>Relevant health determinants: <b>visual</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase. However, these impacts are only likely to be experienced simultaneously from Arundel Castle or sequentially, travelling along the A27 or the Lyminster Bypass and the A284, Lyminster Road.</p> <p>On the basis that transport routes and tourist/recreation destinations (i.e. Arundel Castle) have been excluded from the human health assessment, there is no potential for cumulative human health effects.</p>
5	AQUIND Connector	EN020022	<p>Relevant health determinants: <b>socio-economics</b>.</p> <p>The operation phase is the only likely temporal overlap between this project and Rampion 2. There is the potential for cumulative socio-economic benefits during operation due to the geographic overlap between projects (whereby both projects include Sussex as part of the study area).</p> <p>While this is the case, socio-economic factors (employment and GVA) have been excluded from the Rampion 2 human health assessment on the basis that &lt;100 workers would be employed during operation, with limited health benefits. As a result, there is no potential for cumulative human health effects.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
7	Southampton to London Pipeline Project	EN070005	<p>Relevant health determinants: <b>socio-economics</b>.</p> <p>The Southampton to London pipeline development is located entirely within Hampshire and Surrey, and therefore by-passes the various study areas identified for the preliminary assessment of Rampion 2. As a result, there is no potential for cumulative human health effects.</p>
13 / 14 / 63	<p>Land at Climping</p> <p>Arun Local Plan (2018) Reference Site SD10</p> <p>Policy H SP2c</p>	<p>CM/48/21/RES / CM/1/17/OUT / Local Plan site (SD10)</p>	<p>Relevant health determinants: <b>air quality, visual and noise</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase. However, these impacts relate to changes in landscape character through increasing its 'urbanisation'. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p> <p>The location of this project is directly adjacent to the Climping construction compound. There are no plant equipment emissions expected at the Climping construction compound, however, there is potential for cumulative dust emissions. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures.</p> <p>While there is low certainty of construction overlap, there is potential for cumulative noise impacts at specific receptors if this did occur. In such an instance, the CoCP would be updated with cumulative noise mitigation measures which would ensure noise remains mitigated to acceptable levels.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
			On this basis, the resultant human health effect (associated with air quality, visual and noise effects) would remain <b>not significant</b> .
17	Rudford Industrial Estate	WSCC/015/22	<p>Relevant health determinants: <b>air quality</b>.</p> <p>The location of this project is approximately 488m from the Climping construction compound. There are no plant equipment emissions expected at the Climping construction compound, however, there is potential for cumulative dust emissions. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures. On this basis, the resultant human health effect would remain <b>not significant</b>.</p>
21	HM Prison Ford Road	F/16/21/PL	<p>Relevant health determinants: <b>air quality</b>.</p> <p>The location of this project is approximately 400m from the Climping construction compound. There are no plant equipment emissions expected at the Climping construction compound, however, there is potential for cumulative dust emissions. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures. On this basis, the resultant human health effect would remain <b>not significant</b>.</p>
26	Ford Circular Technology Park, Energy from waste project	WSCC/036/20	<p>Relevant health determinants: <b>socio-economics</b>.</p> <p>The Energy from waste development at the Ford Circular technology park is likely to overlap with the construction phase of Rampion 2 and would therefore have the potential to generate additional economic benefit to the Sussex economy during the construction phase of Rampion 2.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
34 / 62	Land at Dappers Lane / Arun Local Plan site SD9	A/76/20/PL / Arun Local Plan - reference site SD9: Angmering North (Policy H SP2c)	<p>While this the case, construction phase jobs are only temporary in nature. While the magnitude of jobs available may increase, the health benefits will remain at limited to the individual level only. On this basis, the resultant human health effect would remain <b>not significant</b>.</p> <p>Relevant health determinants: <b>visual</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase. However, these impacts relate to changes in landscape character through increasing its 'urbanisation'. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes. As such, the resultant human health effect would remain <b>not significant</b>.</p>
50	Battery Energy Storage System at Coombe Farm #3	DM/22/3228	<p>Relevant health determinants: <b>visual</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character.</p> <p>While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes. As such, the resultant human health effect would remain <b>not significant</b>.</p>
51	Ghyll Farm	DM/20/2554	Relevant health determinants: <b>air quality, visual</b> and <b>EMF</b> .



