

## 13 Population and Health

### 13.1 Introduction

13.1.1 This chapter summarises the assessment of effects upon population and health associated with the proposed Recycling Recovery and Renewable Energy (3Rs) Facility.

#### Scope of Study

13.1.2 This assessment considers the construction and operational activities associated with the proposed development that have the potential to influence health within the local population. As shown in Table 13.1, key health pathways fall under environmental (air quality and noise), transport and socio-economic headings.

**Table 13.1: Health Pathways**

Feature	Health Pathway	Health Determinant	Potential Implication	Distribution
Construction Phase	Changes to local air quality (potential dust nuisance)	Environment	Adverse	Local
	Changes in noise exposure	Environment	Adverse	Local
	Changes in local transport nature and flow rates	Transport	Adverse	Local
	Increased direct, indirect and induced employment opportunities	Socio-economic	Beneficial	Local/Regional
Operational Phase	Changes to local air quality (emissions to air, including odour)	Environment	Adverse	Local/Regional
	Changes in noise exposure	Environment	Adverse	Local
	Changes in local transport nature and flow rates	Transport	Adverse	Local
	Change in net transport movements due to regional transportation of waste and reduced vehicle trips to landfill	Transport	Beneficial	Regional
	Direct, indirect and induced income employment opportunities	Socio-economic	Beneficial	Local/Regional

13.1.3 The scope of this assessment includes the:

- Potential health outcome from changes in exposure to construction and operational emissions to air;
- Potential health outcome from changes in exposure to construction and operational noise emissions; and
- Potential health outcome from changes in local transport movements and nature during construction and operation.

13.1.4 This chapter draws from Chapter 6: Traffic and Transport, Chapter 7: Air Quality and Odour, and Chapter 8: Noise and Vibration), but does not seek to repeat the findings of these assessments.

13.1.5 Aspects scoped out of this assessment include:

- Socio-economic health benefits from the direct, indirect and induced income and employment opportunities, as significant effects are not considered likely; and
- Potential changes in electro-magnetic field (EMF) exposure during the generation and transmission of electrical energy (as the facility will comply with International Committee on Non-Ionising Radiation Protection (ICNIRP) guidance set to protect health).

## 13.2 Legislation and Policy Context

13.2.1 This section summarises relevant legislation and policies that are directly relevant to population and health issues.

### Legislation

13.2.2 Paragraph 4(2)(a) and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require that the Environmental Impact Assessment (EIA) process assesses the effects (where likely to be significant) on population and human health, among other factors. This reinforces the coverage of health within the regulatory assessment process, and improves transparency by further communicating how and where health is inherently addressed within the EIA process.

### National Policy and Guidance

#### National Planning Policy Framework (2012)

13.2.3 Promoting healthy communities is a core theme and underlying aim of the National Planning Policy Framework (NPPF) (DCLG, 2012), which states that *“the planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities”* (paragraph 69).

#### Non-Statutory Population and Health Guidelines

13.2.4 The Institute of Environmental Management and Assessment (IEMA) is in the process of developing EIA population and health guidelines. Where relevant, knowledge of the likely content of the emerging guidance has been taken into account within this assessment.

### Development Plan Policy

#### West Sussex Waste Local Plan (2014)

13.2.5 Public health protection and promotion is inherently covered throughout the West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014), where policy states that new waste development facilities will be located to avoid, minimise and mitigate against any potentially adverse impacts on community health, and the amenity of residents, businesses and visitors to West Sussex. This objective is concisely driven through Strategic Objective 13, and Policy W19: Public Health and Amenity, which states that:

*“Proposals for waste development will be permitted provided that:*

*(a) lighting, noise, dust, odours and other emissions, including those arising from traffic, are controlled to the extent that there will not be an unacceptable impact on public health and amenity;*

*(b) the routes and amenities of public rights of way are safeguarded, or where temporary or permanent re-routing can be justified, replacement routes of comparable or enhanced amenity value are provided; and*

*(c) where necessary, a site liaison group is established by the operator to address issues arising from the operation of a major waste management site or facility."*

