A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 6

6.1 Environmental Statement

Chapter 10: Material Assets and Waste

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

26 February 2021

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A428 Black Cat to Caxton Gibbet improvements

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Chapter 10: Material Assets and Waste

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10 Material assets and waste

10.1 Competent expert evidence

10.1.1 This chapter presents the results of an assessment of the likely significant effects of the Scheme in relation to material assets and waste, defined as comprising:

a. The consumption of materials and products (from primary, recycled or secondary, and renewable sources).

b. The generation and management of waste.

10.1.2 The assessment has been undertaken and reported by a team of competent materials and waste experts within AECOM, the quality and completeness of which has been approved by a Technical Director who holds the qualification of BSc Chemistry, and is a Chartered Chemist and a Member of the Royal Society of Chemistry.

10.1.3 The Technical Director has 25 years of experience in waste and resource management and land quality consultancy. They contribute to, and manage, materials and waste impact assessments as part of Environmental Impact Assessments (EIA) and other projects. They possess a detailed knowledge of the material assets and waste impact assessment process, as applied to linear infrastructure developments.

10.2 Legislative and policy framework

10.2.1 The following legislation and planning policy are of direct relevance to the assessment of material assets and waste. Compliance (or otherwise) with statute and policy relating to material use and waste generation, management and/or disposal is addressed within the Case for the Scheme **[TR010044/APP/7.1]**.

The Waste (England and Wales) Regulations 2011

10.2.2 *The Waste (England and Wales) Regulations 2011* (Ref 10-1) (as amended) transpose the requirements of the European *Waste Framework Directive* (EWFD) 2008/98/EC (Ref 10-2) in England and Wales, and requires the Secretary of State to establish waste prevention programmes and waste management plans that apply the waste hierarchy.

10.2.3 Waste is defined by Article 1(a) of the *EWFD* (Ref 10-2) as *"any substance or object (in the categories set out in Annex I) which the holder discards or intends to discard or is required to discard"*. The waste hierarchy is defined in the *EWFD* (Ref 10-2) and prioritises waste prevention, followed by preparing for reuse, recycling, recovery and finally disposal to the management of waste.

10.2.4 The Regulations (Ref 10-1) require businesses to apply the waste hierarchy when managing waste, and also require that measures are taken to ensure that, by the year 2020 and beyond, at least 70% by weight of non-hazardous construction and demolition waste is subjected to material recovery. The target specifically excludes naturally occurring materials with European Waste Catalogue Code 17 05 04 (Ref 10-3).

10.2.5 The assessment in this chapter has taken account of the waste hierarchy, and of the targets for recovery of non-hazardous construction and demolition waste.

Waste Management Plan for England

10.2.6 The *Waste Management Plan for England* (Ref 10-4) fulfils the mandatory requirements of Article 28 of the *EWFD* (Ref 10-2), and other required content as set out in Schedule 1 of *The Waste (England and Wales) Regulations 2011* (Ref 10-1).

10.2.7 The Plan (Ref 10-4) has been considered in the assessment as it provides an analysis of current waste management practices in England, and evaluates the implementation of the objectives and provisions of the *EWFD* (Ref 10-2). In relation to demolition and construction waste, it also details how England is committed to meeting its target of recovering at least 70%, by weight, of non-hazardous construction and demolition waste by the year 2020 and beyond.

Other waste legislation

10.2.8 The assessment has also taken account of other legislation relevant to waste including, but not limited to:

a. The *Environmental Permitting (England and Wales) Regulations 2016* (Ref 10-5).

b. *Hazardous Waste (England and Wales) Regulations 2005* (Ref 10-6) (as amended).

c. *Environmental Protection Act 1990* (Ref 10-7) (as amended).

National Policy Statement for National Networks

10.2.9 The *National Policy Statement for National Networks* (NPSNN) (Ref 10-8) sets out policies in relation to the safeguarding of mineral resources (paragraphs 5.169 and 5.182) and the management of waste (paragraphs 5.39 to 5.45) on transportation schemes.

