Chapter Nineteen ◆ Waste and Materials

INTRODUCTION

19.1 This chapter presents the assessment of environmental effects of the Proposed Development with respect to solid waste and materials management and provides the following:

- the methods used to assess the effects, which follow the *2020 Institute of Environmental Management and Assessment (IEMA) guide to materials and waste in EIAs*, using landfill capacity receptors;
- a review of relevant waste and materials policies and guidance that has informed the assessment;
- a review and summary of existing baseline conditions;
- an assessment of impacts and effects for solid waste and materials associated with the Proposed Development; and
- the mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been adopted.

19.2 The chapter focuses on solid operational waste as well as excavation, demolition and construction waste from the Proposed Development. An Outline Operational Waste Management Strategy (OOWMS) and Outline Construction Waste Management Plan (OCWMP) have been produced as part of the assessment and are included in Appendix 19.1 and 19.2 respectively.

METHODOLOGY AND DATA SOURCES

EIA scoping

19.3 An EIA scoping report was submitted to the Planning Inspectorate on 15 June 2020. This set out the proposed approach to assessing solid waste and materials management effects in relation to the Proposed Development.

19.4 The EIA Scoping Opinion was received in July 2020 from the Planning Inspectorate, and further comments were received in August 2020 from other consultees. All comments received from the Planning Inspectorate have been given thorough consideration and have been addressed in the assessment within this ES chapter.

19.5 The 2020 Scoping Opinion comments and responses are summarised in Table 19.1.

Table 19.1: 2020 scoping opinion comments and responses

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
Inspectorate's comments (July 2020)		
18.33	*'The applicant is proposing to scope out materials consumed during operational stages…'* *'…the Proposed Development has the potential to use a large quantity of natural resources. Large amounts of natural material may be needed for landscaping and planting… (consumption of) large quantities of fresh water…could result in significant effects. The Inspectorate does not agree to scope these matters our from the assessment'*	Currently the landscape design has been developed to a vision and strategy level which does not include a detailed breakdown of different landscape areas. Assessment of operational use of natural material for landscaping etc. will be carried out as part of the landscaping strategy at the detailed design stage. It is noted that materials to be included in the waste and materials assessment, according to the IEMA (2020) guidance, are typically the main physical resources that are used across the lifecycle of the development. Examples include construction materials such as concrete, aggregate, asphalt and bricks. The effects of operational water use have been assessed in the Water Resources and Flood Risk Chapter 17 (document reference 6.1.17).
18.5	*'The Scoping Report lists a series of policies and guidance, but the Inspectorate suggests that also relevant to the ES are …'*	These directives and regulations have been included in this ES chapter in the policy section.
Table 18.9	(Regarding 2015 consultations) *'It is unclear if this consultation has yet taken place. The Inspectorate recommends that… detailed consultations should take place at the earliest opportunity'*	The consultation by LRCH took place in 2015 and a summary of the comments and responses are detailed in Table 18.2 of the 2020 Scoping Report (Document reference 6.2.1.1). Consultations with local authorities have taken place in 2020 as part of the ES assessment and a summary provided in this ES chapter in the

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
		consultation section.
18.11-18.16	*'…The applicant should make effort to agree the baseline information for the assessment with relevant consultation bodies'*	Consultations with local authorities have taken place in 2020 as part of the ES assessment and a summary is provided in this chapter in the consultation section. Consultees that responded to the waste PEIR chapter include Kent County Council, Dartford Borough Council, Gravesham Borough Council, CEMEX and Ebbsfleet District Council. A full list of Section 42 consultation questions and responses are included in Appendix 19.3 (document reference 6.2.19.3).
18.22	*'…The methodology, waste flow data, and site information should be confirmed and verified with the relevant waste planning authorities in the areas of assessment'*	As above.
18.25-18.26, Tables 18.3, 18.4	*'…wherever possible the ES will follow the same basic definitions and matrix system based on those of the IEMA (guidance)'*	This is noted and the IEMA guidance has been used throughout the ES assessment. The IEMA (2020) methodology approach is detailed in the Assessment Approach section of this chapter.
18.30	*'The inspectorate considers that anticipated vehicle movements required to deliver materials to the Kent and Essex Project sites should also be included within the ES'*	Vehicle movements for materials, and transport effects, have been assessed within the Land Transport Chapter (9). Transport effects from the transport of materials and waste by river have been assessed in the River Transport Chapter (document reference 6.1.10).
18.31	*'…The ES should include the locations of potential landfills/waste receiving sites and depict them on a figure(s)…vehicle movements required to deliver the waste to the sites should be included'* *'…The available capacity of these sites should be assessed against the anticipated volume of waste generated'*	Vehicle movements for waste and materials, and transport effects, have been assessed within the Land Transport Chapter (document reference 6.1.9). Transport effects from transport of materials and waste by river have been assessed in the River Transport Chapter (document reference 6.1.10). The effects on operational noise levels from service vehicles have been assessed in the Noise and vibration Chapter (document reference 6.1.15) based on

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
		the traffic assessment. This Waste and Materials Chapter provides an assessment of the landfill capacities and identifies potential waste receiving sites in the baseline and assessment sections of this chapter in accordance with the IEMA (2020) guidance.
N/A	*'The ES should assess impacts associated with the storage, removal and disposal, including the disposal sites, of contaminated waste derived from the existing landfill within the Proposed Development, or generated by construction and/or operational activities where significant effects are likely to occur'*	The Soils, Hydrogeology and Ground Conditions Chapter 18 (document reference 6.1.18) assesses the contaminated waste derived from the existing landfill areas and estimated volumes of these materials. A breakdown of excavation waste has been outlined in this chapter. Any waste not suitable for reuse on-site will be sent off-site for treatment. ES Chapter 18 lists a number of available landfills/treatment sites within a transportable distance for this waste. Consultations with local authorities have taken place in 2020 as part of the ES assessment and a summary provided in the ES consultation section and Appendix 19.3 (document reference 6.2.19.3).
Waste 18.10-18.12/ Ebbsfleet Development Corporation	Further, no mention of any specific baseline data sources are provided such as the Defra waste statistics (ENV23 - UK statistics on waste; ENV18 - Local authority collected waste: annual results; UK Annual Statistics on Waste) or the Environment Agency Landfill Capacity Tool. The EIA should include baseline data in line with Sections 9.8 and 9.9 of the IEMA guide to: Materials and Waste in Environmental Impact Assessment.	The sources have been incorporated in the baseline and future baseline sections of this chapter where appropriate.
Waste18.10 -18.12/	There is no mention of the future	Current and future baselines have

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
Ebbsfleet Development Corporation	baseline and how it will be projected. This is a key omission as the assessment of the effects of material consumption and waste arisings should be measured against the future baseline. The assessment should present the baseline data from the existing (pre-development scenario) and for the agreed future scenario (the 'do minimum' or 'do nothing scenario').	been used for this assessment including the Waste Data Interrogator/EA (2018) landfill information.
Waste 18.13Ebbsfleet Development Corporation	Baseline data should be obtained from reliable data sources. Bullet 1 refers to predicted waste generation rates; it is assumed that these will be utilised to estimate the waste arisings from the Proposed Development but not to create the baseline. The EIA should use reliable and detailed sources of baseline data in line with section 9.9 of the IEMA guide to: Materials and Waste in Environmental Impact Assessment.	Reliable data sources such as DEFRA, EA, local policy documents and minerals production associations have been used in the assessment, in line with section 9.9 of the IEMA (2020) guidance.
Waste 18.13Ebbsfleet Development Corporation	In all environmental assessments, the impacts and effects of inert, non-hazardous and hazardous wastes should be evaluated separately. Landfill capacity/void should be mentioned as a primary effect for waste	The impacts and associated effects from inert, non-hazardous and hazardous waste on landfill capacities has been assessed in the Assessment of Likely Significant Effects Section of this chapter.
Waste 18.18-18.19/ Ebbsfleet Development Corporation	The temporal scope of the assessment has not been defined. In particular, how the assessment will take into account both operational and construction waste arisings during partial occupation. This should be made clear in the ES.	The effects of waste arisings at different phasing stages have been assessed in the Assessment of Likely Significant Effects Section of this chapter.
Waste 18.19/ Ebbsfleet Development Corporation	This is the first time that a Waste Management Strategy is mentioned. Please clarify if a Waste Management Strategy will be produced as part of the Environmental Statement? Paragraph 18 .18 states that operational waste will be estimated using benchmarks from BS 5906:2005 but this paragraph states that	An Outline Operational Waste Management Strategy (OOWMS) has been produced and is included as an appendix to this chapter (appendix 19.1, document reference 6.2.19.1).

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
	operational waste generation estimates will be extracted from the Waste Management Strategy.	
Permit/ Environment Agency	Waste management facilities are likely to require an Environmental Permit. We would recommend the applicant to liaise with us prior to finalising any plans.	Where waste management facilities require an Environmental Permit, the applicant and appointed contractor will be responsible for applying for the correct permits once permission is granted for the DCO and will liaise with the EA before plans are finalised.
Dredging Arisings/ PLA	In the waste chapter of the Scoping Report there is no mention of dredging arisings.	Dredging arisings have been estimated and outlined in the ES Chapter 17: *Water Resources and Flood Risk*, (document reference 6.1.17) including how this waste will likely be handled.
Waste disposal/ Thurrock Council	It is noted in the EIA Scoping Report for the London Resort that construction waste from the Kent Project Site is to be sent by boat to the Port of Tilbury in Thurrock. References include paragraph 4.53 of Chapter 4. Clarification is sought as to where the construction waste sent to Port of Tilbury would be disposed of and there should not be a presumption that such waste is disposed in Thurrock. The EIA Scoping Report also makes reference to remediation of soils and improved treatment or removal at both the Essex and Kent Project Sites. Further clarification is sought regarding the quantities of any waste soil removed that may be from site and where it is intended to treat and dispose of such waste soil. The EIA Scoping Report details locations in the Kent Project site that include existing waste landfill sites that contain domestic and industrial waste. It is unclear how these sites are to be managed and whether any waste is intended to remove from these sites during construction or	A presumption that waste will be disposed of in Thurrock has not be made within the assessment. Construction waste could be transported off site by boat, but treatment will not necessarily be in Thurrock. As part of the assessment the sensitivity of available capacities for treatment and disposal of waste has been assessed. The regional focus of the assessment is Kent and Essex. Any soil that is geotechnically and geochemically suitable will be reused on-site. Further details of this have been included in the ES Chapter 18: Soils, Hydrogeology and Ground Conditions (document reference 6.1.18). Soil and other material from excavation that is not suitable for re-use on-site will be sent for disposal off-site. The ES Chapter 18 lists a number of available landfills/treatment sites within a transportable distance for this waste.

Scoping opinion reference/ Consultee	2020 Scoping opinion comment	2020 Response
	operation.	
Methodology and Baseline/ Thurrock Council	"Thurrock Council acknowledges the approach being undertaken to assess waste materials and impact in the EIA and notes existing uncertainties to waste information and data as set out in paragraphs 18.30 to 18.32. However, it is considered that an assessment of the impact of waste arisings from the project site on existing waste site capacity would not be sufficient and requires an assessment of total waste flows over time through sites to take account of arisings and imports and exports into the assessment area and facilities. By considering recent average flows from EA Waste Interrogator data over time will help determine the availability of capacity during the construction and operational stages of the development. The assessment of the impact of waste flows should include: …."	The EA Waste Data Interrogator (2018) and future waste projections from local plans/assessments have been used for the assessment in baseline sections, as well as assessment calculations to determine sensitivity, magnitude and effect significance.

Consultation

19.6 Several consultation meetings have been carried out with representatives of local authorities to present the emerging assessment for waste and materials. On the 8th October 2020, a stakeholder meeting took place with representatives of Dartford Borough Council (DBC), Gravesham Borough Council (GBC) and Ebbsfleet Development Corporation (EDC). On the 22nd October 2020, a meeting took place with a representative for Kent County Council (KCC). The benchmarks and data sources were discussed along with waste estimations and assessment outcomes. There was a positive response from attendees, with no outstanding questions or requests. The baseline information that was presented at both meetings was confirmed as sufficient, with some further sources suggested for consideration such as BPP reports. Baseline data was updated where appropriate. Comments were made regarding how to optimise waste reduction and improve segregation, and recommendations were made on data sources which have been noted in this ES chapter.

19.7 As part of the development of the operational waste management strategy, three private waste companies active in the region were consulted. Consultation meetings were conducted with Cory Riverside Energy (1st July 2020), Veolia (2nd July 2020) and SUEZ (22nd July 2020). The companies confirmed an interest to accept operational waste streams from the Proposed Development, subject to commercial terms of agreement. Further consultation is expected during the detailed design stages post the DCO application submission.

