Design Teddington Direct River Abstraction

Preliminary Environmental Information Report

Chapter 11 – Materials and Waste

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11. Materials and Waste

11.1 Introduction

11.1.1 This chapter presents the Preliminary Environmental Information (PEI) relating to materials and waste for the Teddington Direct River Abstraction (TDRA) Project (hereafter referred to as 'the Project') and summarises the likely significant effects. It should be read in conjunction with the description of the Project as presented in Chapter 2: Project Description.

11.1.2 Construction materials, Mineral Safeguarding Areas (MSAs) and operational materials and waste have been scoped out in the scoping exercise (see Section 11.3 for details). This is subject to some minor caveats, in particular in relation to operational waste which are detailed in Table 11.4. Therefore, the assessment provided in this chapter will be focused only on the environmental effects from construction waste generation and management.

11.1.3 In the context of this chapter, all excavated arisings are considered as waste for this assessment. The excavated arisings predominantly include London Clay and superficial geological deposits, with lesser amounts of made ground including historically infilled and built-up land. Nonetheless, it is expected that the majority of London Clay would be repurposed (reused) off-site as a resource material under the CL:AIRE[1] Definition of Waste: Code of Practice guide (2008), and therefore will not be classified legally as a waste. To represent the worst-case situation in the assessment, and to avoid confusion, this chapter refers to all excavated arisings as waste, regardless of their potential future classification. This may be updated at the Environmental Statement (ES) stage, where more details are available.

11.1.4 There are no figures and appendices related to this chapter.

11.2 Legislation, policy and guidance

Legislation

11.2.1 The Environment Act 2021 (as amended) (the Act) provides the relevant national authorities with wide ranging powers to implement secondary legislation covering areas such as: extended producer responsibility obligations; provision of resource efficiency information; deposit schemes and charges for single use items; managing waste; and waste enforcement and regulation. The Act also amends the sections of the Environmental Protection Act 1990 dealing with the separation of waste, hazardous waste, the transfrontier shipment of waste, enforcement and enabling the establishment of an electronic waste tracking system, as well as amending the powers under the Environment Act 1995 to introduce charging schemes.

[1] Contaminated Land: Applications in Real Environments

11.2.2 The Environmental Permitting (England and Wales) Regulations 2016 (as amended) were created to standardise environmental permitting and compliance in England and Wales to protect human health and the environment. This includes permitting waste and recovery operations within the draft Order limits and at off-site third-party facilities receiving waste.

11.2.3 The Waste (England and Wales) Regulations 2011 (as amended) require that reasonable steps are taken when transferring waste to apply the following waste management hierarchy: (a) prevention; (b) preparing for reuse; (c) recycling; (d) other recovery; and (e) disposal.

11.2.4 The Hazardous Waste (England and Wales) Regulations 2005 (as amended) transpose the Hazardous Waste Directive into English and Welsh law. The Regulations prohibit the mixing of hazardous and non-hazardous waste and require that a Hazardous Waste Consignment Note is produced for each consignment of hazardous waste removed from site.

11.2.5 The Environmental Protection Act 1990 (as amended) outlines the basic provisions for the management of all waste, which includes details on the definition of waste, and outlines the duty of care placed on those involved in managing wastes.

National policy

11.2.6 Key policies relevant to materials and waste set out in the National Policy Statement (NPS) for Water Resources Infrastructure (Department for Environment, Food and Rural Affairs (Defra), 2023b) are provided in Table 11.1.

Table 11.1 Key policy from the NPS requirements for materials and waste

Paragraph	Requirement	How the Project addressed this
4.10.16	Requires the applicant to identify and assess any impacts the proposed project may have for mineral safeguarded areas (or other minerals supply aspects) with the relevant Mineral Planning Authority.	Impacts on MSAs were scoped out from further assessment at the Environmental Impact Assessment (EIA) scoping stage.
4.10.28	Indicates that where the development has an impact on a MSA, the Secretary of State must ensure that the applicant has put forward appropriate mitigation or compensation measures to safeguard mineral resources.	Impacts on MSAs were scoped out from further assessment at the EIA scoping stage.
4.12.6	Requires the applicant to set out the arrangements that are proposed for managing any waste produced in the application for development consent and prepare a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) where relevant. These should include information on the proposed waste recovery and disposal systems, and the alternatives that have been considered.	Requirements have been addressed in Section 11.4.
4.12.7	Requires the applicant to demonstrate that waste will be managed in accordance with their duty of care requirements as a waste producer and the waste hierarchy and that, during construction, excavated soil, subsoil and rock will, where feasible, be reused as per the MMP and/or Soil Management Plan.	Requirements have been addressed in Section 11.4.
4.12.7	Requires the applicant to seek to: • Minimise the volume of waste produce • Minimise the volume of waste sent for disposal unless it can be demonstrated that this is the best overall environmental, social and economic outcome when considered over the whole lifetime of the project	Requirements have been addressed in Section 11.4.

National policies and guidance

11.2.7 A summary of the key national policies and guidance relevant to the impact assessment for materials and waste is presented in Table 11.2.

Table 11.2 National policies and guidance relevant to materials and waste

Policy[2,3]	Relevance to the impact assessment
National Planning Policy for Waste (Department for Communities and Local Government, 2014)[4]	The policy sets out the government's ambition to work towards a more sustainable and efficient approach to resource use and management, and states positive planning will play a pivotal role through: Introduction, paragraph 1: '*Helping to secure the reuse, recovery or disposal of waste without endangering human health and without harming the environment.*' Determining planning applications, paragraph 8: '*The handling of waste arising from the construction and operation of development, maximises reuse/recovery opportunities, and minimises off-site disposal.*'
National Planning Practice Guidance on Waste (Ministry of Housing, Communities and Local Government, Department for Levelling Up, Housing and Communities, 2015)	The guidance suggests that a waste audit is advised for proposals that are likely to generate significant volumes of waste. Such an audit should demonstrate that waste will be minimised and managed in an appropriate manner in accordance with the waste hierarchy.
National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2024)	Overarching environmental objective of the NPPF includes minimising waste and prudent use of natural resources. Section 17 requires planning policies to take into consideration secondary and recycled materials, and minerals waste to substitute primary resources (where practicable).

[2] Environmental Improvement Plan 2023 (Defra, 2023a) has been removed from the EIA Scoping Report list as it is focused on government's approach to waste management and does not include policies related to waste generated by the Project (municipal waste stream is expected to be negligible comparing to industrial wastes).

