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Technical Appendix D2 – Climate Change Assessment Detailed Methodology

ENGINEERING CONSULTING

Document approval

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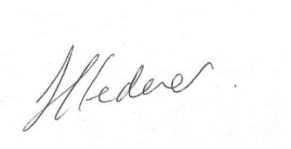
Prepared by:	Hannah Lederer		Environmental Scientist	30/03/2021
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Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	25/03/2021	For Client	HKL	RSF
1	30/03/2021	Final	HKL	RSF

Contents

1 Introduction

This appendix has been written is in support of Chapter 7 – Climate Change of the ES to support the planning application for an Energy Recovery Facility (ERF) and Waste Sorting and Transfer Facility (WSTF) (the proposed development) to be located at the Ford Circular Technology Park.

This appendix provides detail of the climate change assessment methodology, in accordance with Environmental Impact Assessment (EIA) Regulations and the Institute of Environmental Management and Assessment (IEMA) Guidance *"Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation*", 2020 (referred to as the IEMA 2020 guidance).

2 Methodology

2.1 Baseline

The baseline climate data has been sourced from the nearest meteorological site to the proposed development, using Met Office climate averages from the period 1981-2010, which are published on the Met Office website.

The future baseline has been defined using UK Climate Projections 2018 (UKCP18) to determine the changes in climate which the proposed development will be at risk to. UKCP18 are a set of climate projections and tools to access climate data. The data used within this assessment has been extracted from the UKCP18 key results spreadsheet for the scenarios as detailed in Table 1.

Table 1: Future climate change data scenario summary

Projection	Emissions scenario	Percentile	Area	Baseline time period	Time horizon
UKCP18	RCP8.5	50%, 10 and 90% (where appropriate)	South East England	1981-2000	2040-2059

The identified changes have then been incorporated to the current baseline from Shoreham Airport to give a local prediction of future climatic conditions.

2.2 Sensitive receptors

Receptors associated with the proposed development which are vulnerable to climate change have been identified. For each receptor, the impact of each predicted climatic effect has been assessed. This has incorporated the mitigation contained in the design.

The sensitivity of a receptor is the degree of response of a receiver to a change and its capacity to accommodate and recover from a change if it were to be affected. The susceptibility and vulnerability to climate change are considered when determining the resulting sensitivity of a receptor to the impacts of climate change. As stated in the IEMA (2020) guidance, susceptibility is "*the ability of the receptor to be affected by a change*, vulnerability is *the potential exposure of the receptor to a change* and sensitivity is *the degree of response of a receiver to change and a function of its capacity to accommodate and recover from a change if it is affected*." The susceptibilities and vulnerabilities have been selected for each impact of climate change for each receptor using the 'susceptibility of receptor' and 'vulnerability of receptor' thresholds as set out in the IEMA (2020) guidance. In summary:

Table 2: Susceptibility and vulnerability scale

Scale	Susceptibility	Vulnerability
High	receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevailing climatic factors (e.g. lose much of its original function and form).	receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions

Scale	Susceptibility	Vulnerability
Moderate	receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions (e.g. retain elements of its original function and form).	receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK but is not found in southern Spain).
Low	receptor has the ability to withstand/not be altered much by the projected changes to the existing/prevailing climatic factors (e.g. retain much of its original function and form).	climatic factors have little influence on the receptors (consider whether it is justifiable to assess such receptors further within the context of EIA – i.e. it is likely that such issues should have been excluded through the EIA scoping process).

In addition to the susceptibility and vulnerability, the value / importance of the receptor has been used to reach a reasoned conclusion on sensitivity using professional judgement. The greater the susceptibility, and/or vulnerability of the receptor, the greater the likelihood that receptor would also be of higher sensitivity. For instance, a high-value receptor that has very little resilience to change in climatic conditions is considered to be more likely to have a higher sensitivity than a high-value receptor that is very resilient to changes in climatic conditions.