19.8 A public consultation was held between July and September 2020 (Section 42 consultation), which resulted in responses from various stakeholders including KCC, DBC, GBC, EDC and CEMEX. A full list of comments and responses to this consultation are included in Appendix 19.3 (document reference 6.2.19.3).

Study area

19.9 The study area of this assessment includes Kent and Essex, which are the two main areas in which the Proposed Development is situated. The Proposed Development includes two sites, together termed the Project Site:

- The main site at the Swanscombe Peninsula, in the county of Kent, known as the Kent Project Site, is within the boroughs of both Dartford and Gravesham

- The second site includes mainly car parking and transport links, is located on the other side of the River Thames at the port of Tilbury in Essex. This is within the unitary authority of Thurrock, within the county of Essex, and is known as the Essex Project Site.

19.10 For the baseline, Kent and Essex (including Thurrock) have been included within the waste generation estimates and material demands, as these areas are expected to have wide effects.

19.11 This assessment considers construction, demolition and excavation (CDE) and operational waste generated within the Project Site, and the effects that it may have on landfill capacities at a local and regional level to the boundaries of Kent and Essex. The waste that is generated off-site, but is linked to the Proposed Development, (for example waste from the manufacturing process of materials used on-site), is outside the scope of this assessment. The geo-environmental impacts from excavated material during construction has been assessed in the ES Chapter 18: *Soils, Hydrogeology and Ground Conditions (document reference* 6.2.19.1). The transport impacts associated with waste during operation is assessed in Chapter 9 *'Land Transport'* (document reference 6.1.9) and in Chapter 10 '*River Transport'* (document reference 6.1.10) of the ES.

19.12 This assessment considers the main material demands for the construction phase of the Proposed Development. Materials to be included in the assessment, in line with the IEMA (2020) guidance, are typically physical resources that are used across the lifecycle of the development. Examples include construction materials such as concrete, aggregate, asphalt and bricks.

19.13 Operational material demands, including natural resources such as compost for landscaping purposes, will be assessed at a later stage in design when data is available from the associated landscape architect. Currently the landscape design has been developed to a vision and strategy level, which does not include a detailed breakdown of area quantities for the different landscape areas. Assessment of operational demand of natural material for landscaping etc. will be carried out as part of the landscaping strategy at the detailed design stage.

19.14 Operational demands for water as well as the impacts of wastewater production have been assessed in Chapter 17 '*Water Resources and Flood Risk'* (document reference 6.1.17), and the transport of materials during the operational and construction phase has been assessed in Chapter 9 'Land Transport' (document reference 6.1.9) of the ES. Any cumulative effects have been assessed in Chapter 21 '*Cumulative, In-Combination and Transboundary Effects*' (document reference 6.1.21).

Baseline methodology

19.15 A desktop study has been undertaken to determine the baseline conditions. The spare capacity of the current waste management infrastructure in Kent and Essex (including Thurrock where relevant) were determined using data relating to maximum capacities and current usage (as publicly available).

19.16 The baseline with regards to waste management is set in relation to the latest estimated waste generation quantities in Kent and Essex (including Thurrock). Data for waste management practices, infrastructure capacity and generation was obtained from:

- Kent and Essex Local Plans and frameworks;
- Annual monitoring reports; and
- Environment Agency, Waste Data Interrogator (2018) data.

19.17 A desktop study of the existing building stock within the Project Site has been undertaken to assess the volume and type of waste that will be generated during the demolition phase of the development.

Assessment approach

19.18 The assessment of waste and material effects in this chapter follows the IEMA (2020) guidance. The effects associated with the Proposed Development are based on:

- the layouts and plans of the Proposed Development, as detailed in the OCWMP and OOWMS at Appendices 19.1 and 19.2 (document references 6.2.19.1 and 6.2.19.2);

- the Proposed Development size and outline composition mix (outline floor areas and land-use type). These have been used to estimate CDE waste generation figures. The number of daily visitors (estimated using ProFun calculations) and the land use types have been used to determine the quantity of waste generated during the operation phase;

- the development of an OOWMS for the Proposed Development. This is included in Appendix 19.1 of the ES (document references 6.2.19.1);

- the development of an OCWMP for the Proposed Development that provides details on the potential construction and demolition waste. This is included in Appendix 19.2 of the ES (document references 6.2.19.2);

- anticipated volumes of key material requirements during the construction phase have been based on architectural land use plans; and

- relevant local and regional waste and material management regulations and planning policies.

19.19 Construction and demolition waste estimations from the OCWMP (Appendix 19.2) have been used in this chapter. Actual quantities and compositions may differ from estimations, due to changes in the unpredictable variables that influence actual waste quantities and composition. These variables include:

- eventual recycling systems and waste infrastructure available;

- materials types and choices;

- individual contractor, resident or worker behaviour; and

- changes to local policies and requirements.

19.20 Details on excavation including the quantities and potential to reuse excavation material on-site have been provided in the ES Chapter 18: 'Soils, Hydrogeology and Ground Conditions' (document reference 6.1.18).

19.21 Waste in the form of sludge will be generated from the on-site wastewater treatment plant of the Proposed Development. Sludge contains valuable resources that can be processed to recover clean energy and essential nutrients. Sludge will be sent for treatment at specialist treatment facilities either within Kent, Essex or elsewhere and therefore is not considered within this chapter. Potential facilities that could treat the sludge are in Long Reach, Dartford operated by Thames Water or one of 11 regional sludge centres serving Kent operated by Southern Water. Which facility this stream of waste will be sent to depends on the contractual arrangements with the contractor for the treatment works. Further detail on wastewater treatment can be found in ES Chapter 19 'Water

Resources and Flood Risk' (document reference 6.1.17), and information on demands in the Utilities statement (document reference 7.6). Effects from transport of sludge waste are limited as the collection is infrequent and have been assessed in ES Chapter 9: *Land Transport* (6.1.9).

19.22 The operational water use for the Proposed Development has been assessed in the ES Chapter 17: Water Resources and Flood Risk, transport of materials and waste by river in the ES Chapter 10: 'River Transport', vehicle movements for waste and materials, and transport effects in the ES Chapter 9: 'Land Transport' and operational noise levels from service vehicles in the ES Chapter 15: 'Noise and Vibration' based on the traffic assessment and are therefore not assessed within this chapter. Any cumulative effects have been assessed in Chapter 22 '*Cumulative, In-Combination and Transboundary Effects*'.

Assessment of effects

19.23 To assess the sensitivity of receptors, magnitude of impact and significance of effects, the IEMA (2020) guidance has been followed. It is acknowledged in the IEMA guidance that the document provides initial guidance. Where information is not available, in particular for materials and for demolition and excavation waste, professional judgement has been used to undertake the assessment.

19.24 Construction materials typically assessed as part of the IEMA methodology include physical resources that are used across the lifecycle of the development. This assessment has assessed the main materials expected for construction including concrete, steel, aggregates, asphalt and timber. Other materials will be used in construction however these are considered to be the most significant and commonly used. A more detailed breakdown of construction materials to be used in the Proposed Development will be provided in the next stages of detailed design.

19.25 The assessment of effects has taken into account the phasing of the Proposed Development on the identified receptors. Construction of the first phase is expected to begin in 2022, and Gate One of the Proposed Development is assumed to be completed by 2024 and Gate Two in 2029.

Receptor sensitivity

19.26 For waste, the sensitive receptor is available landfill capacity as landfill is a finite resource, as opposed to recycling or other treatment facilities which have an annual operating capacity (IEMA, 2020). The receptor sensitivity is based on the current landfill void capacity against the reduction of landfill capacity based on future projected waste forecasts without development as outlined in Table 19.2.

Table 19.2: Criteria for determining waste receptor sensitivity for inert and non-hazardous landfills (IEMA, 2020).

Waste Receptor Sensitivity	Criteria
Very High	Reduce very considerably (by >10%), end during construction or operation, is known to be unavailable, or would require new capacity/infrastructure to be put in place to meet demand
High	Reduce considerably, by 6-10% as a result of wastes forecast
Medium	Reduce by 1-5%, as a result of wastes forecast
Low	Reduce minimally, by <1% as a result of wastes forecast
Negligible	Remain unchanged, or expected to increase through a committed change in capacity

19.27 Hazardous waste receptor sensitivity is determined with a similar approach and the criteria is outlined in Table 19.3.

Table 19.3: Criteria for determining waste receptor sensitivity for hazardous landfills (IEMA, 2020).

Waste Receptor Sensitivity	Criteria
Very High	Reduce very considerably (by >1%), end during construction or operation, is known to be unavailable, or would require new capacity/infrastructure to be put in place to meet demand
High	Reduce considerably, by 0.5-1% as a result of wastes forecast
Medium	Reduce by 0.1-0.5%, as a result of wastes forecast
Low	Reduce minimally, by <0.1% as a result of wastes forecast
Negligible	Remain unchanged, or expected to increase through a committed change in capacity

19.28 The sensitivity of materials is based on supply and/or stock of materials, as well as the sustainable properties of each material as outlined in Table 19.4.

Table 19.4: Criteria for determining material receptor sensitivity (IEMA, 2020).

Material Receptor Sensitivity	Criteria
Very High	Insufficient in terms of production, supply and/or stock / not available with any sustainable features
High	Suffer from known issues with supply / stock /available comprising little to no sustainable features
Medium	Suffer from some potential issues with supply and stock / available comprising some sustainable features
Low	Generally free from known issues regarding supply and stock / available comprising high portion of sustainable features
Negligible	Free from known issues regarding supply and stock / available comprising of sustainable features

Magnitude of change / impact

19.29 The IEMA (2020) guidance provides criteria for assessing magnitude and provides two approaches to determine the magnitude of impact for waste. Method 1 determines reduction in void capacity of landfill from the Proposed Development, which is the most robust approach, suitable for larger developments and statutory EIAs. It involves a detailed methodology using available industry data. The alternative approach, where data may not be available, is prioritising landfill diversion. This assessment has used Method 1 from the IEMA (2020) guidance, based on landfill void capacity where data is available. The criteria for magnitude of impact are outlined in Table 19.5 and 19.6 for inert/non-hazardous waste and hazardous waste respectively.

Table 19.5: Criteria for determining magnitude of impact for inert and non-hazardous waste (IEMA, 2020).

Magnitude	Criteria
Method 1	
Major	Reduce regional landfill void capacity by >10%
Moderate	Reduce regional landfill void capacity by 6-10%
Minor	Reduce regional landfill void capacity by 1-5%
Negligible	Reduce regional landfill void capacity by <1%
No change	Zero waste generation

Table 19.6: Criteria for determining magnitude of impact for hazardous waste (IEMA, 2020).

Magnitude	Criteria
Method 1	
Major	Reduce national landfill void capacity by >1%
Moderate	Reduce national landfill void capacity by <0.5-1%
Minor	Reduce national landfill void capacity by <0.1-0.5%
Negligible	Reduce national landfill void capacity by <0.1%
No change	Zero waste generation

19.30 The criteria for determining the magnitude of impact for materials is outlined in Table 19.7. This comprises a percentage-based approach, measuring the volume of materials by percentage against regional or national baseline availability.

Table 19.7: Criteria for determining magnitude of impact for materials (IEMA, 2020).

Magnitude	Criteria
Major	No material type is equal or greater than 10% by volume of the regional or national baseline availability
Moderate	No material type is equal or greater than by 6-10% by volume of the regional or national baseline availability
Minor	No material type is equal or greater than between 1-5% by volume of the regional or national baseline availability
Negligible	No material type is equal or greater than 1% by volume of the regional or national baseline availability
No change	No materials are required

Assessment significance criteria

19.31 To determine the overall significance of the effect, the magnitude of impact is assessed against receptor sensitivity. The matrix to determine the significance of effects is outlined in Table 19.8. For this assessment, moderate, large and very large effects are considered to be significant in EIA terms, and can be:

- beneficial or adverse;
- permanent or reversible;
- short, medium or long term;
- significant (moderate, large and very large) or not significant (neutral or slight).

Table 19.8: Matrix for determining effect significance/threshold (IEMA, 2020)

	Magnitude of impact					
Sensitivity of receptor		**No change**	**Negligible**	**Minor**	**Moderate**	**Major**
	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

19.32 The cumulative effects, which include other existing or approved developments in the project areas, may have a more significant effect collectively on waste and material receptors. Where quantitative information is not available, a qualitative assessment has been undertaken. Interactive effects with other EIA chapters such as 'Land Transport' (Chapter 9), 'Air Quality' (Chapter 16) and 'Water Resources and Flood Risk' (Chapter 17) have been assessed. Cumulative effects are summarised in the '*Cumulative, In-Combination and Transboundary Effects*' (Chapter 22).