[3] Government Review of Waste Policy in England 2011 (Defra, 2011) has been removed from the EIA Scoping Report list as it provides an overview of waste policies in the UK that were in place 14 years ago, and the national waste strategies, plans and programmes in Table 11.2 are considered the most up to date and relevant. Additionally, the Government Review of Waste Policy in England does not provide any policies related to waste generated by the Project.

[4] Supersedes the Waste Strategy for England (Defra, 2007).

Resources and Waste Strategy for England (Defra, 2018)	The strategy aims to ensure that business waste producers segregate waste into at least three streams (recycling, food, residuals) and make recycling details available. It also aims to eliminate food waste.
Waste Management Plan for England (Defra, 2021)	The plan states that by 2020, the recovery of non-hazardous construction and demolition waste (CDW) shall be increased to a minimum of 70% by weight.
Waste prevention programme for England: Maximising Resources, Minimising Waste (Defra, 2023c)	The programme sets out priorities for action to manage the resources and waste by prioritising waste prevention and reuse. It proposes three cross cutting themes (design out waste; systems and services; and data and information) and seven key sectors that the action will be focused on. The seven key sectors include: construction; textiles; furniture; electronics; vehicles; plastics and packaging; and food.

Regional and local plans and policy

11.2.8 In addition to the national policy set out above, the Project must also have regard to relevant regional and local plans and policy, as shown in Table 11.3. A summary of legislation and policy is provided in Appendix 1.1: Relevant Legislation and Planning Policies.

Table 11.3 Regional and local plans and policies relevant to materials and waste

Policy document[5]	Relevance to the impact assessment
The London Plan (Greater London Authority (GLA), 2021)	Policy SI7 (Reducing waste and supporting the circular economy) promotes circular economy, waste minimisation and prevention. It requires a Circular Economy Statement (CES) to be submitted along with a planning application. The Policy sets out the following targets: • No biodegradable or recyclable waste landfilled after 2026 • 95% of CDW to be reused/recycled/recovered • 95% of inert excavation waste to be beneficially used
The London Borough of Hounslow (LBH) Local Plan 2015–2030 (adopted) (LBH, 2015) and the LBH Local Plan 2020–2041 (emerging policy) (LBH, 2024)	Policy EQ2 (Sustainable design and construction) expects new development proposals to be designed according to principles for sustainable design and construction established in the London Plan (like reuse and recycling of construction materials). A sustainability statement should be submitted for major developments. Policy EQ7 (Sustainable waste management) promotes managing waste according to waste hierarchy principles. Policy EQ10 (Minerals) aims to promote the recycling of construction, demolition and excavation waste. LBH Local Plan 2020–2041 (emerging plan) contains the same policies as the LBH Local Plan 2015–2030 (adopted plan).
The London Borough of Richmond upon Thames (LBR) Local Plan 2018–2033 (adopted) (LBR, 2018)	Policy LP22 (Sustainable design and construction) Non-residential buildings of over 100m^2 are required to meet BREEAM 'Excellent' standard. Policy LP24 (Waste management) requires managing waste in accordance with the waste hierarchy. All developments are required to provide adequate and accessible waste storage space. Waste management should be incorporated into the overall development design. Where appropriate, the rail and waterway network should be utilised in the transportation of construction materials and waste. Production of a SWMP is required for major developments and those that are likely to generate large quantities of waste.

[5] Decisions are made in line with adopted policies in place; however, emerging policies are afforded some weight.

Policy document[5]	Relevance to the impact assessment
LBR Publication Draft (Regulation 19) Local Plan 2023 – 2039 (emerging plan) (LBR, 2023)	Policy 3 (Tackling the Climate Emergency) requires all developments to follow the circular economy principles and support efficient use of resources. Policy 7 (Waste and the Circular Economy) requires all development to ensure there is sufficient waste storage space for proper municipal waste segregation (into six streams). Developments that are likely to generate large amounts of waste are required to produce a SWMP and, additionally, a Construction Environment Management Plan is required for all development using the river to transport construction materials and waste. Construction materials should be sustainably and locally sourced, and where possible, existing materials should be reused on-site (i.e. from demolition). Non-residential developments of areas greater than 500m^2 must submit a CES. The LBR Local Plan 2023–2039 (emerging plan) policies have been progressed from those detailed in the LBR Local Plan 2018–2033 (adopted).
The Royal Borough of Kingston upon Thames (RBK) Core Strategy 2012 (adopted) (RBK, 2012)	Policy CS1 (Climate Change Mitigation) requires all developments to be designed and built with the most efficient use of resources and using sustainable materials. Policy CS9 (Waste Reduction and Management) requires waste to be approached as a resource, with disposal being the last preferable option of its management.
Kingston's Local Plan 2021–2041 (Regulation 18) (emerging plan) (RBK, 2024)	Policy KC1 (Climate Change and Environmental Sustainability) supports developments that use resources efficiently and implement circular economy principles to minimise waste disposal. Policy KC10 (Sustainable Construction and Supporting the Circular Economy) requires all development proposals to adopt a circular economy approach to building design and construction. Non-residential developments of areas greater than 500m^2 must submit a CES. Kingston's Local Plan 2021–2041 (emerging plan) policies have been progressed from those detailed in the RBK Core Strategy 2012 (adopted).

11.2.9 The West London Waste Plan[6], South London Waste Plan[7] and Policy SI8 of the London Plan (GLA, 2021) are focused on planning for waste facilities and

[6] London Boroughs of Brent, Ealing, Harrow, Hillingdon, Hounslow, Richmond upon Thames and Old Oak and Park Royal Development Corporation (2015). West London Waste Plan

[7] London Boroughs of Croydon, Kingston upon Thames, Merton and Sutton (2022). South London Waste Plan

since they are not relevant to the Project, they have not been included in Table 11.3 above. Paragraph 1.2.4 of the West London Waste Plan states '*This Plan identifies the sites allocated for waste management development in the plan area and provides policies with which planning applications for waste developments must conform.*' Policy SI8 of the London Plan (Waste capacity and net waste self-sufficiency) states that the equivalent of 100% of London's waste (excluding excavation waste) should be managed within London by 2026. It is the GLA (and all the London Waste Authorities) that will need to manage this by increasing the capacities of waste treatment, transfer, disposal and landfill. The Project does not relate to a waste facility and therefore, these policies are not considered relevant.