*Horsham District Planning Framework (2015)*

- 13.2.6 The Horsham District Planning Framework (Horsham District Council, 2015) reinforces the coupling of environment and health within the NPPF. The most relevant policy to this assessment is Policy 24: Environmental Protection which states that:

*"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:*

- 1. Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;*
- 2. Are appropriate to their location, taking account of ground conditions and land instability;*
- 3. Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;*
- 4. Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;*
- 5. Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;*
- 6. Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and*
- 7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."*

## 13.3 Assessment Methodology

### Study Area

- 13.3.1 The study area for the assessment differs according to the health pathway considered during the construction and operational phases. The study areas in each case are described in the methodology section that follows, with reference to the relevant ES sections from which they are derived.

### Approach

- 13.3.2 The basis of this assessment is set on a broad socio-economic model of health that encompasses conventional health impacts, such as communicable disease, accidents and risk, along with wider determinants of health vital to achieving good health and wellbeing. These wider determinants of health

include income; employment; housing; education; the quality of the urban environment; crime and the perception of crime.

- 13.3.3 A key aspect of the approach is to draw from and build upon the work undercame to inform other chapters of this ES, and the updated technical disciplines. Such an approach provides continuity, and the development of a proportionate assessment that focuses on key health pathways directly attributable to what is proposed; and does not cover aspects beyond the influence of this project or the decision making process.

#### **Health Assessment Protocols**

- 13.3.4 Given the multidisciplinary nature of health and the varying relative sensitivity of communities, each health assessment is bespoke; tailored to both local circumstance and the individual health pathways that the project has the potential to influence. As previously mentioned, the scope of this study has been set to investigate the potential health outcome of the proposed development from changes in exposure to air quality, noise and from changes in transport flow rate and nature. The individual assessment protocol for each are described below.

#### Air Quality Health Assessment

- 13.3.5 Research into the potential health effects of air pollution is extensive and provides statistically significant associations between many air pollutants (i.e. particulate matter, nitrogen dioxide and sulphur dioxide) and effects on a wide range of cardiovascular and respiratory health outcomes (COMEAP, 2009).
- 13.3.6 The air quality health assessment draws from the dispersion modelling provided in Chapter 7 (Air Quality and Odour) of the ES, and applies local burdens of poor health and relative exposure to construction and operational emissions (particulate matter and nitrogen dioxide) to assess the magnitude, distribution and significance of any potential risk to population health. The assessment does not consider changes in exposure to dioxins, furans, poly aromatic hydrocarbons and heavy metals, as these will be addressed through a specialist assessment (Human Health Risk Assessment (HHRA)) during the permitting stage.

#### Noise Health Assessment

- 13.3.7 Consensus on the level and duration of noise required to instigate potential health impacts is not clearly defined. Therefore, the main emphasis of noise standards, regulations and guidance is placed on annoyance and sleep disturbance, as they are the most immediate consequences of noise effects and applicable to everyone.
- 13.3.8 The noise health assessment draws from the dispersion modelling provided in Chapter 8 (Noise and Vibration) of the ES, to consider potential changes in noise exposure with the potential to result in annoyance, impact upon cognitive function in schools or result in sleep interference impacting upon cardiovascular health.

#### Transport Health Assessment

- 13.3.9 Potential health pathways associated with changes in road traffic movements include increased risk of road traffic accident and injury, community severance and exposure to vehicle exhaust emissions and noise. Potential changes in exposure to air and noise emissions are addressed through the previous health assessment protocols. The transport health assessment therefore draws from the modelling outputs provided in Chapter 6 (Traffic and Transport) of the ES, to appraise the magnitude and significance of health risk from accident and injury and community severance.