19.33 In-combination effects, that are cumulative non-significant effects from multiple effects from the Proposed Development can have an effect on a particular receptor. This has been considered as part of the assessment in Chapter 22 '*Cumulative, In-Combination and Transboundary Effects*'.

Uncertainties

19.34 In determining the baseline conditions, available information on waste generation for commercial and industrial (C&I) and CDE waste differs between the counties of Kent and Essex. Data on current and future capacities has been estimated using the most recent data available from the Waste Data Interrogator (2018) and Essex forecasting reports (BPP reports 2015-2018). Specifically, landfill void capacities derived from the EA Waste Interrogator. Data is only available up until the end of 2018, and therefore assumptions have been made on future landfill capacity based on waste forecasts from various sources, which have been referenced throughout this chapter.

19.35 The demolition estimates of the existing buildings on-site include uncertainties, particularly regarding the unknown contents of the internal areas of the buildings. A cautious approach has been taken when areas were measured during the desktop study, but actual figures will vary based on the contents of each building.

19.36 There is limited available data on current local and regional material availability, and baseline data is only available nationally up to 2016, 2018 or 2019 for the different materials in this assessment, as shown in Table 19.9.

RELEVANT LAW, POLICY AND GUIDANCE

19.37 The following legislation, policy and best practice guidance are relevant to the Proposed Development in relation to solid waste and material management:

National Policy Statements

19.38 National Policy Statements (NPSs) set out the need assessments and government's policies to deliver Nationally Significant Infrastructure Projects (NSIPs) in England. Due to the scale of transport and highway infrastructure as part of the Proposed Development, there will be significant demand for construction materials. This gives potential for a rise in construction waste. The relevant policy in the NPS for National Networks includes:

- environmental and social impacts (NPS paragraphs 3.2 - 3.5);
- criteria for "good design" for national network infrastructure (NPS paragraphs 4.28 – 4.35);
- pollution control and other environmental protection regimes (NPS paragraphs 4.48 – 4.56);
- waste management (NPS paragraphs 5.39 – 5.45); and
- dust, odour, artificial light, smoke, steam (NPS paragraphs 5.81 – 5.89).

Other national legislation policy and guidance

19.39 The following national guidance documents have been considered in the assessment:

Directive 2008/98/EC on Waste (Waste Framework Directive)

19.40 The Waste Framework Directive sets out basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It also sets out basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.

19.41 The principles that the Waste Framework Directive introduces are "polluter pays principle", "extended producer responsibility" and the "waste management hierarchy". The Waste Framework Directive also requires that Member States adopt waste management plans and waste prevention programmes.

19.42 Furthermore, the Waste Framework Directive includes two recycling and recovery targets to be achieved by 2020:

- 50% preparing for re-use and recycling of certain waste materials from households and other origins similar to households; and

- 70% preparing for re-use, recycling and other recovery of construction and demolition waste*.

*Using best practices as specified in Appendix 19.2, the Proposed Development has the potential to surpass these targets with 90% diversion of demolition waste, and up to 92% diversion of construction waste.

Directive 1999/31/EC on the landfill of waste (Landfill Directive)

19.43 The Landfill Directive aims to prevent and reduce any possible negative effects on the environment from the landfilling of waste. In order to do this, the Landfill Directive sets minimum standards for the location, design, operation and construction of landfills. It also sets targets for the diversion of biodegradable municipal waste and controls the nature of waste accepted for landfill (e.g. banning flammable wastes).

Environmental Permitting (England and Wales) Regulations 2016 (amended)

19.44 The Environmental Permitting (England and Wales) Regulations 2016 transpose fifteen directives of varying subject matters to set out an environmental permitting and compliance regime that applies to various activities and industries. To the extent of their relation to waste, they impose and regulate environmental permitting for activities such as landfill, incineration, mining and general waste operations. Before plans are finalised, the EA will be liaised with in relation to the environmental permits required.

Waste (England and Wales) Regulations 2016 (amended)

19.45 The Waste (England and Wales) Regulations 2016 work towards implementing the revised EU Waste Framework Directive (2008/98) relating to some key components of waste operations; collection, recovery, transport and disposal of waste materials. They also address the application of additional responsibilities to the contents of transfer notes, the introduction of a two-tier system for the registration of waste carriers and brokers, further amendments to hazardous waste controls and also the omission of certain categories of waste from waste controls.

Environmental Protection Act 1990 (Part II)

19.46 Part II of the Environmental Protection Act 1990 sets out a regime for the regulation and licensing of the acceptable disposal of controlled waste (any household, industrial and commercial waste) on land. Unauthorised or harmful depositing, treatment or disposal of controlled waste is prohibited and enforced by criminal sanctions. Further, there is a broad duty of care on importers, producers, carriers, keepers, treaters or disposers of controlled waste to prevent harmful activities. The Proposed Development would fall under this duty

of care. It also states that local authorities have a duty to collect controlled waste and to undertake recycling. Businesses who fail to co-operate with local authorities' arrangements will be subject to criminal penalties.

National Planning Policy Framework 2019, Ministry of Housing, Communities and Local Government, 2019

19.47 The National Planning Policy Framework (NPPF) notes that the purpose of the planning system is to contribute to the achievement of sustainable development. The document identifies three dimensions to sustainable development, with an environmental dimension being one. As part of the environmental role, the document notes that efforts must be made to minimise waste generation and increase re-use and recycling. In the NPPF it is stated that during the planning stages of development, recycled or secondary materials should be prioritised over the use of primary material.

National Planning Policy for Waste, Department for Environment, Food and Rural Affairs, 2014

19.48 This document sets out detailed waste planning policies and guidance to waste planning authorities in preparing their Local Plans. Of key importance is the requirement for waste planning authorities to identify sufficient opportunities to meet identified needs of their area for the management of waste streams. Particularly, waste planning authorities should work collaboratively in groups with other waste planning authorities and in two-tier areas with district authorities, through the statutory duty to cooperate, to provide a suitable network of facilities to deliver sustainable waste management.

Our waste, our resources: A strategy for England, Department for Environment, Food and Rural Affairs, 2018

19.49 The overarching aims of this strategy is to maximise the value of resource use and minimise waste and its impact on the environment. This strategy complements other government strategies such as the 25 Year Plan (2018), the Clean Growth Strategy (2017), the Industrial Strategy (2017), and the Litter Strategy (2017). This strategy will contribute to the delivery of five strategic ambitions:

- to work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025;
- to work towards eliminating food waste to landfill by 2030;
- to eliminate avoidable plastic waste over the lifetime of the 25 Year Environment Plan;
- to double resource productivity by 2050; and
- to eliminate avoidable waste of all kinds by 2050.

Waste Management Plan for England, Department for Environment, Food and Rural Affairs,

2013

19.50 This plan sets out a planning framework to help local authorities develop strategies that identify sites and areas suitable for new or enhanced waste management infrastructure/facilities. In addition, the document provides advice for local authorities to better apply the waste hierarchy in their own jurisdiction.

19.51 The waste hierarchy ranks waste management options according to what is best for the environment. This goes in the order of 'prevention, reuse, recycling, recovery and disposal', with disposal being the least preferred option.

19.52 At its core, the plan describes how the government intends to work towards a more efficient and sustainable approach to waste and resource use/management. It provides an analysis of the waste management situation in England and how it will aim to achieve the objectives and provisions of the EU Waste Framework Directive (EC, 2008). An important point to note is the uncertainty around Brexit and current EU legislation. As at the date of this application, it has not been confirmed yet whether EU waste targets will be transferred into British law.

19.53 A number of key targets from the 2011 Waste Regulations (UK Government, 2011) are reiterated in the plan, including at least 70% (measured by weight) of construction and demolition waste should be subject to material recovery by 2020. These targets are expected to be surpassed in the Proposed Development, if best practice mitigation measures are taken, as outlined in the Appendix 19.2.

Waste & Resources Action Programme (WRAP) Designing out Waste: a design guide for civil engineering

19.54 This document provides design guidance for waste and resource efficiency, focused towards construction waste. The guide outlines drivers for reducing construction waste to landfill and the environmental impacts. The main relevant sections for reference in this assessment include; principles of designing out waste, application of these principles and the process of designing out waste.

Institute of Environmental Management and Assessment (IEMA) guide to Materials and Waste in Environmental Impact Assessments, 2020

19.55 This document provides initial guidance on key terms, concepts and considerations for assessing environmental impacts and effects of materials and waste in the EIA process. There are four main areas of focus for the document, including;

- Principles that govern the assessment process;
- Impacts and effects associated with materials and waste;

- What an assessment of materials and waste should entail; and
- Key messages for industry to advance best practice.

19.56 This assessment uses this guidance for the methodology, including determining environmental effects through sensitivity, magnitude and cumulative effects.

Resources and waste strategy: Monitoring Progress, DEFRA, 2020

19.57 This document aims to monitor the government's key strategic objectives related to resource use, waste prevention and waste management. The document ultimately tracks outcomes, compares them to ambitions and communicates progress.

Environment Bill 2020, DEFRA, 2020

19.58 The Environment Bill 2020 sets out how the UK is to protect and improve the natural environment. Regarding resources and waste management, the Environment Bill introduces a series of measures which aim to change how the government, businesses and individuals produce and consume products, in line with targets set in '*Our Waste, Our Resources*' (2018). It contains powers to introduce clear product labelling, extended producer responsibility and establish deposit return schemes. Furthermore, the bill also stipulates that a consistent set of materials that must be collected from all households and businesses, including food waste in order to make services more consistent across the country. The bill returned to parliament in November 2020 for further debate, after a pause due to the coronavirus outbreak.

The Circular Economy Package: Policy Statement, DEFRA, 2020

19.59 The Circular Economy Package identifies steps for the reduction of waste and the establishment of a credible long-term path for waste management and recycling. Many of the themes and provisions covered within the Circular Economy Package relate to areas of resources and waste policy where the UK nations are already actively involved through existing measures or work underway to take forward commitments made in their respective domestic waste strategies. Furthermore, the bulk of the 2020 Circular Economy Package measures are relatively small technical changes and/or the implementing legislation simply adopts the same wording as that of the Directive. The UK government has also stated that the departure from the EU will not weaken any current or future environmental protections planned.

Local policy and guidance

19.60 This section includes local policies relevant to the Proposed Development in relation to solid waste and material management. The main waste generation source from the Proposed Development will be from the Kent Project Site, however some waste will also be produced from the Essex Project Site. In addition, waste may be transported through or treated in either Kent, Thurrock or Essex as the strategy aims to transport waste and

materials along the River Thames.

Kent Minerals and Waste Local Plan (KMWLP) 2013 – 2030 (Adopted 2016, KCC)

19.61 This document sets out a framework and planning policies for new development regarding mineral extraction, importation and waste recycling. It includes targets and objectives for waste and mineral management. Points of relevance to this assessment include the objective of achieving local net self-sufficiency of waste management and providing opportunities for additional waste management capacity. In terms of minerals and materials, relevant objectives include:

- ensure delivery of adequate and steady supplies of sand, gravel, chalk, brick, earth, clay, silica sand, crushed rock etc. through identifying sufficient sites and safeguarding mineral bearing land;
- promote the use of recycled and secondary aggregates in place of land-won minerals;
- safeguard existing, planned and potential sites for mineral infrastructure; and
- encourage the sustainable use of the inert non-recyclable fraction of CDE waste for quarry restoration.

Early Partial Review- Kent Minerals and Waste Local Plan 2013-2030 (2020, KCC)

19.62 The Early Partial Review adopted in September 2020 provides a number of modifications to the KMWLP. These include minor changes to waste management and mineral resource sections, but nothing major to affect this assessment or the proposed waste strategies.

Kent Minerals Sites Plan (KCC, 2020)

19.63 The Kent Minerals Sites Plan details locations in Kent which are suitable for quarrying essential minerals for growth and economy in the area. As the materials assessment in this document uses national stocks and demands for calculation of effects, figures for Kent are not required from this document. Nevertheless, this document provides a relevant overview as an addition to the KMWLP (2016).

Kent Waste Disposal Strategy 2017 – 2035, Kent County Council

19.64 The strategy sets out Kent's current position, future pressures and how to maintain a sustainable waste management service in Kent. A number of priorities are included, in line with national strategies and the waste hierarchy for environmental protection. Relevant priorities considered in this assessment include:

- Deliver services which mitigate impacts on or from environment and climate change; and

- Provide accessible service whilst encouraging customers to reuse and recycle, and let people know what happens to their waste.