10.2.10 The *NPSNN* (Ref 10-8) states that applicants should safeguard any mineral resources on the proposed site, as far as possible, and put forward appropriate mitigation measures to safeguard mineral resources.

10.2.11 The *NPSNN* (Ref 10-8) states that applicants should set out their arrangements for managing any waste produced and should include information on the proposed waste recovery and disposal system for all waste generated by the development. It also states that applicants should seek to minimise the volume of waste produced and the volume of waste sent for disposal, unless it can be demonstrated that the alternative is the best overall environmental outcome.

10.2.12 The requirements of the *NPSNN* (Ref 10-8) in relation to safeguarding mineral resources, and in relation to minimising and managing waste, have been taken into account as part of the design development of the Scheme and in developing the planned approach to its construction, as described within **Chapter 2**, **The Scheme** of the Environmental Statement **[TR010044/APP/6.1]**.

10.2.13 The assessment has given regard to these requirements through the assessment of potential impacts on Mineral Safeguarding Areas (MSAs). The assessment also provides estimates and assessment of materials and waste associated with the Scheme and identifies measures that would be implemented during construction of the Scheme to ensure both on-site and off-site waste is minimised and managed and disposed of appropriately.

Overarching National Policy Statement for Energy (EN-1)

10.2.14 The *Overarching National Policy Statement for Energy (EN-1)* (Ref 10-9) sets out the Government's policy on energy and infrastructure development.

10.2.15 In relation to minerals, EN-1 (Ref 10-9) states that applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place. It also states that where a proposed development has an impact upon a MSA, appropriate mitigation measures should be put in place to safeguard mineral resources.

10.2.16 With regard to waste, EN-1 (Ref 10-9) states that applicants should set out the arrangements for managing any waste produced and prepare a Site Waste Management Plan, and that these should include information on the proposed waste recovery and disposal system for all waste generated by the development, and an assessment of the impact of the waste arising from development on the capacity of waste management facilities to deal with other waste arising in the area. It further states that applicants should seek to minimise the volume of waste produced and the volume of waste sent for disposal, unless it can be demonstrated that this is the best overall environmental outcome.

10.2.17 The requirements of EN-1 (Ref 10-9) in relation to safeguarding mineral resources and minimising and managing waste associated with the gas pipeline diversion within the Scheme have been accounted for in the assessment, in the manner described in paragraph 10.2.12 and paragraph 10.2.13.

National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

10.2.18 The *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)* (Ref 10-10Ref 10-10) relates to gas supply and gas and oil pipelines and sits under EN-1 (Ref 10-9).

10.2.19 EN-4 (Ref 10-10) acknowledges that, in relation to gas pipelines, sterilisation of mineral resources could result from this type of development.

10.2.20 EN-4 (Ref 10-10) does not contain any specific policies relating to the management and disposal of waste associated with gas pipeline developments.

10.2.21 The potential for impacts relating to the sterilisation of mineral resources associated with the gas pipeline diversion within the Scheme has been accounted for in the assessment, in the manner described in paragraph 10.2.12.

National Planning Policy Framework

10.2.22 The *National Planning Policy Framework* (NPPF) (Ref 10-11) sets out the Government's planning policies for England, and requires development plans to establish strategic policies to make sufficient provision for waste management and the supply of minerals.

10.2.23 The *NPPF* (Ref 10-11) states that planning policies should:

a. As far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously.

b. Safeguard mineral resources by defining MSAs and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked).

c. Set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place.

d. Safeguard existing, planned and potential sites for: the bulk transport, handling and processing of minerals; the manufacture of concrete and concrete products; and the handling, processing and distribution of substitute, recycled and secondary aggregate material.

10.2.24 The *NPPF* (Ref 10-11) also states that local planning authorities should not normally permit other development proposals in MSAs if it might constrain potential future use for mineral working.

10.2.25 The assessment has considered the need to safeguard mineral resources and the impacts of using secondary and recycled aggregate materials.