Other guidance

11.2.10 The assessment is based on the Institute of Environmental Management and Assessment (IEMA) guide to: Materials and Waste in EIA (IEMA, 2020).

11.3 Consultation, engagement and scoping

11.3.1 There have been consultations or engagement related specifically to materials and waste matters. Details of consultations and engagement related to the Project are provided in Chapter 4: Approach to Environmental Assessment.

11.3.2 Table 11.4 presents the section of the Scoping Opinion (Planning Inspectorate, 2024) relating to materials and waste, and our response to those comments.

Table 11.4 Key scoping opinion comments for materials and waste

PINS ID reference	Comment	Response
Planning Inspectorate (ID 3.12.1)	Minerals safeguarding areas and allocated mineral sites – all phases: The Inspectorate agrees that this matter can be scoped out on the basis presented in the ES.	MSAs and allocated mineral sites are scoped out of the ES.
Planning Inspectorate (ID 3.12.2)	Material availability – construction: Based on the information presented in the EIA Scoping Report, the Inspectorate is content that a significant effect is unlikely and this matter can be scoped out of the ES.	Construction materials are scoped out of the ES.

Planning Inspectorate (ID 3.12.3)	Material availability – operation: The Inspectorate is content with this approach and agrees to scope this matter out subject to the materials, including chemicals required in the treatment process and materials for operational maintenance and repair, being quantified in the ES.	Quantities of operational materials are being investigated and will be provided in the ES.
Planning Inspectorate (ID 3.12.4)	Void landfill capacity and expected waste arisings – operation: The Inspectorate is content with this approach and agrees to scope this matter out subject to an appropriate waste management plan being submitted and secured with the DCO application, and the ES confirming the worst-case parameters for sludge in line with the Inspectorate's comments at ID 3.12.5 of this Scoping Opinion.	Appropriate operational waste management plan will be submitted with the Development Consent Order (DCO) application. Worst-case quantities of sludge[8] are being investigated and will be provided in the ES.
Planning Inspectorate (ID 3.12.5)	Sludge volume and disposal: The Inspectorate advises that the ES should confirm the worst-case parameters for the volume of sludge produced by the Proposed Development during operation and its processing, consistent with the powers sought in the DCO.	Appropriate operational waste management plan will be submitted with the DCO application. Worst-case quantities of sludge[8] are being investigated and will be provided in the ES.

[8] Based on information provided in the EIA Scoping Report, the quantity of sludge generated during the maximum tertiary treatment plant (TTP) throughput (75Ml/day) has been estimated as 3.5t/day. The TTP will typically only be operational for a few months every two years, and the maximum throughput is expected only during drought conditions. Thames Water has a well-established route of processing sludge, mainly via anaerobic digestion. As set out in the EIA Scoping Report, the tonnage of sludge is relatively small and if all the annual sludge required disposal, it is considered to have a negligible effect.

11.4 Embedded design (primary) mitigation and standard good practice (tertiary)

Embedded design (primary) mitigation

11.4.1 The Applicant has worked an iterative process to avoid and/or reduce environmental impacts through the Project design. This is referred to as embedded design (primary) mitigation. Chapter 3: Consideration of Alternatives details the design alternatives that have been considered, including the environmental factors which have influenced the decision making.

11.4.2 Embedded design (primary) mitigation relevant to this aspect includes:

a. Excavated arisings shall be re-used on-site as far as reasonably practicable to reduce the necessity to import materials to site and to reduce excess excavated arisings that would need to be managed off-site. It is noted that such opportunities at the Project are limited; however, some proportion of excavated arisings might be reused on-site (Appendix 4.2: Commitments Register, Provisional Commitment Reference (PCR) 73). Where excavated arisings cannot be reused on-site, reuse of those materials shall be sought locally as far as is reasonably practicable. Where it is not reasonably practicable to reuse the material locally, other sites, at greater distances, requiring material for beneficial use shall be sought where reasonably practicable (PCR 73)

b. The contractor will implement standard good practice (tertiary) waste measures such as (PCR 78):

   i. Extending materials life by appropriate design and procurement decisions to reduce the need for new replacement materials and therefore reducing waste generation

c. Pre-cast modules shall be used in preference to *in situ* concrete where reasonably practicable as pre-cast forms are less likely to result in waste generation (PCR 72)

d. Imported materials shall be sought with high recycled content where reasonably practicable, to reduce the need to use primary resources, unless incompatible with design and safety specifications (PCR 71)

e. Designated on-site storage space for waste shall be provided, to allow waste segregation (e.g. separating hazardous waste from non-hazardous) and preventing uncontrolled waste spillage. On-site hazardous excavated material or waste will be kept separate from other materials and removed and managed in accordance with legislative requirements (PCR 77)

Standard good practice (tertiary mitigation)

11.4.3 Standard good practice (tertiary) would occur as a matter of course due to legislative requirements or standard sector practices. Standard good practice (tertiary) for this aspect includes:

a. The contractor will implement standard good practice (tertiary) waste measures such as (PCR 78):

i. Managing waste according to waste legislation requirements, e.g. sending waste only to licensed / permitted facilities and by licensed contractors

ii. Applying circular economy principles, which are driven by design (eliminate waste and pollution, circulate products and materials, regenerate nature)

iii. Implementing an appropriate approach to import of materials that reduces the risk of unusable surplus materials that would need to be discarded as waste

iv. Identifying reusable materials for reuse on-site, storage or resale

v. Exploring opportunities for using surplus recycling or recovered materials in local community projects where reasonably practicable, e.g. utilising recycled mulch from tree felling at community facilities

vi. Prevention of waste and construction materials spillage onto the streets, which is especially important considering the urbanised location of the Project. Vehicles with closed trailers shall be considered to avoid any weather interference with waste transportation

b. The design of the Project shall follow the waste hierarchy by reducing waste generation, increasing the recycling or recovery of waste where reasonably practicable, and reducing the need for waste disposal where reasonably practicable (PCR 70)

c. The contractor shall seek to achieve the following measures as far as reasonably practicable (PCR 79):

i. Recovery of at least 70% of non-hazardous Construction and Demolition Waste generated during the construction, in line with the Waste Management Plan for England

d. The contractor shall develop and implement a MMP with provision for handling of excavated materials including soils, so they can be re-used on- or off-site. The MMP shall be produced in accordance with the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Site (PCR 33)

e. The contractors will develop and implement a Site Waste Management Plan for the sustainable management of waste (PCR 74)

11.4.4 Measures specific to the Project and based on local plans and policies include the following:

a. Reuse/recycling/recovery of at least 95% of Construction and Demolition Waste, in line with the London Plan (PCR 79)

b. 95% of inert excavation arisings to be beneficially used, in line with the London Plan (PCR 79)

c. No biodegradable or recyclable waste landfilled after 2026, in line with the London Plan (PCR 79)

d. A CES will be prepared to capture circular economy solutions (PCR 76)

11.5 Assessment methodology

General approach

11.5.1 The methodology to be applied, as established in the EIA Scoping Report (Thames Water, 2024), is based on the IEMA guide to: Materials and Waste in EIA, using two geographically different study areas (see Section 11.6 for more details defining development and expansive study areas) to examine the generation and management of waste.