## Assessment Criteria

13.3.10 Health assessment criteria are primarily defined according to their nature, be they:

- Beneficial: an impact that is considered to represent an improvement on the health baseline or introduces a positive change.
- Adverse: an impact that is considered to represent an adverse change from the health baseline, or introduces a new undesirable factor.
- Temporary: an impact that is transient in nature.
- Permanent: an impact that constitutes a lasting or long term outcome or influence upon health.
- Direct: impacts that result from a direct interaction between a planned proposed development activity and the host community/receptor (i.e. direct exposure to a hazard/opportunity).
- Indirect: impacts that result from other activities that are encouraged to happen as a consequence of the proposed development (e.g. indirect and diffuse employment).
- Cumulative: aspects that act together including those from concurrent or planned third party activities to affect the same health pathways or communities as the proposed project (i.e. cumulative changes in air quality or noise exposure).

## Sensitivity of Receptor

13.3.11 As detailed in the community profile, the study area is relatively sparsely populated and local communities are not considered particularly sensitive to environmental or socio-economic health pathways. The assessment section, however, applies a conservative approach for the individual residential properties in proximity to the proposed project.

13.3.12 The full community profile is provided in Appendix 13.1.

## Magnitude of Change

13.3.13 Impact magnitude/severity is a function of the extent, duration and intensity of the impact (i.e. how far the impact deviates from established baseline conditions). Given the multidisciplinary nature of health and the strength of evidence for each health pathway, the individual assessment protocols (i.e. for changes in air or noise exposure), have been applied to inform a judgement on the magnitude and distribution of change.

Table 13.2: Definitions of Magnitude

Magnitude	Typical Descriptors
High	Change in environmental and socio-economic circumstance sufficient to quantify a major change in baseline population health (adverse or beneficial)
Medium	Change in environmental and socio-economic circumstance sufficient to quantify a moderate change in baseline population health (adverse or beneficial)
Low	Change in environmental and socio-economic circumstance sufficient to quantify a minor change in baseline population health (adverse or beneficial)
Negligible	Change in environmental and socio-economic circumstance below what is possible to quantify any manifest health outcome at a population level (adverse or beneficial)
No Change	No opportunity for health outcome (adverse or beneficial)

## Significance of Effect

- 13.3.14 The assessment of significance is a function of the magnitude/severity of impact and the sensitivity of the receptor.

Table 13.3: Assessment Matrix

Sensitivity	Magnitude of Health Impact (adverse or beneficial)				
	No Change	Negligible	Low	Medium	High
Negligible	No Effect	No Effect	Negligible or Minor	Negligible or Minor	Minor
Low	No Effect	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No Effect	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No Effect	Minor	Minor or Moderate	Moderate or Major	Major

- 13.3.15 For the purposes of this assessment, effects of moderate significance or greater are considered to be significant in terms of the EIA Regulations.

## 13.4 Limitations of the Assessment

- 13.4.1 The health assessment draws from and builds upon the technical outputs from the air quality, noise and vibration and transport assessment chapters, and as a consequence are bound by the same limitations, assumptions therein applied. The information available provides a suitable basis for a robust assessment of health for EIA purposes.

## 13.5 Baseline Conditions

### Introduction

- 13.5.1 Evidence suggests that different communities have varying susceptibilities to both health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstance. The purpose of the community profile is to establish relative sensitivity of the potential health pathways attributed to what is proposed, forming the basis to the assessment, and providing an insight into how potential health pathways identified may act disproportionately upon certain communities and sensitive groups.
- 13.5.2 This section summarises the findings of the community profile, provided in Appendix 13.1.

### Site Location and Setting

- 13.5.3 As detailed in Chapter 2 of the ES, the site comprises approximately 3.8 hectares of land within the former Warnham and Wealden Brickworks, is classified as a brownfield site in the West Sussex Waste Local Plan, and is allocated for waste management uses.
- 13.5.4 The site is located in a relatively sparsely populated area approximately 900 m to the north-west of the edge of the existing settlement boundary of the town of Horsham and approximately 1.3 km to the north-east of the centre of Warnham. There are no residential receptors or public rights of way located on the site. There are three residential properties along Langhurstwood Road to the immediate south of the access road into the site, the nearest of which is approximately 180 m from the centre of the site. Further south along

Langhurtwood Road there are seven residential properties at Greylands Farm, approximately 325 m to the south-east of the site. There is also a cluster of approximately 20 residential properties located along Station Road and Mercer Road, approximately 300 metres to the south-west of the application site.