Essex and Southend on Sea Waste Local Plan (ECC/ SOSBC, 2017)

19.65 This plan covers all types of waste produced in the area of Essex and Southend on Sea, and how they are to be managed to reduce negative impacts on the environment. The plan forms part of the statutory development plan and provides policies for waste planning. It sets out a plan for future waste needs of the area up until 2032. The main relevant sections include existing waste management capacity, future needs and considerations for waste management proposals.

19.66 This plan covers the entire area of Essex and Southend on Sea, including the unitary authority area of Thurrock. Thurrock, the main location of the Essex Project Site, is not being assessed separately, as waste and materials management in this area specifically is expected to be minimal, and instead will affect Kent and the wider area of Essex.

Essex Minerals and Waste Authority Monitoring Report (ECC, 2018)

19.67 This report assesses current waste arisings and mineral demand, as well as future development trends affecting the area of Essex. Current levels are compared to local and national policy targets. The report also contains lists of operational waste and mineral sites in the area.

Ebbsfleet Implementation Framework (EDC, 2017)

19.68 This framework sets out a vision for Ebbsfleet as a '21st Century Garden City', outlining an evaluation framework for monitoring progress. A spatial framework is outlined for the area, relating to landscape, transport, community and social facilities as well as essential utilities.

19.69 Reference is made throughout to other relevant local plans such as the 2016 KMWLP regarding materials and waste. Sustainable waste management practices are outlined throughout to establish the framework.

Local Development Framework: Core Strategy and Policies for Management of Development, Thurrock Council, 2015

19.70 This strategy framework is a foundation for new development sites to follow for detailed policies on many aspects. In relation to the Proposed Development and this assessment, relevant topics include strategic environment policies and mineral and waste policies. The strategy framework includes important figures for this assessment on waste arisings, current and future waste management options and capacities.

Thurrock Local Plan: Sustainability Appraisal Scoping Report, Thurrock Council, 2016

19.71 This document sets out a scope of the sustainability appraisal of Thurrock's Local Plan adopted in 2016. It includes relevant sections on strategic environmental assessment, local and national policy context and specific sections on materials and waste. It details the current baseline including landfill sites, waste generation and projected baseline up until 2027.

BASELINE CONDITIONS

Materials baseline

19.72 Due to limited available data on current local and regional material availability, this baseline assessment focuses on the national production and import of materials. The national sources that have been used, including the International Steel Statistics Bureau (ISSB) and the Minerals Products Association (MPA) provide the most up to date and comprehensive status of the main materials expected to be used for the Proposed Development. These materials include steel, aggregates, asphalt, concrete, and timber.

19.73 A summary of the availability of the key construction materials are included in Table 19.9.

Table 19.9: National demand for key construction materials (ISSB 2020/ MPA, 2018)

Material	National demand (million tonnes per year)	Baseline data year	Data description
Steel	10.72	2018	UK steel demand
Aggregates	247	2016	UK sales of minerals and mineral products for construction uses
Asphalt	25.2	2016	
Concrete (includes ready-mixed and concrete products)	81.9	2016	
Timber	36.7 million cubic metres per year	2019	UK production and import of timber products

Steel

19.74 As of 2018, the UK produced 7.3 million metric tons (Mt) of crude steel (Statista, 2018). Imports of steel in 2018 were slightly higher than steel produced in the UK. Around 7.8 Mt of steel products were imported in 2018 (ISSB, 2020). The demand for steel in the UK in 2018 was 10.72 Mt (ISSB, 2020).

19.75 Over the last 10 years, crude steel production has fluctuated. From 2015 onwards, British crude steel production has been constantly declining. In the last few years, import activity has steadily increased, while exports have rapidly declined. However, future trends hold large uncertainties and are characterised by constant changes as demand and production are widely dependent on global markets (Statista, 2018).

Concrete and cement

19.76 National demand of concrete in the UK totalled approximately 81.9 million tonnes in 2016 (MPA, 2018). In 2018, the total amount of concrete blocks produced in the UK was approximately 21,000,000m^2 (approximately 4.7 million tonnes), of which approximately 80% was produced in England (Statista, 2020).

19.77 The import of cement into the UK in 2018 was at 2.6 Mt, which was imported by manufacturers and other entities. The amount of cement imported by manufacturers and other entities have shown considerable increases in the last few years (Statista, 2018).

19.78 Future trends for the import and production of cement, and products of concrete, hold considerable uncertainties as the construction sector is largely dependent on international developments and political landscapes. The heightened uncertainty around Brexit is causing some domestic and overseas investors to pause the construction of projects and will continue to contribute to broader constraints on supply (UK Government, National Statistics, 2019).

Aggregates

19.79 Aggregate demand in 2016 totalled 247 million tonnes. This is made up of crushed rock, sand and gravel, recycled and secondary aggregates. A breakdown of the demand is summarised in Table 19.10.

Table 19.10: Breakdown of aggregate material demand in UK in 2016 (MPA, 2018)

Aggregate type	Demand (million tonnes in 2016)
Crushed rock	113.9
Sand and gravel	48.6
Sand and gravel	14.1
Recycled and secondary	70.4
Total	**247**

Asphalt

19.80 Asphalt is produced mainly to support local and national road networks with construction and maintenance. Total UK demand in 2016 was 25.2 million tonnes (MPA, 2018).

Timber

19.81 UK production of wood products totalled 10.9 million cubic metres in 2019, and UK

imports totalled 25.8 million cubic metres. These totals are made up of sawn wood, wood-based panels, paper, paperboard, wood pellets and briquettes (Forest Research, 2020). A breakdown is summarised in Table 19.11.

Table 19.11: Summary of wood production and imports in the UK in 2019 (Forest research, 2020)

Wood type	UK productions (million cubic metres)	UK Imports (million cubic metres)
Sawn wood	3.5	7
Wood-based panels	3.2	3.7
Paper/ paperboard/ pulp	3.9	6.2
Wood pellets/ briquettes	0.3	8.9
Totals	**10.9**	**25.8**

Waste baseline

19.82 This section describes the baseline scenario for waste management in both Kent and Essex considering the location of the Kent Project Site and the Essex Project Site. For the purpose of the assessment, to cover all scenarios, Kent and Essex have been included in the baseline conditions.

19.83 The IEMA (2020) methodology used in this assessment requires data on landfill capacities and future inputs. Infrastructure such as recycling, composting and other diversion methods will only be included where necessary for assessment.

Kent

19.84 The *Kent Minerals and Waste Local Plan 2013-30* seeks self-sufficiency in managing non-hazardous waste arisings in Kent, and to provide limited capacity for non-hazardous waste from London. As of 2016, the local plan states that Kent is achieving self-sufficiency in managing all its waste streams *(KCC, 2020).*

19.85 There are 12 district and borough councils in Kent, all of which provide collection services to households across Kent. However, C&I council collections are limited to the areas of Gravesham, Maidstone and Sevenoaks. For the remainder of C&I waste, this is collected by private contractors. The Proposed Development is located within both Gravesham and Dartford districts.

19.86 Within Kent, the remaining total landfill capacity at the end of 2018 was 8,666,236m^3 (EA, Waste Data Interrogator, 2018). For the purpose of this assessment, inert waste is assumed to be CDE waste and non-hazardous waste is assumed to be local authority collected waste (LACW) and C&I waste.

19.87 There are 13 landfills with remaining capacity stated at the end of 2018 within areas of Kent. These are a mixture of inert, non-hazardous and hazardous landfill types. A

breakdown of capacities of these landfill types for inert, non-hazardous and hazardous waste is shown in Table 19.12.

Table 19.12: Kent landfill capacity breakdown 2018 (UK Environment Agency, 2018)

Metric	Total remaining capacity	Inert (CDE)	Non-Hazardous (LACW & C&I)	Hazardous waste
Cubic metres (m^3)	8,666,236	6,474,205	1,963,549	228,482

19.88 The *Kent Waste Needs Assessment* for C&I waste (BPP, 2017) provides estimates of C&I waste arisings, totalling 1,191,585 tonnes in 2015. A breakdown of the management of this waste is summarised in Table 19.13. LACW has not been included in these totals as most C&I waste in Kent is collected by private contractors. This also provides a more conservative assessment.

19.89 Waste arisings categorised under 'treatment' include a combination of biological treatment, composting, material recovery facilities, physical treatment and physical chemical treatment sites. Overall, these are considered as other methods of diversion from landfill including organics treatment, dry mixed recycling and thermal treatment (waste to energy).

Table 19.13: Management of Kent C&I waste in 2015 through permitted sites excluding LACW, hazardous, agricultural, mining, hazardous waste and leachate/wastewater (BPP, 2017).

	Landfill	Metal recycling	Recovery to land	Transfer	Treatment	Total
Arisings managed within Kent (tonnes/annum)	196,464	34,439	1,015	264,423	344,527	840,868
Arisings managed within Kent (%)	**23.4%**	**4.1%**	**0.1%**	**31.4%**	**41.0%**	
Arisings managed outside of Kent (tonnes/annum)	132,258	50,620	9,832	85,507	75,500	350,717
Arisings managed outside of Kent (%)	**37.7%**	**14.4%**	**2.8%**	**24.4%**	**21.5%**	
Total	328,722	85,058	10,847	346,930	420,027	**1,191,585**
Total (%)	27.6%	7.1%	0.9%	29.1%	35.2%	

19.90 The *Kent Waste Needs Assessment for CDE waste* (BPP, 2017) provides estimates of CDE waste arisings from Kent, totalling 2,249,123 tonnes in 2015. A breakdown the management of this waste is summarised in Table 19.14. It is noted that significant quantities are managed outside of Kent. The percentages of waste managed within Kent

in both tables 19.13 and 19.14 have been used to estimate waste sent to landfill in future forecasts where gaps exist.

Table 19.14: Management of Kent CDE waste in 2015 through permitted sites excluding hazardous waste (BPP, 2017).

	Landfill	Metal recycling	Recovery to land	Transfer	Treatment	Total
Arisings managed within Kent (tonnes/annum)	720,640	95,626	317,948	237,415	480,973	1,852,602
Arisings managed within Kent (%)	**38.9%**	**5.2%**	**17.2%**	**12.8%**	**26.0%**	
Arisings managed outside of Kent (tonnes/annum)	110,133	107,191	33,433	64,411	81,352	396,521
Arisings managed outside of Kent (%)	**27.8%**	**27.0%**	**8.4%**	**16.2%**	**20.5%**	
Total	830,773	202,817	351,381	301,826	562,326	**2,249,123**
Total (%)	37%	9%	16%	13%	25%	

Essex

19.91 Within Essex the landfill capacity was estimated to be approximately 15,044,103m^3 at the end of 2018 (EA, Waste Data Interrogator, 2018). For the purpose of this assessment, inert waste is assumed to largely originate from CDE waste, non-hazardous waste is assumed to be LACW and C&I waste, and restricted is classed as other.

19.92 There are 13 landfill sites with remaining capacity recorded at the end of 2018 within areas of Essex. A breakdown these landfill capacities for inert, non-hazardous and hazardous waste in Essex is shown in Table 19.15.

Table 19.15: Essex landfill capacity breakdown (including area of Thurrock) for 2018 (UK Environment Agency, 2018)

Metric	Total remaining capacity 2018	Inert (CDE)	Non-hazardous (LACW & C&I)	Hazardous waste
Cubic metres (m^3)	15,044,103	3,191,995	11,852,108	0

19.93 The 2018 landfill capacity records shown in Table 19.15 indicate there are no active hazardous landfill sites in Essex. It is assumed that all hazardous waste arisings from the area are either treated by alternative methods than landfill or transported elsewhere to a

hazardous landfill facility.

19.94 Non-LACW makes up approximately 80% of all waste managed in the Essex and Southend on Sea area *(ECC & SOSBC, 2017).* C&I waste arising from Essex and Southend on Sea is specified in the *Essex and Southend on Sea Waste Needs Assessment Update: Updated Baseline for Commercial & Industrial Waste (2018).* The annual C&I arisings from 2016 in the area totalled 1.26 million tonnes, not including any LACW or other wastes. Of this total, 406,712 tonnes were managed within Essex and Southend on Sea.

19.95 A breakdown of waste management within Essex and Southend on Sea in 2016 is summarised in Table 19.16. These percentages assist in determining future forecasts of waste to landfill where there are data gaps.