Planning Practice Guidance

10.2.26 *Planning Practice Guidance* (PPG) for *Minerals* (Ref 10-12) provides context to the *NPPF* (Ref 10-11) and advises on the safeguarding of mineral resources.

10.2.27 PPG for *Waste* (Ref 10-13) provides guidance on waste planning and implementing the waste hierarchy.

10.2.28 Both documents have been considered as part of the assessment of effects associated with material assets and waste.

National Planning Policy for Waste

10.2.29 The *National Planning Policy for Waste* (Ref 10-14) states that when considering planning applications for non-waste developments, local authorities should ensure that:

a. The likely impact of proposed, non-waste related developments on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities.

b. The handling of waste arising from the construction and operation of development maximises re-use/recovery opportunities and minimises off-site disposal.

10.2.30 These statements have informed the development of the assessment methodology. This includes the identification of the impacts of the Scheme on existing waste management facilities, with consideration also given to sites and areas allocated for waste management and the implementation of the waste hierarchy.

National and Regional Guidelines for Aggregates Provision in England 2005 to 2020

10.2.31 The *National and Regional Guidelines for Aggregates Provision in England* (Ref 10-15) set out guidelines for aggregates provision in England for the period 2005 to 2020, including assumptions on the proportional contribution of alternative sources of aggregate (secondary and recycled aggregates) to the overall provision.

10.2.32 The assessment has considered the contribution that secondary and recycled materials would have as part of the Scheme construction.

Local policy

Minerals and Waste Local Plan: Strategic Sites and Policies

10.2.33 The Bedford Borough, Central Bedfordshire and Luton Borough Councils' *Minerals and Waste Local Plan: Strategic Sites and Policies* (Ref 10-16) sets out the vision for minerals and waste management in the plan area over the period to 2028.

10.2.34 Relevant policies:

a. Safeguard strategic waste management sites (Policy WSP 2).

b. Safeguard strategic mineral sites (Policy MSP 1) and other minerals infrastructure (Policy MSP 3, MSP 4 & MSP 10).

c. Set criteria for when borrow pits will be permitted (Policy MSP 9).

d. Define MSAs and measures to safeguard MSAs from sterilisation by surface development (Policy MSP 11 & MSP 12).

Cambridgeshire and Peterborough Minerals and Waste Development Plan: Core Strategy Development Plan Document

10.2.35 The *Cambridgeshire and Peterborough Minerals and Waste Development Plan: Core Strategy Development Plan Document* (Ref 10-17) sets out the strategic vision and objectives for minerals and waste development in Cambridgeshire and Peterborough until 2026.

10.2.36 Relevant policies support:

a. The provision of minerals to meet demand (Policy CS1, CS4, CS6, CS8, CS9, CS10 & CS13).

b. The use of and development of facilities for the production of recycled and secondary aggregates (Policy CS1, CS3 & CS7).

c. The provision of sustainable waste management infrastructure (Policy CS2, CS14, CS15, CS18, CS19, CS20, CS21 & CS29).

d. Sustainable transport infrastructure for minerals and waste (Policy CS1, CS2 & CS23).

e. The use of waste as a resource and the minimisation, reuse and recycling of waste (Policy CS2 & CS28).

10.2.37 The policies also:

a. Define criteria for the use of borrow pits (Policy CS11 & CS12)

b. Define Mineral Consultation Areas (Policy CS27) and Waste Consultation Areas (Policy CS30) to protect active and allocated sites from inappropriate development

c. Protect mineral resources by defining MSAs (Policy CS26).

Cambridgeshire and Peterborough Minerals and Waste Local Plan Proposed Submission (Publication) Draft

10.2.38 The *Cambridgeshire and Peterborough Minerals and Waste Local Plan Proposed Submission (Publication) Draft* (Ref 10-18) sets out the proposed policies for minerals and waste to 2036.

10.2.39 The emerging Plan (Ref 10-18) aims to ensure a steady and adequate supply of minerals to support growth whilst ensuring the best use of materials and protection of land, and to contribute positively to the sustainable management of waste.