### Community Profile Summary

- 13.5.5 Following a review of the available demographic and health statistics, local communities typically have better health than the national trend, with pockets of health deprivation closer to and within urban areas (closely associated with socio-economic deprivation, lifestyle and poor health behaviour).
- 13.5.6 Population growth in Horsham is higher than both the regional and national trend, and when combined with consistently higher life expectancy for males and females, and a lower all-cause mortality rate than the national and regional trend, has contributed towards an elderly age demographic that is higher than the national trend.
- 13.5.7 Respiratory and cardiovascular hospital admission statistics indicate that Horsham remains consistently lower than national rates.
- 13.5.8 Mental health in Horsham is typically good, with lower levels of depression and anxiety, lower rates of long term mental health problems and lower rates of self-harm than both the national and regional trend. Levels of dementia prevalence are consistent with the regional average, albeit higher than the national trend (correlating with the higher life expectancy and higher elderly age demographic in the area). The suicide rate in Horsham remains consistently higher than national and regional trend.
- 13.5.9 In terms of lifestyle, levels of physical activity in Horsham have fluctuated since 2012, but remain consistently higher than both the regional and national trends. Equally childhood obesity and excess weight in adults in Horsham has remained consistently lower than both the national and regional trend, although the gap between the local and regional trend for adult weight is closing. Smoking and alcohol related harm is, again, consistently lower in Horsham than the national and regional trend.
- 13.5.10 Education attainment and employment within Horsham is consistently better than the regional and national average, while unemployment and socio-economic deprivation statistics remain low. Income in Horsham remains lower than both the national and regional trend.
- 13.5.11 On the above basis, the study area is relatively sparsely populated and local communities are not considered particularly sensitive to environmental or socio-economic health pathways.
- 13.5.12 The assessment section will however, apply a conservative approach for the individual residential properties in proximity to the proposed project.

## 13.6 Future Baseline Conditions

- 13.6.1 As it is challenging to predict the health and wellbeing baseline a decade or more in the future with high confidence, trends are analysed as part of the current baseline to provide insight into likely future local community circumstance.
- 13.6.2 Well-established trends, which are considered as part of this assessment, include an increasing elderly population, and improving socio-economic circumstance. It should be noted that factors such as climate change are not likely to materially influence future health and wellbeing baseline conditions.

## 13.7 Incorporated Enhancement and Mitigation

### Construction Phase

- 13.7.1 With respect to construction-related health impacts, incorporated mitigation is primarily addressed through the construction methods proposed, such that known hazards are managed to avoid or minimise risk to both occupational and public health during construction. Where potential hazards cannot be fully removed through design, further mitigation is established within each of the EIA technical disciplines (air quality, noise and vibration, transport, hydrology and hydrogeology etc.) to manage the potential hazard so that it does not constitute a significant risk. A Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) are proposed as part of the proposed development, together with effective dust control measures.

### Operational Phase

- 13.7.2 Incorporated operational health mitigation focusses on removing or managing known hazards through the planning process, such that they are either designed out or mitigated to the point that they do not present a significant risk to occupational or public health. The extent of incorporated health mitigation is significant, but often poorly communicated primarily due to the fact that planning focusses on precursors to any health impact (e.g. air quality and noise objective thresholds set to be protective of the environment and health). In doing so, the planning process takes a preventative approach to adverse health impacts, but also enables monitoring of environmental pathways relevant to health to be put in place where appropriate. This can facilitate intervention in the causal pathways for potential health impacts before any manifest adverse health outcome occurs (while also avoiding issues epidemiological confounding that arise from health indicator monitoring). The approach is therefore inherently proactive and protective of health.
- 13.7.3 The proposed development includes a stack designed on the basis of a stack height assessment to ensure effective dispersion of pollutants. Given that operational traffic numbers are not predicted to exceed the existing consent, no operational traffic measures are considered to be required.