11.5.2 Waste management and processing infrastructure that is used to recover waste arisings and as a result divert them from landfill is considered here as a factor reducing the magnitude of waste impacts. Therefore, they are not a sensitive receptor in the context of the assessment.

11.5.3 The magnitude of impact is assessed for the construction phase only, as operational waste generation has been scoped out. Construction is considered from the point of gaining site access, site preparation including any site remediation, enabling works and construction, up to the commissioning of the Project.

Assessing the significance of effects

Sensitivity

11.5.4 The sensitivity of waste is defined by the availability of regional/national landfill void capacity in the absence of the Project. Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste.

11.5.5 IEMA defines a two-step process to be applied for determining sensitivity (as described in the EIA Scoping Report). However, the data required to be able to follow the two-step process are not available at this time. IEMA allows for this and sets out a simplified approach which allows the sensitivity to be determined using a statistical trend analysis of landfill capacity in the expansive study area. Baseline data forming the assessment of waste in terms of sensitivity have been provided in Table 11.14 and Table 11.15 within Section 11.7.

11.5.6 To determine the sensitivity of landfill void capacity, the following scales from Table 11.5 and Table 11.6 will be applied for inert and non-hazardous, and for hazardous landfill respectively.

Table 11.5 Assessment on sensitivity of landfill void capacity in the absence of the Project, inert and non-hazardous waste

Negligible	Low	Medium	High	Very high
Landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.	Landfill void capacity is expected to reduce minimally: by <1% as a result of wastes forecast.	Landfill void capacity is expected to reduce noticeably: by 1–5% as a result of wastes forecast.	Landfill void capacity is expected to reduce considerably: by 6–10% as a result of wastes forecast.	Landfill void capacity is expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Source: IEMA Materials and Waste in EIA (2020)

Table 11.6 Assessment on sensitivity of landfill void capacity in the absence of the Project, hazardous waste

Negligible	Low	Medium	High	Very high
Landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.	Landfill void capacity is expected to reduce minimally: by <0.1% as a result of wastes forecast.	Landfill void capacity is expected to reduce noticeably: by 0.1–0.5% as a result of wastes forecast.	Landfill void capacity is expected to reduce considerably: by 0.5–1% as a result of wastes forecast.	Landfill void capacity is expected to reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Source: IEMA Materials and Waste in EIA (2020)

11.5.7 The hazardous waste infrastructure within England will be used to assess likely significant effects of hazardous waste generated by the Project due to the limited hazardous waste landfill capacity within the expansive study area. It is likely that hazardous waste would need to be disposed of outside the study area.

Magnitude

11.5.8 The IEMA guidance offers two possible methods for conducting the assessment on waste. For this assessment, Method W1 (see details below) has been chosen, as IEMA recommends it for statutory EIAs and it is considered as most appropriate for more complex developments.

Method W1 – void capacity

11.5.9 Using this method, impacts of the development are assessed by determining the percentage of the remaining landfill capacity that will be reduced by waste produced during the construction of the Project. There are two separate scales to determine the magnitude of impacts, one for inert and non-hazardous waste, and the second one for hazardous waste. They are presented in Table 11.7 and Table 11.8 respectively.

Table 11.7 Void capacity method – environmental effects of inert and non-hazardous waste

No change	Negligible	Minor	Moderate	Major
Zero waste generation and disposal from the development.	Waste generated by the development will reduce regional* landfill void capacity baseline** by <1%.	Waste generated by the development will reduce regional* landfill void capacity baseline** by 1–5%.	Waste generated by the development will reduce regional* landfill void capacity baseline** by 6–10%.	Waste generated by the development will reduce regional* landfill void capacity baseline** by >10%.

** Or, where justified, national. (Note we shall use the two regions (London and South East of England), as defined in the expansive study area).*

*** Forecast as the worst-case situation, during a defined construction phase*

Source: IEMA Materials and Waste in EIA (2020)

Table 11.8 Void capacity method – environmental effects of hazardous waste

No change	Negligible	Minor	Moderate	Major
Zero waste generation and disposal from the development.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.1%.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.1–0.5%.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.5–1%.	Waste generated by the development will reduce national landfill void capacity baseline* by >1%.

** Forecast as the worst-case scenario, during a defined construction phase*

Source: IEMA Materials and Waste in EIA (2020)

Determining significance

11.5.10 To determine whether an effect is significant or not, first the effect threshold should be established, where the sensitivity and magnitude are put together to determine the effect itself. The effect threshold used in this assessment is presented in Table 11.9. The pre-mitigation scenario should consider primary (inherent/embedded) and tertiary (inexorable/good practice) mitigation, while the post-mitigation scenario should also include secondary (foreseeable) mitigation that has been identified and committed to through environmental assessment.

Table 11.9 Effect threshold to be used in EIA

		Magnitude of impact				
Sensitivity (or value) 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

Source: IEMA Materials and Waste in EIA (2020)

11.5.11 Once the effect threshold has been established, Table 11.10 is used to determine whether the effect is significant or not. Where the effect has been established to be ‘Slight or Moderate’, professional judgement and appropriate justification should be applied in determining the outcome.

Table 11.10 Determining significance

Effect	Significance
Neutral, Slight	Not significant
Moderate, Large, Very Large	Significant

Source: IEMA Materials and Waste in EIA (2020)

Assumptions and limitations

11.5.12 The assessment on waste receptors is predominantly based on a review of the publicly available baseline information and waste quantities estimates, and other design information available at the time of the assessment.