10.2.40 The proposed policies:

a. Support the provision of minerals (Policy 2) and waste management infrastructure (Policy 3, Policy 4) to meet need.

b. Protect mineral resources by defining MSAs (Policy 5).

c. Protect minerals sites and infrastructure by identifying Mineral Development Areas and Mineral Allocation Areas (Policy 6).

d. Define Waste Management Areas to protect existing and committed waste management sites (Policy 10).

e. Define Transport Infrastructure Areas to protect existing and planned sites for the sustainable transportation of minerals and waste (Policy 15).

f. Support the production and supply of recycled and secondary aggregates (Policy 8).

g. Support suitable proposals for concrete batching (Policy 8).

h. Define criteria for the use of borrow pits (Policy 7).

10.2.41 The plan also identifies Consultation Areas, as a buffer around Mineral Allocation Areas, Mineral Development Areas, Waste Management Areas and Transport Infrastructure Areas to protect them from incompatible development (Policy 16).

10.2.42 The assessment has considered the safeguarding of active and allocated minerals and waste infrastructure and mineral resources.

Other local policy

10.2.43 Other local planning policy considered in the assessment includes:

a. *Bedford Borough Local Plan 2030* (Ref 10-19).

b. *Central Bedfordshire Pre-submission Local Plan 2015-2035* (Ref 10-20).

c. *Huntingdonshire's Local Plan to 2036* (Ref 10-21).

d. *South Cambridgeshire Local Plan* (Ref 10-22).

10.2.44 Relevant policies support the minerals and waste policies and site specific proposals set out in the minerals and waste plans (Ref 10-16; Ref 10-17; Ref 10-18), and also support the sustainable management of waste and the use of waste as a resource.

10.2.45 Relevant local policy has been considered as part of the assessment of impacts and effects on mineral resources and waste infrastructure.

10.3 Assessment methodology

Scope of the assessment

10.3.2 A scoping exercise was undertaken in March 2019 to identify the matters to be covered by the material assets and waste assessment and agree the approach with relevant statutory bodies.

10.3.3 The assessment scope was established at that time by comparing available design and land take details for the Scheme with data and records relating to projected material use and waste generation.

10.3.4 The scoping exercise was informed by the technical and reporting guidance contained in the *Design Manual for Roads and Bridges Volume 11: Environmental Assessment* (Ref 10-23) (DMRB), *Interim Advice Note 125/25: Environmental Assessment Update* (Ref 10-24) and *Interim Advice Note 153/11: Materials* (Ref 10-25).

10.3.5 The outcomes of scoping were recorded in a scoping report (Ref 10-26), which was consulted upon as part of a formal request to the Inspectorate for a scoping opinion and included a summary of all assessment work undertaken as part of the design development of the Scheme.

10.3.6 The Inspectorate's scoping opinion **[TR010044/APP/6.5]** identified a number of additional overarching EIA and topic specific matters that were subsequently brought into the overall scope of the assessment. These further considerations are detailed in **Table 1** of **Appendix 4.3** of the Environmental Statement **[TR010044/APP/6.3]** and include a summary of how Highways England has responded to the points raised, and where information is reported.

10.3.7 The Inspectorate agreed with Highways England that effects associated with the extraction of raw materials and the manufacture of products (for example the depletion of non-renewable resources and the production of waste at point of extraction and manufacturing) could not be accurately predicted and assessed as they relate to procurement decisions that cannot be assured. Accordingly, this matter was scoped out of the assessment.

10.3.8 Material use and waste arising is expected to be very limited during the operational phase of the Scheme. As confirmed within the scoping opinion **[TR010044/APP/6.5]**, the consideration of effects relating to material use and waste arising during operation of the Scheme have been scoped out of the assessment on the basis that the scale of such activities would be unlikely to generate significant effects.

10.3.9 The Inspectorate agreed with Highways England that activities associated with the future maintenance of the Scheme would have limited potential to result in significant material assets and waste effects. Accordingly, the effects associated with the maintenance/management phase of the Scheme were scoped out of the assessment and are not considered further.