ID <sup>1</sup>	Development name	Application reference	Assessment discussion
			<p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p> <p>Should the construction phases of both developments overlap, there is potential for cumulative air quality effects from the generation of dust and other pollutants. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity transmission infrastructure is well below the public health exposure guidelines (only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines.</p> <p>On this basis, the resultant human health effect (associated with air quality, visual and EMF effects) would remain <b>not significant</b>.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
52	Battery Energy Storage System at Coombe Farm #2	DM/22/0807	<p>Relevant health determinants: <b>EMF</b>.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity transmission infrastructure is well below the public health exposure guidelines (only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines. On this basis, the resultant human health effect associated with EMF effects would remain <b>not significant</b>.</p>
53	Battery Energy Storage System at Coombe Farm	DM/21/1668	<p>Relevant health determinants: <b>visual</b> and <b>EMF</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
54	Land at Coombe Farm	DM/15/0644	<p>transmission infrastructure is well below the public health exposure guidelines (only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines, and would remain <b>not significant</b>.</p> <p>On this basis, the resultant human health effect (associated with visual and EMF effects) would remain <b>not significant</b>.</p> <p>Relevant health determinants: <b>visual</b> and <b>EMF</b>.</p> <p>This development is likely to have been constructed prior to construction of Rampion 2.</p> <p>There is potential cumulative visual impacts from the operation of this project and the construction phase of Rampion 2, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity transmission infrastructure is well below the public health exposure guidelines</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
56	Battery Energy Storage System at Coombe Farm #4	DM/23/0769	<p>(only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines.</p> <p>On this basis, the resultant human health effect (associated with air quality, visual and EMF effects) would remain <b>not significant</b>.</p> <p>Relevant health determinants: <b>air quality, visual, socio-economics</b> and <b>EMF</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p> <p>There is no potential for cumulative plant emissions due to the distance between this development and Rampion 2 DCO Order Limits (300m east of the National Grid Bolney substation). However, there is potential for cumulative dust emissions. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures.</p> <p>Due to the likely overlap with the construction phase of Rampion 2, there is the potential to generate additional economic benefit to the Sussex economy during the construction phase of Rampion 2. While this the case, construction phase</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
57	Grid Stability Infrastructure at Bolney Substation	DM/21/4285	<p>jobs are only temporary in nature. While the magnitude of jobs available may increase, the health benefits will remain at limited to the individual level only.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity transmission infrastructure is well below the public health exposure guidelines (only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines.</p> <p>On this basis, the resultant human health effect (associated with air quality, visual, socio-economic and EMF effects) would remain <b>not significant</b>.</p> <p>Relevant health determinants: <b>air quality, visual and EMF</b>.</p> <p>The potential cumulative visual impacts from this project and Rampion 2 are predominantly associated with the construction phase, whereby it could extend and intensify effects on landscape character in the Eastern Low Weald around the existing National Grid Bolney substation. Specifically, loss of vegetation along Wineham Lane or ProW could open up gaps to reveal further development altering the view and the perceived landscape character. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
59	Lyminster Bypass	WSCC/049/18/LY	<p>Should the construction phases of both developments overlap, there is potential for cumulative air quality effects from the generation of dust and other pollutants. While this is the case, the impact from both projects are expected to be managed to a level which is not significant through best practice air quality management measures.</p> <p>Once operational, this project has the potential to introduce electricity transmission infrastructure within 30m of such infrastructure proposed for Rampion 2, whereby EMF emissions from both infrastructure could interact to generate cumulative EMF which is higher than either project in isolation. While this is the case, the worst-case EMF associated with the Rampion 2 electricity transmission infrastructure is well below the public health exposure guidelines (only 6% of the value). As a result, it is reasonable to assume that any interaction would not result in EMF levels which are higher than the health exposure guidelines.</p> <p>On this basis, the resultant human health effect (associated with visual, air quality and EMF effects) would remain <b>not significant</b>.</p>
60	Littlehampton	LEGA/SD4	<p>Relevant health determinants: <b>visual</b>.</p> <p>The Lyminster Bypass will cross the onshore cable corridor at right angles and there will be associated visual impacts locally from Lyminster and ProW. While this is the case, these changes are not anticipated to deter recreational users from using those specific or similar routes. As such, the resultant human health effect would remain <b>not significant</b>.</p>