Table 19.16: Management of C&I waste within Essex and Southend on Sea Area minus LACW, CDE, agricultural, mining, hazardous waste and leachate/wastewater (WNA, BPP, 2018).

	Landfill	**Metal recycling**	**Transfer**	**Treatment**	**Recovery to land**	**Total**
Total C&I arisings managed within with Essex and SoS (tonnes/annum)	169,964	20,216	52,399	164,133	0	406,712
Total C&I arisings managed within with Essex and SoS (%)	42%	5%	13%	40%	0%	**100%**

19.96 The *Essex County Council Authority Monitoring Report 2017/18 (BPP, 2019)*, states that in 2017, total non-hazardous CDE waste generation from Essex and Southend on Sea managed through permitted sites totalled over 3.1 million tonnes. Of this total, approximately 2.3 million tonnes were managed within Essex and Southend on Sea.

19.97 A breakdown of management routes is summarised in Table 19.17. Both Table 19.16 and 19.17 include the percentage of C&I and CDE waste sent to landfill in recent years. This data has been used in the sensitivity analysis where there are uncertainties in future waste quantities sent to landfill, alongside other forecasting data.

Table 19.17: Management of CDE waste production in Essex and Southend on Sea in 2017 (BPP, 2019)

	Permanent deposit to land			**Transfer**	**Treatment**	**Metal recycling**	**Total**
	Non inert landfill	**Inert landfill**	**Recovery to land**				
Total arisings managed within Essex and SoS (tonnes/annum)	614,314	383,457	251,544	396,596	608,786	83,037	2,337,734
Total arisings managed within Essex and SoS (%)	26%	16%	11%	17%	26%	4%	**100%**

Summary of current baseline for Kent and Essex

19.98 To determine capacity gaps in waste infrastructure in the wider areas of Kent and Essex, recent waste arisings and available capacities have been sought where available for C&I and CDE waste. A summary of the arisings and capacity gaps are shown in Table 19.18. These capacities are a total of landfill and other waste infrastructure.

Table 19.18: Capacities for Kent and Essex at the end of 2018 (cubic metres)

	Kent	Essex	Total
Operational Waste			
Current landfill capacity non-hazardous (C&I) within area (m^3)	1,963,549	11,852,108	13,815,657
Construction waste			
Current inert landfill capacity (CDE) within area (m^3)	6,474,205	3,190,995	9,665,200

19.99 Total landfill capacities, as of the end of 2018, are summarised in Table 19.19 for Kent and Essex. These capacities include landfill capacities for both construction and operational waste types. A breakdown of different landfill type quantities and their capacities is shown in Tables 19.19 to 19.21.

Table 19.19: Total landfill capacities of Kent and Essex *(DEFRA, 2018)* Includes active sites with capacity at end of 2018.

	Kent	Essex (incl. Thurrock)
Number of landfill facilities *(including hazardous)* (Total)	13	13
Remaining landfill capacity at end of 2018 (m^3)	8,666,236	15,043,103
Total remaining landfill capacity (2018) of combined areas of Kent and Essex (m^3)	23,709,339	

Table 19.20: Total non-hazardous landfill capacities of Kent and Essex *(EA, Waste Data Interrogator, 2018)* Includes active sites with capacity at end of 2018.

	Kent	Essex (incl. Thurrock)
Number of non-hazardous landfill facilities (LACW/C&I)	2	7

Remaining landfill capacity at end of 2018 (m^3)	1,963,549	11,852,108
Total non-hazardous landfill capacity (2018) of combined areas of Kent and Essex (m^3)	13,815,657	

Table 19.21: Total inert capacities of Kent and Essex *(EA, Waste Data Interrogator, 2018)* Includes active sites with capacity at end of 2018.

	Kent	**Essex (incl. Thurrock)**
Number of inert landfill facilities (CDE)	9	6
Landfill capacity at end of 2018 (m^3)	6,474,205	3,190,995
Total landfill capacity (2018) of combined areas of Kent and Essex (m^3)	9,665,200	

Summary of hazardous waste baseline

19.100 In order to assess hazardous waste effects, regional or national hazardous landfill capacities are required *(IEMA, 2020).* Due to the availability of data, England has been used as the receptor at a national level. Remaining hazardous landfill capacity at the end of 2018 in England was recorded at over 19.8 million m^3 *(Waste Data Interrogator, 2018)*

Table 19.22: Remaining hazardous landfill capacity in England at the end of 2018 (*Waste Data Interrogator, 2018*)

	England total
Landfill capacity at end of 2018 (m^3)	19,820,000

Future Baseline

19.101 The future baseline when the Proposed Development is assumed to be completed will be (Gate One) by 2024 and (Gate Two) opening year will be 2029, with construction starting from 2022. The future baseline to assess receptor sensitivity is 2029, the opening year of Gate Two, assuming full build out. The assessment of operational effects includes partial operation i.e. with only Gate One operational in 2024.

19.102 Though full maturity of the Proposed Development is not expected until 2038, Gate One and 2 will be operational in 2029. Projections of future waste arisings and estimated waste sent to landfill are currently available up until 2029 for Kent and Essex. Landfill capacities and use of other facilities such as waste-to-energy plants at the year 2038 are difficult to confirm. Local and national environmental targets point towards a zero waste to landfill approach for the future. It is expected by the year 2038, that most non-recyclable waste will be sent to waste-to-energy plants, but it cannot currently be confirmed whether there will be additional future landfill capacity planned within Kent and Essex. Therefore, the sensitivity receptor has been based on waste generated between 2019 and 2029.

19.103 The assessment has used 2029 data for the future baseline, assuming full occupancy at the year 2029, though full maturity will be in 2038. This will represent a 'worst case' scenario, where the full operational and construction effects of the Proposed Development are realised at the opening of Gate Two, rather than phased up to 2038.

Kent (2029)

19.104 Data relating to the future baseline for C&I waste in Kent is included mainly in the following documents:

- *Kent Waste Needs Assessment 2018: Capacity requirement for the Management of Residual Non-Hazardous Waste (BPP, 2018); and*
- *Kent Waste Needs Assessment for C&I waste (BPP, 2017*).

Additional data on forecasting is included from:

- *Kent Minerals and Waste Local Plan (KMWLP, 2016) 2013-30; and* the
- *Kent Minerals and Waste Development Framework (2012) (KMWDF).*

19.105 The predicted depletion of non-hazardous landfill in Kent is detailed in the *Kent Waste Needs Assessment 2018: Capacity requirement for the Management of Residual Non-Hazardous Waste (BPP, 2018)*, considering factors such as consented waste-to-energy capacity. The report concludes that there is sufficient non-hazardous landfill capacity in

Kent to the end of the plan period (2031).

19.106 Between the years 2024 and 2029, non-hazardous landfill capacity in Kent is predicted to reduce by 226,047 m^3, or 12.7%. This results in a 'Very High' sensitivity rating for Kent landfill receptors. This leaves a remaining 1,554,527 m^3 of remaining non-hazardous capacity in 2029. A breakdown is shown in Table 19.23.

Table 19.23: Predicted depletion of non-hazardous waste landfill void in Kent (BPP, 2018)

	2022	**2023**	**2024**	**2025**	**Depletion from 2022-2029**
Void remaining m^3	1,780,574	1,733,007	1,691,371	1,655,663	
	2026	**2027**	**2028**	**2029**	
Void remaining m^3	1,625,879	1,599,125	1,575,344	1,554,527	**226,047**

19.107 Table 19.24 and 19.25 show past, current and future waste management requirements for Kent based on forecasting. These figures, mainly the percentage splits of waste sent to landfill, have been used in early stages of the assessment to inform assumptions of routes for waste types and future trends.

Table 19.24: Kent residual and non-residual C&I waste management requirements based on forecasts for 2019 and 2031

	2016	***2016 %***	**2021**	**2026**	**2031**	***2021-2031 %***
Recycling/composting (tonnes/annum)	832,300	***70%***	891,857	937,091	985,341	***70%***
Other recovery (excl. recycling and composting) (tonnes/annum)	297,250	***25%***	356,743	374,836	394,136	***28%***
Remainder to landfill (tonnes/annum)	59,450	***5%***	25,482	26,774	28,153	***2%***

19.108 Table 19.24 shows that 2% of C&I waste is expected to be sent to landfill between 2021 and 2031. Up until 2021, it is assumed that 5% of C&I waste is sent to landfill.

19.109 For CDE waste forecasts, The *Kent Waste Needs Assessment 2017 (BPP)* specifies CDE management requirements for Kent. These are summarised in Table 19.25.

Table 19.25: Kent management requirements for CDE waste 2021-2031 (BPP, 2017).

Waste Facility	2016	% 2016-2020	2021	% 2021-2025	Annual tonnage 2026-2031	% 2026-2031
Recycling/composting (tonnes/annum)	1,352,000	52%	1,560,000	60%	1,560,000	60%
Other recovery (excl. recycling/composting) (tonnes/annum)	884,000	34%	728,000	28%	780,000	30%
Landfill (tonnes/annum)	364,000	14%	312,000	12%	260,000	10%

19.110 Based on Table 19.25, the annual tonnages of CDE waste sent to landfill from 2019 to 2029 has been estimated, with a cumulative total of 3,328,000 tonnes. A breakdown is shown in Table 19.26.

Table 19.26: Generation of CDE waste sent to landfill from 2019 to 2029 in Kent

Year	CDE waste (tonnes)	Year	CDE waste (tonnes)
2019	364,000	2025	312,000
2020	364,000	2026	260,000
2021	312,000	2027	260,000
2022	312,000	2028	260,000
2023	312,000	2029	260,000
2024	312,000	**Cumulative CDE waste to landfill**	**3,328,000**

19.111 Between 2019 and 2029, approximately 3,328,000 tonnes of CDE waste will be landfilled. Assuming a density of 1.5tonnes/m^3 (GLA, 2017) (within the landfill, post compaction) this equates to approximately 2,218,667m^3. Of this, 1,619,627 tonnes, 73% (based on BRE 2009 benchmarks) is assumed to be inert waste sent to landfill. Inert landfill capacity at the end of 2018 in Kent was 6,474,205m^3, resulting in a reduction of inert landfill capacity by 25%.

19.112 Hazardous waste effects have been assessed at a national level. The sensitivity rating for England is Very High, based on forecasting estimated from historic trends noted from Waste Data Interrogator (2018) data. By 2029, it is expected that 28% of existing hazardous waste landfill capacity in England will be depleted.

Essex (2029)

19.113 Data on C&I waste forecasts for Essex and Southend on Sea is available from the 2018 *Non- Hazardous Waste Capacity Gap Update* (BPP Consulting, 2018). The forecast of total

C&I waste generation up to 2029 is summarised in Table 19.27. The cumulative C&I waste generation is approximately 10.5 million tonnes, with approximately 2 million m^3 to be sent to landfill by 2029. Non-hazardous landfill capacity at the end of 2018 in Essex was 11,852,108m^3, resulting in a reduction in inert landfill capacity by 17% predicted by 2029.

Table 19.27: Forecast C&I arisings to 2029 tonnes for Essex and Southend on Sea.

Year	C&I waste (tonnes)	Year	C&I waste (tonnes)
2019	942,000	2025	962,000
2020	948,000	2026	965,000
2021	952,000	2027	967,000
2022	954,000	2028	969,000
2023	957,000	2029	973,000
2024	960,000	**Cumulative C&I generation**	**10,549,000**

19.114 Forecasts for CDE waste arisings are summarised in Table 19.28 from 2019 to 2029 with a 0.3% growth increase scenario. This is a low growth scenario is generated by BPP for expected growth in the area up to the years quoted, based on the East of England Economic Forecast Model.

Table 19.28: Forecast CDE waste arisings with 0.3% growth scenario to 2029 for Essex and Southend on Sea (BPP, 2015).

Year	CDE waste + 0.3% growth (tonnes)	Year	CDE waste + 0.3% growth (tonnes)
2019	3,360,784	2025	3,421,734
2020	3,370,867	2026	3,431,999
2021	3,380,979	2027	3,442,295
2022	3,391,122	2028	3,452,622
2023	3,401,296	2029	3,462,980
2024	3,411,500	**Cumulative CDE generation**	**37,562,178**

19.115 Between 2019 and 2029, approximately 37,562,178 tonnes of CDE waste will be generated. Assuming a density of 1.5tonnes/m^3 (within the landfill, post compaction) this equates to 25,041,452m^3. Of this, 73%, 18,280,260m^3, is assumed to be inert waste (BRE 2009 Benchmark), and 10.8% of this is expected to be landfilled (1,980,361m^3). The 10.8% assumption of waste sent to landfill is based on typical portions of CDE waste sent to landfill in Kent, as data on this is limited for Essex. Inert landfill capacity at the end of 2018 in Essex was 3,190,995m^3, resulting in a reduction in inert landfill capacity by 62% by 2029.