10.3.10 Subsequent to the publication of the scoping opinion **[TR010044/APP/6.5]** Highways England published a series of new DMRB standards relating to sustainability and the environment (Ref 10-27), resulting in the phased withdrawal of the guidance used to inform the scoping exercise (Ref 10-23; Ref 10-24; Ref 10-25) from July 2019.

10.3.11 A decision was made by Highways England to adopt the new DMRB standards (Ref 10-27) part way into the assessment process, the details of which are summarised in **Chapter 4**, **Environmental assessment methodology** of the Environmental Statement **[TR010044/APP/6.1]**.

10.3.12 **Table 2** of **Appendix 4.3** of the Environmental Statement **[TR010044/APP/6.3]** sets out the changes to the scope and methodology of the material assets and waste assessment resulting from the adoption of the new DMRB standards (Ref 10-27).

10.3.13 In addition to the matters raised in the scoping opinion **[TR010044/APP/6.5]** and through the adoption of the new DMRB standards (Ref 10-27), the final assessment scope has been shaped by the following:

a. The outcomes of consultation and engagement with statutory bodies, non-statutory organisations and other stakeholders.

b. Design changes made to the form and extent of the Scheme and the areas of land required for its construction, operation and maintenance (the Order Limits).

c. The development of estimates for the likely types and quantities of materials required for the construction of the Scheme, and the types and quantities of waste that could be generated.

d. The outcomes of further desk-based studies undertaken to establish the baseline conditions associated with material assets and waste, and to inform the identification of the likely significant effects of the Scheme.

10.3.14 The assessment has been informed by the outcomes of a separate assessment undertaken to identify the effects of the Scheme on mineral safeguarding sites and mineral resources, the findings of which are presented in the Minerals Safeguarding Report in **Appendix 10.1** of the Environmental Statement **[TR010044/APP/6.3]**.

Assessment standards and guidance

10.3.15 The following standards and guidance have been used to inform the scope and content of the assessment, and to assist the identification and mitigation of likely significant effects. This builds upon the overarching EIA methodology and guidance presented in **Chapter 4**, **Environmental assessment methodology** of the Environmental Statement **[TR010044/APP/6.1]**.

Design Manual for Roads and Bridges

10.3.16 The requirements contained within the following DMRB standards have been applied in the assessment to identify and assess the impacts and significance of effects on material assets and waste from the construction of the Scheme:

a. LA 104 Environmental assessment and monitoring (Ref 10-28).

b. LA 110 Material assets and waste (Ref 10-29).

Establishment of the baseline

10.3.17 The methodology for establishing the material assets and waste baseline has considered the following:

a. Material assets:

i. The types and quantities of material use associated with operation of the existing road / site.

ii. The location of mineral safeguarding sites and peat resources in relation to the Scheme.

iii. Information on the availability of key construction materials required for the Scheme, specifically the production and use of aggregates, including alternative (recycled and secondary) aggregates.

iv. Information on the recovery of non-hazardous construction and demolition waste.

b. Waste:

i. The types and quantities of waste arisings associated with operation of the existing road / site.

ii. Regional and national presence and capacity of landfill facilities and waste inputs to landfill.

iii. Local presence of waste management facilities.

Assessment and significance criteria

10.3.18 The effects on material assets and their significance have been assessed by:

a. Identifying any direct impacts on mineral safeguarding sites or peat resources within the Order Limits.

b. Estimating the likely types and quantities (where appropriate to the assessment) of the main materials that would be required during construction.

c. Estimating the likely proportion of non-hazardous construction and demolition waste arisings that would be recovered.

d. Estimating the proportion of reused, recycled or secondary aggregate that could be imported to site for use during construction.

e. Comparing the likely waste recovery rate and proportion of reused, recycled or secondary aggregate to the relevant national targets.