11.5.13 At the PEI Report stage, there is limited availability of detailed information on construction waste quantities and their management. Only high-level estimates of the potential excavation arisings and their composition have been made, based on the current design information. It has been assumed that only a small proportion of all arisings will be used on-site for engineering purposes, in landscaping or as environmental bunding. Quantities of such arisings will be determined in more detail and provided in the ES. Where they cannot be used within the Project, it is assumed that the material will be managed off-site, and disposal would be the least preferrable option.

11.5.14 Whilst the baseline data sources used in this assessment represent the most recently available stakeholder information, there is a general lag (in years) for waste processing and landfill capacity data in the UK, and conditions may have changed since the publication of these data. Waste management facilities may be subject to reduced capacities due to use of their finite capacity or permit modification and surrenders changing the availability of capacities. Although checks are made by stakeholders for anomalies or errors in their data prior to publication, it cannot be guaranteed that these data sets are error-free, or whether any commercial decisions have been taken by site operators that may have affected these data. The availability of waste management capacity may also be impacted by other buildings and infrastructure projects taking place at the time of construction of the Project.

11.6 Study area

11.6.1 Study areas are defined with reference to the IEMA guide to: Materials and Waste in EIA. The assessment defines two geographically different (development and expansive) study areas, used to examine the management of waste (as other aspects have been scoped out from this assessment).

11.6.2 The development study area comprises all land contained within the Project draft Order limits, meaning the construction boundary and areas required for temporary use. Such temporary land use could include temporary access, site compounds, working platforms and other enabling activities. It is understood that waste would be generated within the development study area and in the

case of the Project, it would be mainly at the Mogden Sewage Treatment Works (STW) site and at shaft locations.

11.6.3 The expansive study area includes the capacity of waste management infrastructure and remaining landfill void space. This is considered on a regional (or, where justified, national) basis, within one or more regions as appropriate. The Project is localised in the western part of the London region, which is the assumed place of waste generation during the construction phase. However, due to the urbanised character of the region and lack of waste management sites within it, there may be effects on the neighbouring region of South East of England. This region is therefore taken into consideration in this assessment and, along with London, forms the expansive study area.

11.6.4 In the context of this chapter, the South East is the region comprising Berkshire, Buckinghamshire, East Sussex, Hampshire, Isle of Wight, Kent, Oxfordshire, Surrey and West Sussex. The region of London comprises City of London and Greater London.

11.7 Baseline conditions

11.7.1 A desk-based assessment has been undertaken to establish existing baseline conditions. This has been prepared with reference to the following documents, which represent the most recent information available:

a. Environment Agency (2024): 2023 Waste Data Interrogator
b. The London Plan (GLA, 2021)
c. The LBH Local Plan 2015–2030 (LBH, 2015)
d. LBH Local Plan 2020–2041 (emerging policy) (LBH, 2024)
e. The LBR Local Plan 2018 (LBR, 2018)
f. LBR Publication Draft (Regulation 19) Local Plan (emerging policy) (LBR, 2023)
g. RBK Core Strategy (RBK, 2012)
h. Kingston's Local Plan. First Draft of the Local Plan Consultation (Regulation 18) 2023 (emerging policy) (RBK, 2024)

11.7.2 The baseline environment for waste is focused on one receptor, described below, as materials and MSAs were scoped out from further assessment in the EIA Scoping Report.

a. Landfill void capacity – regional (or, where justified, national) availability of inert, non-hazardous and hazardous landfill void capacity within the expansive study area

Waste

11.7.3 Construction of the Project would potentially generate a range of waste types including inert, non-hazardous and hazardous wastes. A large proportion of the solid waste is likely to be suitable for reuse, recycling or other recovery, although a proportion may also require disposal.

11.7.4 No precise information on waste types and quantities is available at this stage; nonetheless, estimates have been provided by the Applicant. These will be updated as ground investigations and design work develop, at the ES stage.

11.7.5 A small amount of municipal solid waste (MSW) (food waste, packaging and such like) associated with construction workers is expected. Maximum construction staff numbers have been estimated to be 250 and associated waste generation is shown in Table 11.11 Construction, demolition, excavation and municipal waste quantities from the Project. Nonetheless, proper municipal waste segregation on-site would minimise the risk of waste being diverted to a landfill.

11.7.6 Green wastes, from the clearance of the areas that form the development study area, can include wastes such as trees, plants, bushes, leaves and grass. These are expected to be relatively small as the majority of works will be carried out underground.

11.7.7 Hazardous wastes are expected in the form of oils, grease, used batteries or accumulators. The quantities are not available, but they are expected to be negligible, and they have not been included in the waste assessment.

11.7.8 The vast majority of wastes from the construction phase will be classified as Construction, Demolition and Excavation (CDE) waste type. The quantity of demolition waste has been provided and is expected to be in the form of broken out concrete from the removal of existing structures[9] at the proposed site of the Tertiary Treatment Plant (TTP) and Thames Lee Tunnel (TLT). Construction waste quantities have been estimated in accordance with the Waste and Resources Action Programme (WRAP) wastage rates from the Net Waste Tool, which were applied to the quantities of imported materials required for the Project construction, as shown in Table 11.11.

11.7.9 It should be noted that, in the context of the Project, excavated arisings include London Clay, made ground (anthropogenic materials, i.e. landfill), soils and other types. Some excavated arisings, especially London Clay, might not be classified as waste after excavation, but to represent the worst-case situation, in this chapter they are considered as such.

11.7.10 As presented in Chapter 10: Ground Conditions and Contaminated Land, it is anticipated that within the development study area the excavated arisings would be predominantly (approximately 75%) London Clay based on the Conceptual

[9] Existing concrete structures to be removed are the storm tank slab at the TTP and the shaft lining at the TLT (assuming that the pipejack option is selected).

Ground Model (see Chapter 10 for more details) and confirmed by the ongoing ground investigation. The chapter also confirms there are historical landfills within the development study area; however, ground investigation completed to date confirms there are no hazardous materials found in the areas to be excavated[10]. If there are any changes in this matter, they will be reviewed at the ES stage. The volume of the excavated arisings has been based on the current design data and provided in Table 11.11 below. This has been generated through assessment of the current ground investigation data and design information.