## 13.8 Assessment of Construction Effects

- 13.8.1 The following assessment investigates each of the previously identified potential health pathways associated with the construction of the proposed development, including:
- The potential health risk from changes in emissions to air;
  - The potential for community disruption from noise and vibration; and
  - The potential health risk from additional road movements (risk of accidents and injury).

### Health Effect from Changes in Air Quality

- 13.8.2 During the construction phase, activities with the potential to impact upon local air quality include ground clearance and excavation, vehicle and fixed plant emissions; deliveries of construction materials and earthwork activities.
- 13.8.3 Construction related emissions from the construction phase would not materially differ to the sites current use, nor would they be of a type, concentration, duration or present a level of community exposure sufficient to result in any measurable adverse health outcome. As detailed in Chapter 7 (Air Quality and Odour), prior to mitigation, the main effect with the potential to impact neighbouring residential properties could include annoyance from dust deposition (soiling of surfaces, particularly windows, cars and laundry). However, the mitigation measures detailed in the air quality assessment and implemented through the CEMP would be



sufficient to control potential dust nuisance and manage any respiratory risk to staff or neighbouring communities.

- 13.8.4 Given construction activities would not be of an extent, duration or magnitude to quantify any measurable impact on health, and sub clinical effects (annoyance) would be controlled through the CEMP, it is concluded that there would be no significant effect on health from changes in construction emissions to air. The magnitude of the predicted impact would be low, resulting in a minor adverse significance of effect.

#### **Health Effect from Changes in Noise Exposure**

- 13.8.5 As detailed in Chapter 2 of this ES, construction would take place on Monday to Friday between the hours of 07.30 and 19.00, and on Saturday between the hours of 08.00 and 16.00. As a result, there is no risk of sleep disturbance to sensitive receptors within the study area.
- 13.8.6 Any noise generation would be controlled through applying good construction practices as detailed in the CEMP, would be temporary and not of an extent, duration or magnitude to quantify any measurable impact on health. As a result, it is predicted that the magnitude of impact would be low, resulting in minor adverse significance of effect.

#### **Health Effect from Changes in Road Movements**

- 13.8.7 Potential health pathways associated with changes in road traffic movements include increased risk of road traffic accident and injury, community severance and exposure to vehicle exhaust emissions and noise.
- 13.8.8 As detailed in Chapter 6 (Traffic and Transport), construction traffic movements would include cars and Light Goods Vehicles (LGVs) for construction workers as well as Heavy Goods Vehicles (HGVs) to deliver construction materials and plant to the site. The transport chapter has investigated the potential impact of these movements upon local capacity and any subsequent risk of community severance, visual impacts, pedestrian delay, pedestrian amenity and safety. The assessment concludes that for these health pathways, the relative change in vehicle movements would not be of a magnitude, timing or duration sufficient to establish a significant effect, and any residual temporary disruption is to be managed through a dedicated CTMP.
- 13.8.9 Given the potential health impact from changes in construction traffic are temporary and are addressed through design and a dedicated CTMP, it is concluded that there would be no significant construction traffic impacts to health. The magnitude of the predicted impact would be low, resulting in a minor adverse significance of effect.

#### **Further Mitigation**

- 13.8.10 Mitigation is proposed in the form of the CEMP/CTMP addressing transport risks, air quality and noise precursors to any potential adverse health outcome. In doing so, there is limited opportunity for community hazard exposure sufficient to quantify any measurable adverse health outcome.
- 13.8.11 Further health mitigation would therefore be limited to ongoing engagement with local communities to raise awareness of any particularly disruptive construction activities, to monitor and feedback the effectiveness of mitigation, and respond to community concerns.

### Future Monitoring

- 13.8.12 As detailed in Chapter 7 (Air Quality and Odour), construction air quality monitoring would be agreed with the local planning authority prior to the commencement of construction works. This would focus on appropriate environmental precursors of health impacts, thereby enabling a monitoring regime that enables intervention before any manifest adverse health outcome occurs.

### Accidents and/or Disasters

- 13.8.13 Given the location of the site, and the absence of residential properties with no public right of way across the site, there is limited opportunity for public exposure to construction activities that might present a risk of accident and injury. Activities beyond the site perimeter with the potential for accident and injury would be limited to vehicle movements, and would be managed through the CTMP.