10.3.19 The effects on waste and waste management infrastructure, and their significance, have been assessed by:

a. Identifying any direct impacts on waste management infrastructure in proximity to the Order Limits.

b. Establishing the baseline for landfill capacity in the region in proximity to the Scheme.

c. Estimating the earthworks cut and fill balance.

d. Estimating the likely types and quantities of waste that would be generated during construction, including the potential for hazardous waste.

e. Estimating the recovery rates likely to be achieved for each waste type and the quantity of waste that may require off-site management or disposal.

f. Comparing the likely waste arisings and the quantity requiring off-site disposal to the baseline landfill capacity and assessing the likely impact on that capacity.

10.3.20 The assessment of effects on material assets and waste has adopted the significance category descriptions and criteria contained in *LA 110* (Ref 10-29), as reproduced in **Table 10-1**.

Table 10-1: Significance category descriptions and criteria

Significance category	Significance criteria	Description: Material assets	Description: Waste
Neutral	Not significant	Project achieves >99% overall material recovery / recycling (by weight) of non-hazardous construction and demolition waste (CDW) to substitute use of primary materials; and Aggregates required to be imported to site comprise >99% re-used / recycled / secondary content.	No reduction or alteration in the capacity of waste infrastructure within the region.
Slight	Not significant	Project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise re-used / recycled / secondary content in line with the relevant regional percentage target.	≤1% reduction or alteration in the regional capacity of landfill; and Waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Moderate	Significant	Project achieves <70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise re-used / recycled / secondary content below the relevant regional percentage target.	>1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 1-50% of project waste requires disposal outside of the region.
Large	Significant	Project achieves <70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise <1% re-used / recycled / secondary content; and Project sterilises ≥1 mineral safeguarding site and/or peat resource.	>1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and >50% of project waste requires disposal outside of the region.

Significance category	Significance criteria	Description: Material assets	Description: Waste
Very Large	Significant	No additional criteria.	>1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or Construction of new (permanent) waste infrastructure is required to accommodate waste from a project.

10.3.21 In accordance with *LA 110* (Ref 10-29), where primary aggregate materials are mandated within DMRB these have been excluded from the material recovery, recycling or reuse calculation.

10.4 Assessment assumptions and limitations

Scheme design and limits of deviation

10.4.2 The assessment has been based on the Scheme description presented in **Chapter 2, The Scheme** of the Environmental Statement **[TR010044/APP/6.1]** and has taken into account the lateral limits of deviation illustrated on the Works Plans **[TR010044/APP/2.3]**, and the vertical limits of deviation, in order to establish a realistic worst case assessment scenario.

10.4.3 This scenario has identified the effect that any lateral (horizontal) and/or vertical deviation would realistically give rise to. The material calculations and estimates have, for example, taken into account the potential for earthworks slopes to be modified slightly during the detailed design stage, and thereby alter the total quantity of materials required in their construction.

10.4.4 Notwithstanding any potential deviation, all embedded and essential mitigation measures would remain deliverable within the extents of the limits of deviation.

Baseline data

10.4.5 This assessment has been based on available construction information and phasing details provided by Highways England's appointed buildability advisor, as presented within **Chapter 2, The Scheme** of the Environmental Statement **[TR010044/APP/6.1]**.

10.4.6 The assessment assumes that all third-party data used to generate the baseline accurately reflects the current status of material assets and waste in the adopted study areas (see section 10.5).

10.4.7 Information on the current permitted landfill capacity and inputs to landfill is provided for the waste management study area. This data does not include certain landfill sites which are excluded on the grounds of commercial confidentiality, and therefore is likely to be an underestimate. There is also no available collated and published information on any potential changes to this permitted landfill capacity by the time that construction of the Scheme is planned, and therefore the current baseline is assumed to apply.

10.5 Study area

10.5.1 The first study area comprises the area defined by the Order Limits (including any temporary land requirements during construction) and informs the assessment of:

a. The potential for sterilisation of mineral safeguarding sites and peat resources.

b. The use of materials in the construction of the Scheme.

c. Waste arising from the construction of the Scheme.

d. Direct, physical impacts on waste management infrastructure.