Table 11.11 Construction, demolition, excavation and municipal waste quantities from the Project

Waste Type	Material Type	Material quantity (m^3)	Expected wastage rate	Waste quantity (m^3)
Construction waste	Cement powder	3,660	5.0%	180
Construction waste	Pre-cast concrete	18,010	0.5%	90
Construction waste	Ready-mixed concrete	27,730	5.0%	1,390
Construction waste	Steel	1,320	2.0%	30
Demolition waste	Concrete	N/A	N/A	4,740**
Excavation waste	Excavated arisings*	N/A	N/A	217,770** ***
MSW	Mixed MSW	N/A	N/A	3,140****
	Total	**50,720**	**N/A**	**227,340**

** At the PEI Report stage, to represent the worst-case situation, it has been assumed that all excavated arisings would require disposal to a landfill. This assumption will be revised and updated at the ES stage where more information is available.*

*** A factor of 2.5% has been applied to demolition waste and excavated arisings to represent the worst-case situation for example over excavation activities.*

**** Bulking factor of 1.5t/m^3 has been applied to the excavated volume, to illustrate its increase (decompaction) after excavating.*

***** Municipal waste generation from construction workers has been calculated using the MSW density of 0.15t/m^3 and a waste generation rate of 0.377t/person/year.*

11.7.11 Any contaminated ground and excavated made ground identified within the excavated arisings would need to be disposed of off-site. Currently, there are

[10] Note that asbestos was identified in the inspection pits for the borehole MT-027; further details are provided in Chapter 10: Ground Conditions and Contaminated Land. However, the proposed works will not disturb or interact with the surface soils in this area.

two main locations with identified made ground: Eastern Embankment and drive shaft, both at the Mogden STW site. Its composition, based on samples recovered during the ground investigation, includes mainly inert materials (concrete, flint, gravel, sand, brick, clay, glass, clinker, ash) with occasional occurrence of non-inert materials (wood, coal, charcoal, rootlets). It has been estimated that made ground constitutes up to 25% of the total excavated arisings volume. More detailed information will be provided in the ES.

11.7.12 Excavated London Clay will likely be transported off-site as opportunities to reuse it for the construction of the Project are limited; however, further investigation as to on-site uses will be explored. It is yet to be established how the material will be processed, but it may be reused or processed and recycled as it is a sought-after material. Examples of clay reuse include within the ceramics industry, site backfilling or for wider construction purposes. Excavated arisings, other than London Clay, can be reused in various construction schemes such as landfill shaping or embankments. Suitable processing and/or disposal locations are being developed and will be provided in the ES. It has to be noted that disposal to landfill may be required for excavated made ground.

Transfer, treatment, recycling and incineration of waste

11.7.13 The availability of waste transfer, treatment, recycling and recovery infrastructure, able to accept waste likely to be generated, has been considered through a review of the 2023 Waste Data Interrogator for London and South East of England (expansive study area).

11.7.14 Whilst annual capacity data are published by the Environment Agency for both landfill and incineration facilities at the national, regional and sub-regional level, no annual capacity data are published by the Environment Agency for waste transfer, treatment or recycling sites. Only annual tonnage throughput is published for these facilities. Table 11.12 provides information on the annual throughput for different facilities.

Table 11.12 Annual permitted throughput or capacity of transfer, treatment, recycling and incineration in London and South East of England

Site type	London (000s t)	South East (000s t)	Total (000s t)
Transfer (annual throughput)			
Hazardous waste transfer stations	571	755	**1,326**
Household, industrial, commercial waste transfer stations	5,128	4,017	**9,145**
Non-biodegradable waste transfer stations	1,466	293	**1,759**
Treatment and metal recycling (annual throughput)			
Material recovery	1,713	2,450	**4,163**
Physical treatment	4,779	6,543	**11,322**
Physico-chemical treatment	338	359	**697**
Chemical treatment	-	8	**8**
Composting	177	752	**929**
Biological treatment	650	2,406	**3,056**
Metal recycling	786	558	**1,344**
Incineration (annual capacity)			
Hazardous waste	-	58	**58**
Co-incineration of non-hazardous waste	-	-	**0**
Municipal and/or industrial and commercial incineration	1,948	3,508	**5,456**
Biomass/waste wood incineration	-	332	**332**

11.7.15 Based on the above, it can be assumed that there will be opportunities for waste arisings to be transferred, treated, recycled or recovered as appropriate if they cannot be reused, recycled or otherwise recovered on-site. The available waste transfer, treatment, recycling and recovery infrastructure is considered as beneficial in that this management will move waste up the waste hierarchy. These facilities are therefore not considered to be receptors for the purposes of assessment in the same way as landfills, given that they have the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal.

Disposal

11.7.16 For wastes which cannot be reused, recycled or otherwise recovered, disposal to landfill will be required. The 2023 Waste Data Interrogator details the total remaining landfill capacity in London and South East of England in 2023, as presented in Table 11.13.

Table 11.13 Landfill capacity available in London and South East of England, 2023

Landfill type	London (000s m^3)	South East (000s m^3)	Total (000s m^3)
Hazardous merchant landfill	0	73	**73**
Hazardous restricted landfill	0	160	**160**
Non-hazardous landfill with SNRHW cell*	0	10,014	**10,014**
Non-hazardous landfill	3,943	16,644	**20,587**
Non-hazardous restricted landfill	0	0	**0**
Inert landfill	856	19,321	**20,177**
Total	**4,799**	**46,212**	**51,011**

**Some non-hazardous sites can accept some Stable Non-Reactive Hazardous Wastes (SNRHW) into a dedicated cell, but this is usually a small part of the overall capacity of the site.*

Forecast of landfill capacity

11.7.17 IEMA guidance requires an assessment to consider the potential impact of waste by forecasting regional landfill capacity up to construction finalisation (opening year) of a project.

11.7.18 Inert landfill capacity has been chosen as an indicator for assessing waste effects at this stage, as it is expected that inert waste (mainly excavated arisings) will be the most significant waste stream generated by the Project. Ground investigation completed to date shows that even the excavated made ground would be mainly inert type (see Appendix 10.1: Teddington DRA Phase 1 Ground Investigation Interim Factual Report). Construction wastes would also mainly be inert (concrete, cement). Furthermore, it is treated as the worst-case, with regard to landfill capacity, to only take inert landfill capacity into consideration for the expected inert waste stream as inert waste could be disposed to both inert and non-inert landfills and their joined capacity is bigger than inert landfill capacity itself.

11.7.19 The predicted changes in landfill capacity (from 2023 onwards) have been derived from the latest 2023 Waste Data Interrogator time-based data (which have analysed the remaining landfill capacity trend between 2005 and 2023). These data have been projected forward to 2033 (proposed opening year), using the calculated average annual capacity change in inert landfill in London (2.7% increase) and the South East (2.0% increasing capacity) in order to provide an estimate of the remaining landfill void that may be available during the construction years.