ID <sup>1</sup>	Development name	Application reference	Assessment discussion
W48	Rampion Offshore Wind Farm (Rampion 1)	EN010032	<p>Relevant health determinants: <b>noise</b>.</p> <p>A screening assessment showed no exceedances of screening criteria with both Rampion 1 and Rampion 2 operating together. On this basis, the resultant human health effect would remain <b>not significant</b>.</p>

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## 28.13 Transboundary effects

- 28.13.1 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state affects the environment of another EEA state(s). A screening of transboundary effects has been carried out and is presented in Appendix B of the Scoping Report (RED, 2020).
- 28.13.2 While human health was not considered as a discrete topic at the scoping stage, the assessment of human health relates solely to onshore populations. The nearest EEA landmass to the Proposed Development is France at 94.6km away. As such, there are no onshore populations beyond the jurisdiction of the UK who will be impacted by the Proposed Development.

## 28.14 Inter-related effects

- 28.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance and decommissioning phases of Rampion 2 on the same receptor, or group of receptors.
- 28.14.1 Inter-related effects could potentially arise in one of two ways. The first type of inter-related effect is a Proposed Development lifetime effect, where multiple phases of the Proposed Development interact to create a potentially more significant effect on a receptor than in one phase alone. The phases for Rampion 2 are construction, operation and maintenance, and decommissioning. All Proposed Development lifetime effects are assessed in [Chapter 30: Inter-related effects, Volume 2](#) of the ES (Document Reference: 6.2.30).
- 28.14.2 The second type of inter-related effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient or longer-term.
- 28.14.3 Receptor-led effects have been considered, where relevant, in this chapter for potential interactions between human health and the following environmental aspects:
- socio-economics;
  - landscape and visual impact;
  - air quality;
  - noise and vibration (onshore);
  - transport; and
  - ground conditions.
- 28.14.4 Full results of the receptor-led effects assessment can be found in [Chapter 30: Inter-related effects, Volume 2](#) of the ES (Document Reference: 6.2.30).

## 28.15 Summary of residual effects

28.15.1 **Table 28-29** presents a summary of the assessment of significant impacts, any relevant embedded environmental measures and residual effects on human health receptors.

**Table 28-29 Summary of assessment of residual effects**

<b>Activity and impact</b>	<b>Magnitude of impact</b>	<b>Receptor and sensitivity or value</b>	<b>Embedded environmental measures</b>	<b>Assessment of residual effect (significance)</b>
<b>Construction</b>				
Health effects from changes in air quality	Negligible	Low	C-19, C-24, C-33, C-106, C-158	<b>Negligible (Not Significant)</b>
Health effects from changes in noise exposure	Negligible to Low	Low	C-24, C-33	<b>Negligible to Minor adverse (Not Significant)</b>
Health effects from changes in vibration exposure	Negligible	Low	C-22, C-33	<b>Negligible (Not Significant)</b>
Health effects from changes in transport nature and flow rate	Negligible	Low	C-106, C-157, C-158, C-159, C-166, C-201	<b>Negligible (Not Significant)</b>
Health effects from changes in visual amenity	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>
Health effects from changes in exposure to land contamination	Negligible	Low	C-8, C-14, C-24, C167	<b>Negligible (Not Significant)</b>

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Health effects from changes in access to opportunities for physical activity	Negligible	Low	C-7, C-19, C-20, C-27	<b>Negligible (Not Significant)</b>
Health effects from changes in socio-economic factors	Negligible	Low	C-34, C-35	<b>Negligible (Not Significant)</b>
<b>Operation and maintenance</b>				
Health effects from changes in noise exposure	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>
Health effects from changes in exposure to EMF	Negligible	Low	C-1, C-29, C-33	<b>Negligible (Not Significant)</b>
Health effects from changes in visual amenity	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>
<b>Decommissioning</b>				
Health effects from changes in air quality	Negligible	Low	C-24	<b>Negligible (Not Significant)</b>