19.116 CDE forecasts for Essex show a shortfall between the plan area projected arisings and current available capacity in the *Waste Capacity Gap Update* report. The shortfall, in a worst-case scenario, ranges from 1.03 million tonnes in 2025 to 1.6 million in 2035.

19.117 Hazardous waste effects have been assessed at a national level, using data from England

landfill capacities. The sensitivity rating for England is Very High, based on forecasting estimated from historic trends noted from Waste Data Interrogator (2018) data. By 2029, it is expected that 28% of existing hazardous waste landfill capacity in England will be depleted.

Identified receptors and their sensitivities

19.118 The IEMA guidance (2020) has been used to determine receptor sensitivity. Cumulative future waste generation rates have been used for each waste type (C&I and CDE) from 2019 to 2029, which have been outlined in the future baseline section. For CDE waste, this includes inert and non-hazardous waste based on BRE 2009 and 2012 assumptions.

19.119 Where these totals were not specific to landfill deposit, percentage assumptions have been used where available for future waste treatment routes, and where this was not available for Essex, professional judgement has been used along with data from Kent.

19.120 The totals expected to be deposited in landfill for these cumulative years have been compared to the 2018 landfill capacities to determine the reduction in landfill void capacity as a result of future waste generation. The waste receptor sensitivity has been based on the IEMA guidance as outlined in Table 19.2.

19.121 Table 19.29 to Table 19.31 provide a summary of the identified receptors and their sensitivity for waste and materials respectively, based on the information outlined in the baseline section. Inert and non-hazardous landfill receptors in both Kent and Essex have a very high sensitivity. Hazardous landfill receptors in Kent and England also have a very high sensitivity, considering the future generation rates for Kent and England respectively.

19.122 The materials sensitivity range between medium and negligible based on the supply.

Table 19.29: Identified waste receptors sensitivity

Receptor	Sensitivity	Justification
Construction		
Kent inert landfill void (regionally)	Very High	Approximately 25% of Kent inert landfill capacity will be depleted by 2029.
Essex inert landfill void (regionally)	Very High	62% depletion of landfill predicted by 2029. There is a shortfall in CDE waste capacity within Essex, confirmed in the *Waste Capacity Gap Update 2015* for Essex and Southend on Sea.
Operation (also used for non-hazardous CDE waste effects)		
Kent non-hazardous landfill void (regionally)	Very High	Approximately 12.7% of Kent of non-hazardous landfill capacity will be depleted by 2029.

Receptor	Sensitivity	Justification
Essex non-hazardous landfill void (regionally)	Very High	Additional capacity is required for composting and recycling streams only, but not for other waste streams as outlined in local authority plans. 17% of non-hazardous landfill capacity is expected to be depleted by 2029 including non-hazardous CDE waste.

Table 19.30: Identified hazardous waste receptors sensitivity

Receptor	Sensitivity	Justification
Total (CDE + C&I)		
England hazardous void (England generation to 2029 vs. remaining capacity)	Very High	Total hazardous landfill input within England up to the year 2029 is expected to deplete current capacity as of 2018 by 28%, resulting in a Very High receptor sensitivity.

Table 19.31: Identified material receptors sensitivity.

Receptor	Sensitivity	Justification
Construction		
Steel	Medium	British crude steel production has been declining and imports increasing. However, future trends hold large uncertainties and are characterised by constant changes as demand and production are widely dependent on global markets.
Aggregates	Medium	Long term replenishment rates suggest there may be a lack of supply for certain aggregates such as sand and gravel in future years (MPA, 2018), however other aggregate types appear to have stable stocks and are also available through recycled sources.
Asphalt	Negligible	The 2018 MPA report states that asphalt is sustainable due to it being 100% recyclable for use in new asphalt. The sensitivity of this material is considered negligible.
Concrete	Low	The UK was a net importer of cement in 2018, which were imported by manufacturers and other entities and have increased over recent years.
Timber	Low	Timber supply in 2019 had small increases and decreases for different types since 2018, with maximum changes of -7% (imports of pulp/paper) and +11% (imports of wood pellets). Overall, these changes are considered of low significance. Many timber sources are considered sustainable overall, with exceptions of sources which are unsuitably managed (e.g. uncertified). It is recommended that recycled or other sustainable certified sources such as FSC certified products timber are used in the Proposed Development to minimise environmental impact.

ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Demolition and construction effects

Waste

19.123 CDE comprises of waste arising from the construction and demolition phase and is made up of mainly inert materials such as soils, stone, concrete, brick and tile. There are also non-hazardous elements in this waste stream, such as wood, metals, plastics, cardboard, and residual household-like waste. Due to their weight, inert material typically makes up the majority of total CDE tonnage.

19.124 The Proposed Development is expected to generate significant volumes of CDE waste during the construction period that will reduce landfill capacities. Potential volumes of CDE waste generated have been estimated as part of this chapter, summarised in Table 19.32. The estimations are based on the industry standards from BRE 2009 and 2012 benchmarks, using the Proposed Development's gross floor areas for construction waste, desk surveys for demolition waste and input from the ES Chapter 18: *Soils, Hydrogeology and Ground Conditions* assessment for excavation waste (document reference 6.1.18).

19.125 It is noted that the construction waste volumes included in this assessment include areas within the Project Site but exclude areas inside of Gates 1 and 2 (theme park areas). This is due to the level of detail within the DCO application that has been provided at this stage. It is assumed that the attractions will be fabricated off-site, and constructed in situ, therefore minimising on-site construction waste production.

19.126 CDE waste quantities and estimates have been made and used to assess the effects during the construction phase. Detail on composition of these stream types can be found in the OCWMP (Appendix 19.2). The estimated construction and demolition waste generation figures are summarised in Table 19.32.

19.127 The quantity of excavation material is estimated to be significantly greater than construction and demolition waste, as historic information (see ES Chapter 18: *Soils, Hydrogeology and Ground Conditions*) states that some of the area includes contaminated material unsuitable for reuse. As stated in Appendix 19.2, approximately 40% of excavation waste is expected to be suitable for reuse on-site, 25% may be hazardous and the remaining 35% is expected to be inert or non-hazardous waste that is to be treated elsewhere. Table 19.32 shows that excavation waste makes up approximately 92% of the total CDE waste expected to be generated from the Proposed Development.

Table 19.32: Estimated CDE waste quantities before mitigation (Project Site within DCO Order Limits)

Waste type	Total estimated waste (tonnes)	Total estimated waste (m^3)	Percentage of total CDE waste
Construction	74,300	66,500	4%
Demolition	77,200	69,100	4%
Excavation	1,700,000	1,050,600	92%
Total	**1,851,500**	**1,186,200**	

19.128 To assess the effects of CDE waste against both areas, generation at each of the sites (Kent Project Site and the Essex Project Site) have been estimated. A breakdown of waste streams is shown in Tables 19.33 and 19.34.

Table 19.33: CDE waste generation at the Kent Project Site

Waste type	Total estimated waste (tonnes)	Total estimated waste (m^3)
Construction	69,000	61,800
Demolition	77,200	69,100
Excavation	1,700,000	1,050,600
Total	**1,846,200**	**1,181,500**

Table 19.34: CDE waste generation at the Essex Project Site

Waste type	Total estimated waste (tonnes)	Total estimated waste (m^3)
Construction	5,300	4,700
Demolition	0	0
Excavation	0	0
Total	**5,300**	**4,700**

19.129 The magnitude of impact is the reduction in future landfill capacity by waste produced during the construction and operation stages of the Proposed Development, as outlined in Table 19.5.

19.130 For CDE waste, the magnitude of impact is determined by comparing the generation of CDE waste from the Proposed Development against remaining inert landfill capacity. This calculation only includes inert landfill capacity and the inert waste portion expected from the Proposed Development.

19.131 The magnitude of impact from CDE waste (before mitigation) assuming that waste generated within the Kent or Essex Project Site will be managed regionally within the local authority is outlined in Table 19.35. The significance of effect based on Table 19.8, is large adverse for inert landfills within Kent and slight adverse within Essex reducing the void capacities of regional landfills.

Table 19.35: Magnitude of impact of CDE waste

	Magnitude of impact before mitigation (worst case)	Reduction in landfill void capacity	Justification
Kent (inert)	Moderate	6.6%	Landfill capacity to reduce by approx. 1.6 million m^3 by 2029. Proposed Development inert waste before mitigation approx. 362,000m^3. Most of the waste is generated at the Kent Project Site.
Essex (inert)	Negligible	0.3%	Minimal CDE waste generated at Essex Project Site
Kent (non-hazardous)	Major	70.7%	High CDE waste generation vs. limited Kent non-hazardous landfill capacity.
Essex (non-hazardous)	Negligible	0.01%	Minimal CDE waste generated at Essex Project Site

Materials

19.132 During construction there will be a demand for raw materials that will have an adverse effect of reducing supplies, though recycled materials should be sourced where practical.

19.133 Initial analysis of logistics operations has generated a preliminary estimate of approximately 4 million tonnes of construction materials demand. Approximately 30% of this is assumed to be required for bulk earthworks, leaving 2.8 million tonnes of remaining material. These figures will be refined as the design development is progressed and more information becomes available. Current estimations use a reasonable level of assumptions (as set out in the Construction Method Statement) and do not represent a worst-case scenario.

19.134 An approximate breakdown from the total materials figure has been estimated based on professional judgement. The actual portions will likely vary from an equal split, and these will be confirmed at detailed stages of design. A breakdown of expected material demands is summarised in Table 19.36.

Table 19.36: Summary of material demand estimates from the Proposed Development

Material	Portion (%)	Tonnes	Typical density (tonnes/m^3)	Volume (m^3)
Steel	20%	560,000	8.05	69,565
Aggregates	20%	560,000	2.65	211,321
Asphalt	20%	560,000	2.24	250,000

Material	Portion (%)	Tonnes	Typical density (tonnes/m^3)	Volume (m^3)
Concrete	20%	560,000	2.24	250,000
Timber	20%	560,000	0.5	1,120,000

Magnitude of Impact

19.135 The magnitude of impact for materials has been determined based on the criteria in Table 19.8, calculating the percentage of demand from the Proposed Development against total UK demands/ imports. The magnitude of impact ranges from Negligible to Moderate as shown in Table 19.37.

Table 19.37: Magnitude of impact of materials

	Total UK demand (m^3)	Proposed Development demand (m^3)	% by volume of national availability	Magnitude of impact
Steel	1,331,677	69,565	5.2%	Moderate
Aggregates	93,207,547	211,321	0.2%	Negligible
Asphalt	11,250,000	250,000	2.2%	Minor
Concrete	36,562,500	250,000	0.7%	Negligible
Timber	36,700,000	1,120,000	3.1%	Minor

19.136 The significance of effect is determined by the criteria outlined in Table 19.8 and ranges from slight to moderate adverse for materials. This is summarised in Table 19.38 below. The threshold for materials is determined by comparing the sensitivity to effect magnitude.

Table 19.38 Summary of construction effects before mitigation

Receptor	Sensitivity	Description of Effect	Magnitude of impact	Significance of Effect
Waste				
Kent inert landfill	Very high	Pressure on regional landfills arising from the proposed development reducing landfill void capacities	Moderate	Large to Very Large (adverse)
Essex inert landfill	Very high		Negligible	Slight (adverse)
Kent non-hazardous landfill	Very high		Major	Very Large (adverse)
Essex non-hazardous landfill	Very high		Negligible	Slight (adverse)
Hazardous* landfill (England)	Very High	Pressure on national hazardous landfill	Major	Very Large (adverse)

		capacities		
Materials				
Steel	Medium	Pressure on supply of materials and reduction in materials availability/ stocks	Moderate	Moderate (adverse)
Aggregates	Medium		Negligible	Slight (adverse)
Asphalt	Negligible		Minor	Slight (adverse)
Concrete	Low		Negligible	Slight (adverse
Timber	Low		Minor	Slight (adverse)

**Hazardous waste breakdown covered in following Hazardous section*

Operational Effects

Waste

19.137 The challenges associated with managing waste in multi-use environments are well documented. There is a clear need to ensure that waste is removed from the Proposed Development and back of house areas without creating congestion or hygiene concerns. Upstream waste management, focusing on the reduction of waste generated at the Project Site, must also be considered at an early stage of the Proposed Development. An OOWMS has been provided as part of the ES (Appendix 19.1). This sets out estimated operational waste generation, composition and how operational waste will be managed.