11.7.20 Forecast information on inert landfill capacity for London and the South East of England is set out in Table 11.14. As explained in the EIA Scoping Report, an increasing trend of inert landfill capacity can be expected as a result of planning for new capacity by local planning authorities (both new landfill sites and expansion of existing ones) and backfilling of former quarries.

Table 11.14 Inert landfill capacity forecast for London and South East of England

Year	Forecasted inert landfill capacity (000s m^3) London	Forecasted inert landfill capacity (000s m^3) South East England
2029	1,006	21,750
2030	1,033	22,183
2031	1,062	22,626
2032	1,091	23,076
2033	1,120	23,536
Average capacity during construction (2029–2033)	1,062	22,634
Combined average capacity during construction		**23,697**

11.7.21 Similarly, the predicted changes in non-inert landfill capacity have been projected for the construction period to provide an estimate of the remaining landfill void that may be available for potential accommodation of non-inert waste types. This has been forecast using the calculated average annual capacity change (excluding the two most extreme changes) in non-inert landfill (2.4% increasing capacity in London, 7.1% decreasing capacity in the South East). The results are shown in Table 11.15.

11.7.22 Non-inert[11] landfill capacity has been chosen as a sensitive factor for non-inert waste as it would likely be transferred there if disposal is required. However, currently available information estimates mainly inert waste, except for the 30m^3 of steel wastes and 3,140m^3 of MSW, as per Table 11.11. Nonetheless, further information on quantities of non-inert waste will be sought at future stages of the Project and potential impacts on non-inert landfills in the region will be analysed then.

Table 11.15 Non-inert landfill capacity forecast for London and South East of England

Year	Forecasted non-inert landfill capacity (000s m^3) London	Forecasted non-inert landfill capacity (000s m^3) South East England
2029	4,550	17,216
2030	4,660	15,998
2031	4,772	14,867
2032	4,887	13,816
2033	5,005	12,839
Average capacity during construction (2029–2033)	4,775	14,947
Combined average capacity during construction		**19,722**

11.7.23 The data provided in Table 11.14 and Table 11.15 have been used to calculate total (inert and non-inert) landfill capacity in the expansive study area, which is 43,419,000m^3.

Future baseline

11.7.24 As materials and waste assessment is focused only on the construction part of the Project, there is no need to consider future baseline in this chapter. Future landfill availability expected between 2029 and 2033 (construction period) has been covered in the Table 11.15 above.

[11] Non-inert: non-hazardous landfill sites, non-hazardous landfill sites with a SNRHW Cell, merchant hazardous landfill sites

11.7.25 However, climate change is expected to lead to an increase in temperatures, with a greater frequency of hotter, drier summers and warmer, wetter winters. Climate change is also expected to lead to sea level rise which will affect tide levels and associated flood risk within the tidal section of the River Thames as far west as Teddington Weir. Further information on projected changes in climate parameters is provided in Chapter 18: Climate Change. Projected future changes in climate (e.g. an increase in temperatures) have the potential to interact with effects identified within some environmental aspects and exacerbate or diminish their impact. Such combined impacts are termed In-Combination Climate Impacts (ICCI). Consideration of the potential ICCI associated with materials and waste is provided in Section 11.8 of this chapter.

11.8 Preliminary assessment of likely significant effects

11.8.1 This section sets out the likely significant effects on waste during construction. The assessment assumes that embedded design (primary) mitigation and standard good practice (tertiary) measures in the draft Code of Construction Practice are in place, and the results of the assessment then inform the need for any additional (secondary) mitigation requirements during construction.

11.8.2 As stated previously, the sensitive receptor in the context of this chapter is landfill capacity within the expansive study area. Potential impacts already include embedded mitigation and standard good practice (tertiary) (see Section 11.4) and can be considered from both a direct and indirect perspective, as shown in Table 11.16. They are inextricably linked with waste generation in general and cannot be eliminated but can be minimised with appropriate additional (secondary) mitigation and enhancement measures.

Table 11.16 Potential impacts and effects on waste

Element	Direct impacts	Adverse effects	Indirect impacts
Waste	Generation and disposal of waste	Reduction in landfill capacity. Unsustainable use or loss of resources to landfill that result in the temporary or permanent degradation of the natural environment.	Release of dust and greenhouse gas emissions (through transportation and management). Water and energy consumption. Ecological impacts (e.g. necessity to open new waste management and disposal sites). Visual impacts, noise, vibration, disruption to traffic and other potential causes of nuisance.

11.8.3 Generally, the Project would result in the generation of a number of common waste types, including excavated earthworks, soils, green waste, unavoidable construction wastes (off-cuts and off-specification products), avoidable construction wastes (damaged and excess materials), small quantities of hazardous oils, paints and Waste from Electrical and Electronic Equipment,

(WEEE), packaging wastes, wood/timber waste, waste metal and MSW from site offices.

11.8.4 Small amounts of hazardous wastes such as used paint, oils, adhesives, batteries, sealants and tars generated during construction can be managed via the regional hazardous waste transfer station facilities for recycling, recovery and disposal as appropriate. Although it is possible that some specific items of hazardous wastes may end up being disposed of outside the region, this is unlikely to be large volumes, e.g. small numbers of portable batteries to be disposed of at very specialist national facilities. Green waste arisings from site clearance can be recovered via composting facilities. Finally, quantities of non-hazardous MSW will be suitable for recycling and recovery via commercial and industrial facilities within the region.

11.8.5 The most significant waste stream produced by the Project would be excavated earthworks arisings, which, depending on their quality, would be reused, recycled or disposed. As identified in paragraph 11.7.9, made ground contains mainly inert materials with rare occurrences of non-inert ones. It has been assumed then, that if the whole tonnage requires disposal, it would be potentially transferred to an inert landfill.

Likely significant effects

11.8.6 To determine the likely significant effect, and first the sensitivity and magnitude level of the receptor, IEMA requires the worse-case situation to be assessed, which would be landfilling all waste from the construction of the Project. Two scenarios have been considered:

a. Scenario 1 – where it is assumed that all currently estimated inert waste would be disposed to inert landfill sites, as the vast majority of waste generated by the Project is expected to be inert. The aim of this scenario is to present the worst possible impacts on inert landfill sites in the region.