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Health effects from changes in noise exposure	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>
Health effects from changes in transport nature and flow rate	Negligible	Low	C-106, C-157, C-158, C-159, C-166, C-201	<b>Negligible (Not Significant)</b>
Health effects from changes in visual amenity	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>
Health effects from changes in exposure to land contamination	Negligible	Low	C-239	<b>Negligible (Not Significant)</b>
Health effects from changes in socio-economic factors	Negligible	Low	n/a	<b>Negligible (Not Significant)</b>

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## 28.16 Glossary of terms and abbreviations

**Table 28-30 Glossary of terms and abbreviations – human health**

<b>Term (acronym)</b>	<b>Definition</b>
<b>AIS</b>	Air Insulated Switchgear
<b>AQMA</b>	Air Quality Management Area
<b>BEIS</b>	Department for Business, Energy and Industrial Strategy. A ministerial department that replaced the Department for Business, Innovation and Skills (BIS) and the Department of Energy and Climate Change (DECC) in 2016.
<b>CEA</b>	Cumulative effects assessment
<b>CoCP</b>	Code of Construction Practice
<b>CoP</b>	Code of Practice
<b>CRFs</b>	Concentration-response functions
<b>CTMP</b>	Construction Traffic Management Plan
<b>DCO</b>	Development Consent Order
<b>DECC</b>	Department of Energy and Climate Change
<b>DLUHC</b>	Department for Levelling Up, Housing and Communities
<b>EC</b>	European Commission
<b>EEA</b>	European Economic Area
<b>EIA</b>	Environmental Impact Assessment
<b>ELF</b>	Extremely Low Frequency
<b>EMFs</b>	Electric and magnetic fields
<b>ENA</b>	Energy Networks Association
<b>EPP</b>	Evidence Plan Process
<b>ES</b>	Environmental Statement
<b>ETG</b>	Expert Topic Group
<b>EU</b>	European Union
<b>FTE</b>	Full-time Equivalent

<b>Term (acronym)</b>	<b>Definition</b>
<b>GEART</b>	Guidelines for the Environmental Assessment of Road Traffic
<b>GIS</b>	Gas Insulated Switchgear
<b>GVA</b>	Gross Value Added
<b>HDD</b>	Horizontal Directional Drilling
<b>HGV</b>	Heavy Goods Vehicle
<b>HIA</b>	Health Impact Assessment
<b>HPA</b>	Health Protection Agency
<b>HRA</b>	Habitats Regulations Assessment
<b>HVAC</b>	High Voltage Alternating Current
<b>IAQM</b>	Institute of Air Quality Management
<b>ICNIRP</b>	The International Commission on Non-Ionizing Radiation Protection
<b>IEMA</b>	Institute of Environmental Management and Assessment
<b>IMD</b>	Index of Multiple Deprivation
<b>IPC</b>	Infrastructure Planning Commission
<b>LSOAs</b>	Lower Super Output Areas
<b>MEMR</b>	Mitigation, Enhancement and Monitoring Register
<b>NOAL</b>	“no observed adverse effect level”
<b>NPPF</b>	National Planning Policy Framework
<b>NPPG</b>	National Planning Practice Guidance
<b>NPS</b>	National Policy Statement
<b>NRPB</b>	National Radiological Protection Division
<b>NSIP</b>	Nationally Significant Infrastructure Project
<b>OHID</b>	Office for Health Improvement and disparities
<b>ONS</b>	Office of National Statistics
<b>PEIR</b>	Preliminary Environmental Information Report
<b>PHE</b>	Public Health England



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<b>Term (acronym)</b>	<b>Definition</b>
<b>PINS</b>	Planning Inspectorate
<b>PPE</b>	Personal Protective Equipment
<b>PPGs</b>	Pollution Prevention Guidelines
<b>PRoW</b>	Public Rights of Way
<b>PRoWMP</b>	Public Rights of Way Management Plan
<b>QOF</b>	Qualities and Outcomes Framework
<b>RED</b>	Rampion Extension Development Limited
<b>WSCC</b>	West Sussex County Council
<b>ZOI</b>	Zone of Influence

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