19.138 In order to determine the likely servicing requirements for waste management within the Proposed Development, it is necessary to understand the forecasted volume of waste which may be generated. Kent County Council (KCC) and Essex County Council (ECC) at the date of this application do not produce guidelines to estimate waste generation from developments.

19.139 Operational waste calculations have been broken down into three zones (A-C), as illustrated in Figure 19.1. Table 19.39 shows the estimated total operational waste generation of the Proposed Development. Zone C includes areas at both the Kent and Essex Project Site such as terminals, with Zones A and B covering the Kent Project Site only. Waste is broken down into three streams; mixed recyclables, organics and residual. Detail on the benchmarks used for generation rates and composition of waste are included in the OOWMS (Appendix 19.1). These total waste figures represent the Proposed Development at full build out in year 2029, including both Gates 1 and 2.

Table 19.39: Estimated operational waste quantities at full build out for Zones A to C of the Proposed Development (2029)

Land Use	Total estimated waste (tonnes/annum)	Mixed recyclables (tonnes/annum)	Organics (tonnes/annum)	Residual (tonnes/annum)
Zone A (Theme Park)	14,300	7,100	5,700	1,500
Zone B (Hotels, Market, Commercial)	7,400	3,800	2,700	900
Zone C (Support facilities, staff residential)	1,100	600	400	100
Total	**22,800**	**11,500**	**8,800**	**2,500**

Magnitude of Impact

19.140 For C&I waste, the magnitude of impact is determined based on Table 19.6 comparing the generation of C&I waste from the Proposed Development against remaining non-hazardous landfill capacity. In a worst-case scenario, all waste including recyclables would be sent to landfill, this is shown in Table 19.40.

19.141 Prior to mitigation measures the magnitude of impact will be Major for Kent non-hazardous landfills from the operational stage, as the Proposed Development is estimated to produce 22,800 tonnes (197,000m^3) per year at full build out. This results in a Very Large (adverse) significance of effect rating. Kent has been confirmed to have limited non-hazardous landfill capacity based on forecasting. It is expected that most non-hazardous waste will either be treated elsewhere or by alternative treatment such as waste-to-energy.

Table 19.40: Magnitude of impact of C&I waste for the Project Site at full build out (2029). Total waste including recyclables (worst case).

	Reduction in landfill void capacity (before mitigation)	Magnitude of impact (worst case)	Justification
Operational stage (Kent non-hazardous receptor)	23.3%	Major	Kent has limited non-hazardous capacity. By 2029, Kent is expected to have approximately 845,000m^3 remaining non-hazardous landfill capacity based on forecasting.

19.142 The scenario shown in Table 19.40 shows the magnitude of impact if all C&I waste from the Proposed Development was sent to Kent. An assessment for Essex landfill capacity has not been included as the Essex Project Site is expected to generate minimal operational

waste. The main uses of the Essex Project Site include car parking and terminal areas for transport. The exact location of treatment of operational waste will depend on several factors, including access to treatment facilities either by road or the River Thames. The aim of the Proposed Development is to transport a majority of operational waste on the River Thames, if treatment facilities with river access have capacity to accept waste from the Proposed Development. River transport would allow to transport waste further away, to ensure highest quality processing and recycling, but available data is too limited to make assumptions on this for this assessment. In the scenario where waste from the Essex Project Site (mainly construction waste) is managed within Essex, the effects are assumed to be negligible. The appointed waste contractor will determine which facilities will receive construction waste from the Proposed Development. The significance of effect will be very large (adverse) prior to mitigation.

19.143 In order to assess effects considering phasing, generation figures have been broken down into annual waste in 2024 (when construction of Gate One is completed) to assess the effect of the Proposed Development during partial occupation. These figures are summarised in Table 19.41.

Table 19.41: Estimated operational waste quantities once Gate One is constructed (2024).

Land Use	Total estimated waste (tonnes/annum)	Mixed recyclables (tonnes/annum)	Organics (tonnes/annum)	Residual (tonnes/annum)
Zone A, Gate One only (Theme Park)	9,400	4,700	3,800	1,000
Zone B (Hotels, Market, Commercial)	7,400	3,800	2,700	900
Zone C (Support facilities, staff residential)	1,100	600	400	100
Total	**17,900**	**9,100**	**6,900**	**2,000**

19.144 Prior to mitigation measures, the total annual generation of waste when Gate One is completed in 2024 is expected to be approximately 17,900 tonnes. The magnitude of impact (before mitigation) is shown in Table 19.42. The magnitude of impact and significance of effects remains unchanged from the 2029 prediction (Table 19.40) due to the majority of the Proposed Development being completed by this time, with a major magnitude of impact rating. This also results in a Very Large (adverse) significance of effect.

Table 19.42: Magnitude of impact of C&I waste at the Project Site during partial occupation (Gate One)

	Reduction in landfill void capacity	Magnitude of impact	Justification
Operational stage (Kent non-hazardous landfill receptor)	15.95%	Major	Kent has limited non-hazardous capacity

Hazardous Waste

19.145 It is assumed that due to the nature of the Proposed Development, operational hazardous waste arisings will mainly consist of materials including oils, lubricants and others associated with repairs of the theme park mechanics. These materials are typically unsuitable for disposal by landfill and are expected to be managed in a closed-loop system, where suppliers will typically take back the materials they supply for recycling or special disposal. For the purpose of this assessment, a worst-case scenario is carried out where all hazardous waste from the Proposed Development would be sent to hazardous landfill(s).

19.146 During design stages, the need for excavation was minimised as much as possible to reduce potential generation of hazardous waste. Further detail on minimisation of excavation waste, which makes up the largest portion of hazardous CDE waste, can be found in the ES Chapter 18: *Soils, Hydrogeology and Ground Conditions*. (6.1.18)

19.147 Total hazardous waste arisings from the Proposed Development are summarised in Table 19.43. It can be seen that the major source of hazardous waste arisings are from excavation, due to the nature of the existing site. Further details on excavation waste can be found in the ES Chapter 18: *Soils, Hydrogeology and Ground Conditions* This is a worst-case scenario for the year 2029, based on the data available, however it is likely that CDE waste will be managed gradually over the construction period where possible. There is the exception of excavation waste which will require significant waste movements in the initial stages, apart from the non-hazardous portion that will be reused on-site.

Table 19.43: Hazardous waste arisings from the Proposed Development

	Annual Hazardous Operational Waste (m^3)	Hazardous construction and demolition hazardous waste (m^3)	Hazardous excavation waste (m^3)	Total hazardous CDE waste from Proposed Development (m^3)
Project Site	415	2,754	262,640	265,394

19.148 The magnitude of impact from hazardous waste has been assessed for waste at the construction and operational stages of the Proposed Development. In line with IEMA

guidance, hazardous waste from the Proposed Development has been assessed against remaining national (England) landfill capacity, instead of regional capacities. Magnitude ratings have been calculated by comparing hazardous waste arisings from the Proposed Development against England hazardous landfill capacity in 2029.

Table 19.44: Magnitude of impact of hazardous waste from the Proposed Development

	Magnitude of impact (prior to mitigation)	Reduction in landfill void capacity	Justification
Construction stage	Major	1.85%	>1% reduction national landfill void. The majority of hazardous waste is from excavation waste.
Operational stage	Negligible	0.002%	Minimal operational waste is expected to be hazardous.

Table 19.45: Summary of operational effects (before mitigation)

Receptor	Sensitivity	Description of effects	Magnitude of impacts	Significance of effects
Kent non-hazardous landfills	Very high	Pressure on regional and national landfills arising from the proposed development reducing landfill void capacities	Major	Very large (adverse)
England hazardous landfills	Very High		Negligible	Slight (adverse)

AVOIDANCE AND MITIGATION MEASURES

Introduction

19.149 To reduce the effects from construction and operational waste, mitigation measures are explained in detail in the OOWMP and OCWMP (Appendices 19.1 and 19.2). These measures, which include material and waste reduction, avoidance and diversion through recycling, are in line with local and national targets outlined in the Law, Policy and Guidance section. All measures proposed strive for a best practice approach to maximise material and waste savings and reduce the associated environmental effects.

19.150 As a result of the notification of the Swanscombe Site of Special Scientific Interest (SSSI), , mitigation measures are required to ensure the surrounding environment is protected. In regard to waste and materials, it is noted that waste management facilities, such as landfills, recycling facilities and composting may cause potential impacts to the SSSI, as noted by Natural England (2021). It is not planned for any treatment, recycling or

landfilling to take place within the Proposed Development. Any potential on-site composting will have to be reviewed against the specific requirements relating to Swanscombe SSSI.

19.151 Further mitigation measures which will also protect the SSSI include the mitigation of pollution into the environment from litter generated from both operational and construction activities and appropriate storage, collection and disposal of waste. These measures are further outlined within the OOWMP and OCWMP (Appendices 19.1 and 19.2).

Construction

19.152 The main effects of the construction phase are a result of excavated material. Therefore, it was requested from the Scoping Opinion to determine if river transport for excavation waste is feasible. The feasibility of river transport needs to be assessed at the construction stage, taking into account risk management due to high levels of contaminated soil and the locations of hazardous treatment infrastructure. For the construction period of the Proposed Development, there is an ambition to move at least 80% of construction waste and materials using the River Thames. If in close proximity, road transport may be more efficient compared to river transport. Further assessments on the impact of transport related emissions have been carried out in the ES Chapter 9: *Land Transport* and ES Chapter 10: *River Transport* (6.1.9 and 6.1.10).

19.153 As outlined in Tables 19.33 and 19.34, approximately 1.8 million tonnes of CDE waste will be generated during construction. A further detailed breakdown of CDE waste is outlined in the OCWMP (Appendix 19.2). The following measures and actions included in the OCWMP will help further mitigate the effects from the generation of CDE waste:

- The OCWMP will ensure that CDE waste produced from the Proposed Development is handled in an environmentally sustainable manner and in line with industry best practice and relevant policies;

- The OCWMP outlines measures to design out waste to be considered at later design stages in order to reduce CDE waste generation or maximise reused or recycled waste considering the WRAP designing out waste principles; and

- The OCWMP contains recommendations and best practice for the management of CDE waste on-site during construction to help increase recovery and recycling rates (thus minimising landfilling).

Table 19.46: Effects and mitigation measures for CDE waste

Description of effect	Mitigation measures	Responsibility/ mechanism for implementation	Timing
Pressure on local waste management infrastructure to collect and manage CDE waste arisings throughout construction phase	Further development and implementation of the OCWMP. The OCWMP includes measures aimed at reducing CDE waste at design stages and will provide actions and guidelines on waste segregation on-site	Further development of the OCWMP at next design stages and implemented by the appointed contractor. LRCH remains responsible for the implementation of proposed mechanism in the OCWMP and future documents.	Prior to and during construction phase

General construction waste management

19.154 The Principal Contractor will be responsible for waste management and all contractors will take reasonable steps to ensure that all waste from the Project Site is dealt with in accordance with the Environmental Protection (Duty of Care) Regulations (1991). In line with this, all site materials will be handled efficiently to minimise wastage and all waste arisings from the Project Site will be managed appropriately. The site operator will ensure registered waste carriers are used to convey any waste material off-site to a suitably permitted facility and described on waste transfer notes or hazardous waste consignment note to track the movement of waste.

19.155 Sustainable waste management techniques will be considered throughout the site preparation, demolition and construction phases. The Principal Contractor will nominate a waste champion who will oversee the implementation plan and will ensure the Proposed Development adopts the following sustainable waste management principles.

19.156 Approximately 40% of excavation waste from the Proposed Development is expected to be available for reuse on-site. Further detail on potential uses as well as justification for this assumption is provided in the ES Chapter 18: *Soils, Hydrogeology and Ground Conditions*.

Materials management on-site

- A system will be established so that the correct quantities of materials are ordered. This will reduce the volume of unused materials going to landfill.

- Dedicated areas will be created that allow for the correct storage of new building

materials. This will reduce the risk of contamination/spoiling.

- Timely ordering of materials will reduce the time that materials are stored on-site. This will also reduce the risk of spoiling.

- Provision of clearly marked segregated bins/skips for construction materials to avoid cross-contamination and to facilitate recycling.

- Recycled materials should be sourced where possible to reduce the demand for virgin materials.

- All waste generated will be stored in designated areas that are isolated from surface drainage. Waste containers will be covered to prevent dust and litter being blown out and rainwater accumulating. Containers will be inspected regularly and replaced when full.