The susceptibility, vulnerability, and value of receptor have been considered to determine a sensitivity descriptor of low, medium and high for each receptor. These descriptors have been determined based on professional judgement and are in line with the following examples:

1. The sensitivity of a receptor to the impacts of fluvial flooding could be described as ‘low’ under the following scenario;

- The value of the receptor is low - such an unused low grade farmers field,
- The vulnerability is low – as it does not lie within the flood plain so is unlikely to be impacted by fluvial flooding associated with increased rainfall as a result of climate change, and
- The susceptibility is low - as the receptor would have the ability to return to its previous use as the event would only cause temporary loss of use of the field, and damages would be limited.

2. The sensitivity of a receptor to the impacts of fluvial flooding could be described as ‘high’ under the following scenario;

- The value of the receptor is high - such a residential property,
- The vulnerability is high – as it lies within the flood plain and is likely to be impacted by fluvial flooding associated with increased rainfall as a result of climate change; and
- The susceptibility is high - as there are no flood defences or on site mitigation measures and therefore no ability to withstand fluvial flooding.

3. The sensitivity of a receptor to the impacts of fluvial flooding could be described as ‘medium’ under the following scenario;

- The value of the receptor is high - such a residential property,
- The vulnerability is high – as it lies within the flood plain and is likely to be impacted by fluvial flooding associated with increased rainfall as a result of climate change, and

- The susceptibility is low - as there are effective mitigation measures in place such as flood defences which would allow the property to withstand the projected increases in rainfall and associated fluvial flooding events.

For each receptor and each identified change in climate, the magnitude of effect has been identified. As stated in the IEMA (2020) guidance, magnitude is the degree of a change from the relevant baseline conditions which derives from the construction and operation of a development. This is based on a combination of probability, which would take into account the chance of the effect occurring over the lifespan of the development, and consequence, which would reflect the scale or complexity of the effect, considering degree of harm, duration, frequency and reversibility of effect. A combination of probability and consequence has been used to reach a reasoned conclusion on the magnitude of effect using professional judgement. Where a probability and /or consequence of the effect is high then the magnitude of effect would also be high. Descriptors of negligible, small, medium and large have been used to define the magnitude of impact in line with the following examples in relation to fluvial flooding;

4. A **negligible** magnitude of change may be used to describe a scenario where there is a low probability of a fluvial flooding occurring, if the receptor is not within or close to a flood zone, and the consequence of flooding would be low, for example the damage caused by fluvial flooding of a low grade farm field is minimal and reversible.
5. A **small** magnitude of change may be used to describe a scenario where there is a low probability of a fluvial flood occurring, i.e. the receptor is not within a flood zone, but there is a higher consequence of risk, for example a residential property may undergo a small amount of damage. A small magnitude of change could also be used to describe a scenario where there is a high probability of fluvial flooding, but the consequence is low, for example the damage caused by flooding of a low grade farm field is minimal and reversible.
6. A **medium** magnitude of change may be used to describe a scenario where there is some probability of a fluvial flood event occurring, if the receptor is within a flood zone, and there is some consequence to a flood, for example a residential property may undergo some amount of damage.
7. A **large** magnitude of change may be used to describe a scenario where there is a high probability of a fluvial flood event occurring, if the receptor is within a flood zone particularly close to a river, and there is a likely consequence to a flood, for example a residential property may undergo significant damage.

2.3 Assessment of significance

The basis for assigning the significance is in line with IEMA (2020) methodology and uses professional judgement. The significance of effect has been determined, taking into account the sensitivity for each receptor and the magnitude for each climate change effect. The following matrix provides an example of how the sensitivity of receptor and magnitude of change can be used to determine the effect and it's significance.

Table 3: Significance matrix

	Magnitude of change descriptor			
Sensitivity descriptor	Negligible	Small	Medium	Large
Low	Negligible	Negligible	Negligible	Slight
Medium	Slight	Slight	Moderate	Substantial
High	Moderate	Moderate	Substantial	Substantial

Where the overall effect is greater than slight adverse the effect is likely to be considered significant.

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