## 13.9 Assessment of Operational Effects

- 13.9.1 The following assessment investigates each of the previously identified potential health pathways associated with the operation of the proposed development, including:
- The potential health risk from changes in emissions to air;
  - The potential for community disruption from noise and vibration; and
  - The potential health risk from additional road movements (risk of accidents and injury).

### Health Effect from Changes in Air Quality

- 13.9.2 Once operational, the primary source for any change in local air quality would be from the stack of the facility. As detailed in Chapter 7 (Air Quality and Odour), the maximum predicted ground-level concentrations have been modelled applying a range of recent meteorological data in the area, and assuming the facility is operating at the long-term emission limit permitted under the Industrial Emissions Directive. Actual emissions from the facility are likely to be considerably lower than the emission limits applied. The modelling results are therefore conservative and likely to over-estimate the actual contributions that would arise from the proposed development.
- 13.9.3 As shown in Table 7.19, when applying the long-term emission limit, the predicted environmental concentrations all remain well within the air quality environmental objective thresholds set to be protective of the environment and health, and are not considered significant within the air quality assessment.
- 13.9.4 While sufficient to demonstrate compliance, the air quality assessment is complex, and may not fully address community health concerns. The following section draws from and builds upon the air quality assessment to further set potential risk into context for changes in exposure to particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and NO<sub>2</sub>.
- 13.9.5 The Committee on the Medical Effects of Air Pollutants (COMEAP) provides a catalogue of exposure response risk ratios for changes in exposure to a range of pollutants, including PM<sub>10</sub>, PM<sub>2.5</sub>, and NO<sub>2</sub>. The relative change in health risk is a function of changes in concentration and population exposure, and existing burdens of poor health.
- 13.9.6 As shown in Table 7.19, the maximum annual mean process contribution of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) at any receptor, is 0.04 µg.m<sup>3</sup>. Even when disregarding the low burdens of poor health locally, and when assuming that the facility is operating at the maximum long-term emission limit permitted under the Industrial Emissions Directive; the change in concentration and exposure are orders of magnitude lower than are required to quantify any manifest adverse health outcome locally.

- 13.9.7 Such a result is to be expected for a facility that is designed to control hazardous emissions to air, and has demonstrated that it would remain within air quality objective thresholds set to be protective of the environment and health.
- 13.9.8 Given operational emissions are not of a concentration or exposure to quantify any measurable impact to health, and remain within air quality objectives set to be protective of health, it is considered that the impact on health from changes in operational emissions would be low, leading to a minor adverse effect.

#### **Health Effect from Changes in Noise Exposure**

- 13.9.9 As detailed in Chapter 2 of this ES, the proposed development would operate 24 hours per day, 7 days a week except during shutdowns for maintenance activities. Waste would normally be received between 07.00 to 18:00 on Mondays to Saturdays. As detailed in Chapter 8 (Noise and Vibration), the maximum predicted increase in ambient sound level from on-site activities is +1 dB, experienced at 11 Station Road during the hours of 23:00 and 07:00.
- 13.9.10 As the total volume of waste imported to the site would be the same as is currently permitted for the existing Waste Transfer Station/Materials Recycling Facility, the proposed development would not materially impact upon noise generated from traffic flows. As detailed in Chapter 8 (Noise and Vibration), the maximum predicted increase in ambient sound level from road traffic would be +1.6 dB, experienced at Link 2: Langhurstwood Rd between Site Access and Mercer Rd.
- 13.9.11 As a result, noise generated from the facility and associated traffic movements will not be of an extent, duration or magnitude to quantify any measurable impact on health. As a result, it is predicted that the magnitude of impact would be low, resulting in minor adverse significance of effect.

#### **Health Effect from Changes in Road Movements**

- 13.9.12 Once operational, the total volume of waste imported to the site would be the same as is currently permitted for the existing Waste Transfer Station/Materials Recycling Facility. On this basis the proposed development would not materially impact upon current traffic flows or associated health pathways.
- 13.9.13 The potential operational transport related health impact is therefore considered to be negligible, resulting in a minor adverse effect.