   Only inert landfill capacity is required for scenario 1.

b. Scenario 2 – where it is assumed that all currently estimated waste would be disposed of to both inert and non-inert landfill sites, as the Project would generate both waste types. This scenario presents the standard approach set out in the IEMA guidance, where the total of inert and non-inert landfill capacity is assessed.

   The total of inert and non-inert landfill capacity is required for scenario 2.

11.8.7 Sensitivity of landfill capacity is assessed by the forecasted reduction in such capacity during the construction period (2029 to 2033), as shown in Table 11.17. Considering:

a. Scenario 1 (inert landfill) – between the years 2029 and 2033, inert landfill capacity in the expansive study area is expected to increase by 8.4% (see Table 11.14). This is considered a Negligible sensitivity level, as defined in Section 11.5.

b. Scenario 2 (inert and non-inert landfills) – such capacity is expected to reduce by 4.5% (see Table 11.14 and Table 11.15) between 2029 and 2033

in the expansive study area. This is considered a Medium sensitivity level, as defined in Section 11.5.

Table 11.17 Determining sensitivity level of the landfill capacity

Scenario		Sensitivity determined	Sensitivity criteria
1	Waste disposal at inert landfill	Over the years 2029–2033, inert landfill capacity in the expansive study area is expected to increase by 8.4%.	Negligible: Landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.
2	Waste disposal at inert and non-inert landfill	Over the years 2029–2033, inert and non-inert landfill capacity in the expansive study area is expected to decrease by 4.5%.	Medium: Landfill void capacity is expected to reduce noticeably: by 1–5% as a result of wastes forecast.

11.8.8 Magnitude of impact is assessed by calculating the landfill void that will be reduced by waste generated from the construction, as shown in Table 11.18. The Project will produce 224,170m^3 of inert waste and 3,170m^3 of non-inert waste[12] in the worst-case situation. That would result in altering the average forecasted landfill capacity in the expansive study area as follows:

a. Scenario 1 (inert landfill) – disposal of inert wastes at inert landfills would reduce the capacity by 0.95%. This is considered a Negligible magnitude level, as defined in Section 11.5.

b. Scenario 2 (inert and non-inert landfills) – disposal of all wastes at both inert and non-inert landfills would reduce their combined capacity by 0.52%. This is considered a Negligible magnitude level, as defined in Section 11.5.

[12] Non-inert waste, in this case, includes MSW and steel waste.

Table 11.18 Determining magnitude level of the landfill capacity

Scenario		Magnitude determined	Magnitude criteria
1	Waste disposal at inert landfill	Project will generate around 224,170m^3 of inert waste. That would alter the inert landfill capacity* (23,697,000m^3) in the expansive study area by 0.95%.	Negligible: Waste generated by the development will reduce regional landfill void capacity baseline by <1%.
2	Waste disposal at inert and non-inert landfill	Project will generate around 227,340m^3 of inert and non-inert waste. That would alter the inert and non-inert landfill capacity* (43,419,000m^3) in the expansive study area by 0.52%.	Negligible: Waste generated by the development will reduce regional landfill void capacity baseline by <1%.

**Construction period (2029–2033) average capacity, as calculated in Table 11.14 (inert landfill) and Table 11.15 (non-inert landfill).*

11.8.9 Overall, based on the receptor (landfill capacity) sensitivity and magnitude of impacts, the effects of the Project are expected to be Neutral (considering only inert landfill capacity as scenario 1) or Neutral/Slight (considering inert and non-inert landfill capacity as scenario 2), both of which are considered Not significant. This is shown in Table 11.19.

Table 11.19 Preliminary assessment of likely significant effects during construction

Scenario		Receptor	Sensitivity of receptor	Magnitude of impact	Likely significance of effect
1	Waste disposal at inert landfill	Inert landfill capacity in the expansive study area	Negligible	Negligible	Neutral
2	Waste disposal at inert and non-inert landfill	Inert and non-inert landfill capacity in the expansive study area	Medium	Negligible	Neutral or Slight

11.8.10 It should be noted that, according to the London Plan (GLA, 2021), 95% of excavated arisings (and all inert excavations) should be beneficially used – this would be a more realistic approach rather than disposing them at a landfill. As the vast majority of waste generated by the Project would be in the form of excavated arisings, it is anticipated that disposal of waste will be minimal although it is not possible to provide details at this stage.

Cumulative effects

11.8.11 A preliminary assessment of intra-project and inter-project cumulative effects (excluding climate change) for materials and waste is contained in Chapter 19: Cumulative Effects.

In-combination effects with climate change

11.8.12 Climate change is unlikely to impact materials and waste. The materials and waste assessment focuses on the construction phase of the Project, and changes in climate over the shorter term are relatively small. Although extreme events such as flooding may restrict access to waste facilities including landfill, there is sufficient available landfill and alternative capacity within the expansive study area.

11.8.13 ICCIs in relation to materials and waste during the operational phase have been scoped out from the ES due to the low volumes of materials and waste. Climate change in the longer term is unlikely to increase operational materials and wastes volumes sufficiently to scope in materials and/or waste impacts, if the TTP operated more frequently than the currently assumed future operation. Any changes in climate to operational materials and waste would still be considered low in comparison to the receptors.

11.8.14 Overall, the change in climate does not affect the receptors (landfill capacity) in this materials and waste assessment for both the construction and operational phases.

11.9 Additional (secondary) mitigation and enhancement measures

Additional (secondary) mitigation

11.9.1 Mitigation measures are defined in Chapter 4: Approach to Environmental Assessment. Embedded design (primary) mitigation and standard good practice (tertiary) specific to this aspect are provided in Section 11.4.

11.9.2 As set out in Table 11.4, PINS agreed to scope out operational waste; however, as part of an additional (secondary) mitigation an appropriate operational waste management plan will be submitted with the DCO application.

11.9.3 There are no other additional (secondary) mitigations identified at this stage of the Project.

Enhancement measures

11.9.4 There are no enhancement measures identified at this stage of the Project. Opportunities will be explored and provided at the ES stage.

11.10 Summary of Residual Likely Significant Effects

Table 11.20 Summary of residual likely significant effects for materials and waste

Description of effect	Likely significance of effect	Additional mitigation (secondary) and enhancement measures	Residual effects
Reduction in regional landfill void capacity (Construction Phase)	Neutral or Slight adverse (Not significant)	None identified	Neutral or Slight adverse (Not significant)

11.11 Next steps

11.11.1 Further refinement on waste types and quantities will be provided and analysed in the ES. Nonetheless, no significant effects are expected.

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