Waste segregation on-site

19.157 Waste will be segregated on-site wherever possible. The following measures will be taken to minimise the amount of waste produced and increase the proportion of waste that is segregated:

- A specific area will be allocated and labelled to facilitate the segregation of waste materials for potential re-use, recycling and recovery;

- Hazardous waste will be stored separately from non-hazardous waste to avoid contamination in line with the Hazardous Waste Regulations;

- Efforts should be made to recover and recycle packaging waste in accordance with packaging legislation;

- Different waste streams will be segregated. At a minimum, containers/skips for hazardous/non-hazardous waste and plasterboard waste will be provided on-site;

- Recycling and waste skips will be kept clean and clearly marked to reduce contamination of materials. The labelling shall use 'Waste Stream Colour Codes';

- Training will be provided for all site personnel, informing them of the correct disposal routes for materials. A site waste champion will be appointed to oversee correct segregation/disposal and keep a record of all resources generated on-site.

Operational

19.158 As outlined in Table 19.39, approximately 22,800 tonnes of waste will be produced per year during the operational phase. The breakdown of operational waste is provided in the OOWMS (Appendix 19.1), including a full description of mitigation measures including waste reduction and separation.

19.159 Ensuring that adequate provision is made for clean, hygienic and efficient waste management is essential to the successful operation and aesthetics of the Proposed Development. The OOWMS expands on this and provides a detailed strategy on movement and management of operational waste. The OOWMS adopts the waste hierarchy principles to divert waste from landfill and maximise recycling. The OOWMS also includes principles of a circular economy to mitigate effects from operational waste management.

19.160 Waste receptacles will be provided within the public realm, office and other areas to segregate waste into several waste streams. All waste is proposed to be collected in five waste streams at source. The waste streams are; paper and cardboard, mixed recyclables, glass, organic and residual waste. Additionally, there will be separate storage for bulky, hazardous and electrical waste.

19.161 The owners and operators within the Proposed Development will have a duty of care to ensure that waste is handled safely and appropriately in line with regulations, in addition the operator will also have to adhere to the producer responsibility and Waste Electrical and Electronic Equipment (WEEE) Regulations (2013).

RESIDUAL EFFECTS

19.162 This section outlines the residual effects that remain once mitigation measures have been applied.

Residual construction effects

19.163 In a best-case scenario, mitigation measures will be implemented to reduce CDE waste. The results in this scenario are summarised in Table 19.47 and 19.48.

Table 19.47: Magnitude of impact before and after mitigation of CDE waste at full build out (2029)

	Magnitude of impact before mitigation	Magnitude of impact after mitigation
Kent Project Site (inert landfill receptor)	Moderate (6.6%)	Minor (2.9%)
Kent Project Site (non-hazardous landfill receptor)	Major (70.7%)	Major (40.7%)
Essex Project Site (inert landfill receptor)	Negligible (0.3%)	Negligible (0.02%)
Essex Project Site (non-hazardous landfill receptor)	Negligible (0.01%)	Negligible (0.001%)

Table 19.48: Summary of residual effects for CDE waste on the Project Site (full build out, 2029)

Receptor	Description of Effect	Significance of effect before mitigation	Supplementary mitigation	Residual significance of effect
Inert landfill void (regionally)	Pressure on regional waste management infrastructure to collect and manage CDE waste arisings from the construction of the Proposed Development throughout the construction phase	Kent Project Site: Large (adverse)	An OCWMP has been developed as part of the ES to be implemented during construction to increase recycling and reduce waste. In addition, as part of the design, measures to design out waste have been considered.	Kent Project Site: Moderate (adverse)
		Essex Project Site: Slight (adverse)		Essex Project Site: Slight (adverse)
Non-hazardous landfill void (regionally)	Pressure on regional waste management infrastructure to collect and manage CDE waste arisings from the construction of the Proposed Development throughout the construction phase	Kent Project Site: Very large (adverse)	An OCWMP has been developed as part of the ES to be implemented during construction to increase recycling and reduce waste. In addition, as part of the design, measures to design out waste have been considered.	Kent Project Site: Very Large (adverse)
		Essex Project Site: Slight (adverse)		Essex Project Site: Slight (adverse)

Residual material effects

Table 19.49: Summary of likely residual effects during construction phase for materials

Receptor	Description of Effects	Significance of effects before mitigation	Supplementary mitigation	Residual significance of effect
Consumption of materials	Depleting of natural resources that will result in either temporary or permanent loss within the natural environment	Slight to moderate (adverse)	As outlined in OCWMP, during construction, materials management should be in place and recycled materials sourced where possible.	Slight (adverse)

Residual operational effects

19.164 To calculate residual operational effects, the magnitude of impact is calculated including mitigation reductions. For operational waste, mitigation measures are considered to be the diversion of the recyclable material (organics and mixed recyclable) from landfill.

19.165 This leaves the residual, non-recyclable waste along with non-hazardous CDE waste to be compared against remaining capacity. Diversion of recyclable waste results in a significant reduction of waste quantity to landfill.

19.166 In a best-case, good practice scenario, all recyclables including organics waste will be diverted from landfill. This scenario is shown in Table 19.50.

Table 19.50: Magnitude of effects before vs. after mitigation of C&I waste from the Kent Project Site at full build out (2029)

	Reduction in landfill void capacity before mitigation	Reduction in landfill void capacity after mitigation (best case)	Magnitude of impact (best case)
Kent Project Site	23.3 (Major)	3.5%	Minor

19.167 In a best-case, good practice scenario, for the first phase (Gate One, 2024) all recyclables including organics waste will be diverted from landfill. This scenario is shown in Table 19.51.

Table 19.51: Magnitude of effects before vs. after mitigation of C&I waste from the Kent Project Site at partial occupation (2024) including non-hazardous waste from CDE generation (residual non-recyclable waste only)

	Reduction in landfill void capacity before mitigation	Reduction in landfill void capacity after mitigation (best case)	Magnitude of impact
Kent Project Site	15.95% (Major)	2.4%	Minor

Table 19.52: Summary of residual effects during operation (full build out, 2029)

Receptor	Description of Effects	Significance of effects before mitigation	Supplementary mitigation	Residual significance of effect
Non-hazardous landfill void (regionally)	Pressure on regional area to collect, transfer and manage residual waste arisings from the proposed development.	Kent Project Site: Very large (adverse)	An OOWMS has been produced and for the ES, this outlines measures to provide sufficient storage to manage and segregate recyclables.	Kent Project Site: Moderate or large (adverse)

CUMULATIVE AND IN-COMBINATION EFFECTS

19.168 Cumulative effects have been assessed in the ES, with waste and materials data accounting for committed developments.

19.169 A summary of cumulative and in-combination effects for the Proposed Development is included in the ES Chapter 21: *Cumulative, In-Combination and Transboundary Effects* (document reference 6.1.21). This covers all topic-based chapters and their effects based on surrounding developments.

19.170 Cumulative effects are multiple effects on the same receptor, arising from a proposed development in combination with all developments that have been built and are operational. In-combination effects are those that might arise from the development proposed in combination with other plans and projects that are proposed or consented but not yet built and operational (i.e. those developments that are separate from the baseline).

19.171 Currently, there are 30 developments within relevant proximity to the Proposed Development that are either under construction or will be simultaneously with the

Proposed Development, meaning that large quantities of operational and CDE waste are likely to be generated.

Construction waste

19.172 It is assumed that each individual development, will carefully plan for waste minimisation, re-use and disposal to ensure that CDE waste infrastructure is used efficiently. This exercise should be undertaken as part of an OCWMP which should be prepared at construction stages by the appointed contractors for each scheme. The phased approach of the Proposed Development (and other developments) will also reduce pressure on waste treatment infrastructure, as CDE waste generation will be spread over time. However, it is acknowledged that there will be a significant impact on predicted future landfill capacities due to the sensitivity of both Kent and Essex with or without any new developments. It is expected that high portions of the residual (non-recyclable) CDE waste from the Proposed Development, and surrounding development, will either be sent outside of Kent and Essex to an appropriate landfill, or instead will be sent for incineration at a nearby waste-to-energy plant.

Operational waste

19.173 As the landfill sensitivity for C&I waste for Kent and Essex is rated Very High for both areas, it is concluded that any development in these areas will have significant effects overall, on landfill infrastructure at least. It is expected that high portions of the residual (non-recyclable) waste from the Proposed Development, and surrounding development, will either be sent outside of Kent and Essex to an appropriate landfill, or instead will be sent for incineration at a nearby waste-to-energy plant. This will be confirmed by the appointed waste contractor(s).

19.174 As with the Proposed Development, other developments should comply with best practice principles of the waste hierarchy, a circular economy and relevant design standard such as British Standard (5906:2005). This will ensure minimisation of waste and material demands, as well as recycling provision and segregation.

CLIMATE CHANGE

19.175 Waste management can have an impact on climate change and be impacted by climate change. It is not anticipated that there will be any direct impacts to the assessment completed. However, increasingly erratic weather patterns will require that waste infrastructure for the Proposed Development is designed to take this into account and provide resilience to ensure efficient operations. Such design could mean including new structural measures that will provide higher resistance against environmental damage (e.g. flooding etc.).

SUMMARY AND CONCLUSIONS

19.176 The Proposed Development will generate significant quantities of both construction and operational waste and will require materials during the construction phase that will deplete natural resources.

19.177 The significance of effects during construction, before mitigation, is expected to be Slight to Moderate adverse for materials. Effects for CDE waste are expected to be Large adverse on Kent inert landfill receptors to Slight adverse on Essex inert landfill receptors with approximately 322,100 of inert waste generation from the Project Site. Effects on non-hazardous waste receptors for Kent at construction stage are expected to be Very Large adverse for Kent, and Slight adverse for Essex.

19.178 An OCWMP has been included as part of the ES that outlines designing out waste measures and measures that should be adopted during the construction phase to maximise waste segregation and recycling. Reuse and recycled materials procurement should be adopted where possible to minimise demand on virgin materials. Following mitigation, it is expected the residual effects will be Slight adverse for materials. For waste, residual effects will be Moderate adverse for Kent inert landfill receptors to Slight adverse for Essex inert landfill receptors, with approximately 144,000 m^3 of inert CDE waste potentially being landfilled from the Project Site. Effects on non-hazardous landfill receptors remain the same after mitigation measure for both Kent and Essex.

19.179 Following the best practice measures outlined in Appendix 19.2 relating to CDE waste, the Proposed Development is expected to surpass targets set out in the 2008 Waste Framework Directive, 2011 Waste Regulations and 2013 Waste Management Plan (England). These required a 70% diversion rate of construction and demolition waste, and the Proposed Development is set to divert at least 90% of both waste types with a best practice approach. Implementation of this will be the responsibility of the LRCH and the Principal Contractor.

19.180 The significance of waste effects during the operational phase is expected to be Very Large (adverse) for non-hazardous landfills in Kent. A high proportion of operational waste will be recyclable and an OOWMS has been appended outlining the measures to store, segregate and collect waste to maximise recycling. With the implementation of mitigation measures, total non-hazardous waste generation may reduce to approximately 341,000m^3. The residual effects reduce to a Moderate or Large (adverse) for Kent non-hazardous landfill receptors.

19.181 Hazardous waste effects from the construction phase are expected to have a Very Large (adverse) effect, and hazardous operational waste effects are expected to have a Slight (adverse) effect in the worst-case scenario carried out in this assessment. It is noted that hazardous construction waste effects are temporary and will take place over the course of the construction period which will reduce pressure on landfills and other infrastructure. It is also likely that much of this waste will be diverted from landfill for other treatment, but the portion cannot be confirmed at this stage.

19.182 Overall, considering the residual effects, the effects of materials from the Proposed Development are considered to be 'Not significant' and waste effects, mainly due to CDE waste, are considered to have a 'Significant' effect overall. With the exception of the effect on Essex waste receptors, which is expected to be 'Not Significant' due to minimal waste production at the Essex Project Site.

19.183 It is acknowledged that, even after mitigation measures, expected effects of the Proposed Development are Significant. This is due certain factors which should be taken into consideration:

- The sensitivity of C&I and CDE landfills in both Kent and Essex are Very High, and are therefore sensitive to a large development (such as London Resort); and
- This assessment approach considers scenarios where all residual waste is sent to landfill, within Kent and/or Essex. It is likely that this may not be the case, instead significant portions of residual waste may be sent to waste-to-energy plants, and the majority of recyclable waste will be sent to the appropriate facilities;
- Effects from CDE waste are temporary and expected to be spread out during construction phases, which will significantly reduce pressure on landfills and other infrastructure; and
- An assessment considering recycling and recovery facilities is not factored into this assessment, based on the IEMA guidance followed.

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