#### **Further Mitigation**

- 13.9.14 Prior to mitigation, potential changes in air quality, noise and transport would not be of a magnitude or exposure to quantify any measurable impact to local community health.
- 13.9.15 Further health mitigation would therefore be limited to ongoing engagement with local communities to feedback the effectiveness of mitigation, and respond to community concerns.

#### **Future Monitoring**

- 13.9.16 Where appropriate, monitoring would focus on environmental precursors of health impacts, thereby enabling a monitoring regime that allows intervention before any manifest adverse health outcome occurs.

#### **Accidents and/or Disasters**

- 13.9.17 Potential abnormal operation could include incidents such as technically unavoidable stoppages, disturbances or failures of the pollution control equipment or monitoring equipment. The impact on air quality from periods of abnormal operations, will be assessed when applying for the Environmental Permit to meet the requirements of the Industrial Emissions Directive. In addition, continuous air quality monitoring would be in place, as required by the Environmental Permit which would notify the operator and the Environment

Agency of exceedances of air pollutant emission limits. Due to these controls, abnormal operation would not lead to greater levels of air pollutants and, therefore, any potential public health effects are considered adequately managed.

- 13.9.18 In addition, the facility would be required to have in place an Accident Management Plan and would be designed and managed to minimise fire risk according to a Fire Prevention Plan (which sets out materials storage and emergency response procedures to ensure that any fire can be contained) approved by the Environment Agency prior to operation.

#### **Potential Changes to the Assessment as a Result of Climate Change**

- 13.9.19 Changes in environmental and social parameters as a consequence of climate change with the potential to modify the assumptions and or findings of the health assessment fall into the following three categories:
- Modification of hazard: i.e. a change in environmental condition modifying the hazardous nature of operational emissions and/or hazardous activities;
  - Modification of exposure: i.e. a change in meteorological conditions modifying dispersion and exposure to emissions and/or hazardous activities; and
  - Modification of sensitivity: i.e. a change in local burdens of poor health, seasonal stress (excess winter and summer mortality) and/or sensitivity to exposure pathways.
- 13.9.20 Changes in environmental and social setting and receptor sensitivity as a consequence of climate change sufficient to alter the findings of the health assessment are not anticipated to be realised within the lifespan of the proposed development.

### **13.10 Assessment of Decommissioning Effects**

- 13.10.1 The potential health pathways associated with decommissioning phase would be comparable to the construction phase, and would similarly be managed through the regulatory planning process set to be protective of the environment and health.
- 13.10.2 Given decommissioning activities are unlikely to be of an extent, duration or magnitude to quantify any measurable impact on health, and sub clinical effects (annoyance) would be further addressed through a bespoke management plan tailored to local environmental and social circumstance, it is concluded that there is not likely to be any significant effect on health from decommissioning emissions and activities.

#### **Further Mitigation**

- 13.10.3 Subject to consent, and come the end of the operational life span of the proposed development, an appropriate management plan would be developed accounting for the appropriate standards at that time, and in compliance with environmental and health legislation and planning requirement.

#### **Future Monitoring**

- 13.10.4 Where necessary, monitoring would focus on environmental precursors to health impact, thereby enabling a monitoring regime that enables intervention before any manifest health outcome.

#### **Accidents and/or Disasters**

- 13.10.5 Given the location of site, and absence of residential properties with no public right of way across the site, there is limited opportunity for public exposure to decommissioning activities that might present a risk of accident and injury. Activities beyond the site perimeter with the potential for accident and injury are limited to vehicle movements, and would be managed through legislation and the management plan.

## Potential Changes to the Assessment as a Result of Climate Change

- 13.10.6 Changes in environmental and social setting and receptor sensitivity as a consequence of climate change sufficient to alter the findings of the health assessment are not anticipated to be realised within the lifespan of the proposed facility.

## 13.11 Inter-relationships

- 13.11.1 There is a significant level of overlap between public health and a range of EIA technical disciplines. This is in part due to the development of EIA, where the founding principle and overarching aim of the process is to protect the environment in order to facilitate public health and wellbeing. In this instance, and as detailed in Section 3.1.5, the population and health section draws from and supplements the wider ES technical disciplines (most notably Chapter 6: Traffic and Transport, Chapter 7: Air Quality and Odour, and Chapter 8: Noise and Vibration), but does not seek to repeat them.

## 13.12 Assessment of Cumulative Effects

- 13.12.1 Due to the inter-relationship between health and the wider technical disciplines, potential cumulative effects from third party developments are already considered within the technical disciplines on which the health assessment is derived.
- 13.12.2 No further cumulative effects on health are considered likely.

## 13.13 Summary of Effects

- 13.13.1 Table 13.4 summarises the significance of effects for the construction, operational and decommissioning phases of the project, taking into account the mitigation measures incorporated into the development proposals.

Table 13.4: Summary of Likely Effects on Health

Health Pathway	Sensitivity of receptor	Health impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
<b>Construction Phase</b>									
Changes in air quality	High	Localised change in emissions to air, with minimal risk of community exposure	Temporary	Low	Minor	CEMP	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in noise from construction activities with minimal change in community exposure	Temporary	Low	Minor	CEMP and TMP	Negligible	Minor	Not Significant
Change in transport movements		Change in transport vehicle movements on local road networks	Temporary	Low	Minor	TMP	Negligible	Minor	Not Significant
<b>Operational Phase</b>									
Changes in Air quality	High	Localised change in emissions to air	Permanent	Low	Minor	Addressed through design	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in operational noise	Permanent	Low	Minor	TMP	Negligible	Minor	Not Significant
Change in transport movements		No material change in net transport movements from consented waste transfer station	Permanent	Negligible	Minor	TMP	Negligible	Minor	Not Significant

Health Pathway	Sensitivity of receptor	Health impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
<b>Decommissioning Phase</b>									
Changes in Air quality	High	Localised change in emissions to air, with minimal risk of community exposure	Temporary	Low	Minor	CEMP	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in noise from decommissioning activities	Temporary	Low	Minor	CEMP and TMP	Negligible	Minor	Not Significant
Change in transport movements		Change in transport vehicle movements on local road networks	Temporary	Low	Minor	TMP	Negligible	Minor	Not Significant

## 13.14 Conclusions

- 13.14.1 Construction activities would not be of a magnitude, duration or timing to constitute a significant risk to public health. When further considering the absence of residential receptors on site, and no public rights of way through the site, there is limited opportunity for community exposure to such hazards, and no significant risk to health. Potential transport hazards that extend beyond the site boundary would not be of a magnitude, duration or timing to materially impact on health. Following the implementation of the CEMP and CTMP, the potential risk to public health from construction activities would not be of a level to quantify any change in local health, and are not considered significant.
- 13.14.2 Once operational, there would be no material change in HGV movements from the existing Waste Transfer Station/Materials Recycling Facility, and no material change in road safety or community severance.
- 13.14.3 Given the proposed site, design and proposed mitigation, construction and operational noise and vibration is not of a level to result in significant annoyance, result in sleep disturbance or result in any measurable adverse health outcome.
- 13.14.4 The primary health pathway is therefore the potential change in local air quality emissions. However, the potential health consequence for changes in exposure to emissions to air are well known, understood and inherently addressed through design, such that the proposed development would not present a significant source of PM<sub>10</sub>, PM<sub>2.5</sub> or NO<sub>2</sub> exposure. Following a review of the available scientific evidence base and based on an exposure response assessment of worst case hypothetical scenarios, it is concluded that changes in concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>2</sub> would not be significant. Total concentrations would remain well within air quality objective thresholds set to protect the environment and health, and would not be of a magnitude sufficient to quantify any measurable adverse health outcome during construction and operation of the proposed project (including transport emissions). Such a conclusion is consistent with the current scientific evidence base and the position of Public Health England.
- 13.14.5 Overall the potential effects of the facility on public health are not considered to be significant.



## 13.15 References

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