10.5.2 The second study area is defined as the geographic area within which materials will be sourced and wastes will be managed.

10.5.3 The second study area for waste management comprises the wider region within which waste management infrastructure, specifically landfill capacity, is located and is defined based on professional judgement and informed by consideration of the proximity principle and value for money. The study area comprises the East of England region, as defined in the Environment Agency's *2019 Waste Data Interrogator: 2019 Waste Summary Tables for England* (Ref 10-30) as comprising the sub-regions of Bedfordshire (including Bedford and Central Bedfordshire), Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk, together with the adjacent sub-regions of Northamptonshire and Buckinghamshire, due to their proximity to the Scheme.

10.5.4 The second study area for hazardous waste management comprises the whole of England, as planning for hazardous waste management is undertaken at a national level.

10.5.5 For the assessment of the use of alternative aggregate materials (recycled and secondary aggregates) in construction, the second study area is defined as the East of England region.

10.6 Baseline conditions

10.6.1 The following sections refer to sites, features and designations relating to material assets and waste. These are illustrated on **Figure 10.1** of the Environmental Statement **[TR010044/APP/6.3]**.

Existing materials, waste and potential contamination

10.6.2 The types and quantities of material use and waste arisings associated with the operation of the existing road network include materials required for routine maintenance and also for intermittent repairs and refurbishment, with associated limited waste arisings. The quantities of material use and waste arisings are estimated, using professional judgement, to be small when compared to regional and national data and are therefore considered within this wider geographic context.

10.6.3 Information on previously developed land and potential sources of contamination that could give rise to materials and waste that require specific handling, storage and management arrangements, are set out in **Chapter 9, Geology and soils** of the Environmental Statement **[TR010044/APP/6.1]**.

Material assets: mineral safeguarding sites and peat resources

10.6.4 The *Minerals and Waste Local Plan: Strategic Sites and Policies* (Ref 10-16) identifies an MSA for sand and gravel along the River Great Ouse Valley, the extents of which coincide with the Order Limits.

10.6.5 The Plan (Ref 10-16) also identifies the Black Cat permitted mineral site, strategic site and permitted mineral processing plant as being located within the Order Limits. Planning consent to extend the extraction of sand and gravel into the strategic site areas was granted in April 2016.

10.6.6 Minerals and waste plan documents for Cambridgeshire and Peterborough (Ref 10-17; Ref 10-18) do not identify any active or allocated minerals sites, sites for the production of recycled and secondary aggregates, minerals transport sites or Minerals Consultation Areas as coinciding with the Order Limits, but do identify MSAs for sand and gravel along the River Great Ouse Valley and Hen Brook which are adjacent to, and overlap slightly with, the Order Limits.

10.6.7 The British Geological Survey's *Geoindex Onshore* (Ref 10-31) does not identify any peat resources within the Order Limits.

10.6.8 Further details regarding the baseline conditions for mineral safeguarding are contained in **Appendix 10.1** of the Environmental Statement **[TR010044/APP/6.3]**.

Material assets: Recovery of non-hazardous construction and demolition waste

10.6.9 The national target for the recovery of non-hazardous construction and demolition waste is at least 70% (by weight) by 2020, as set out in the *EWFD* (Ref 10-2). Excavated soil and stones (European Waste Catalogue code 17 05 04) are specifically excluded from this target.

10.6.10 Annex E/2 of *LA 110* (Ref 10-29) states that projects in England should aim to achieve at least 90% (by weight) material recovery of non-hazardous construction and demolition waste.

10.6.11 The Department for Environment, Food and Rural Affairs (Defra) reports on performance against the national target for the recovery of non-hazardous construction and demolition waste. The most recent Defra report (Ref 10-34) estimates that, in England, 92.1% (approximately 55 million tonnes) of non-hazardous construction and demolition waste was recovered in 2016.

Material assets: alternative aggregates

10.6.12 The baseline guidelines for alternative aggregates, which comprise both secondary aggregates (which are by-products from industrial and mining operations) and recycled aggregates (which are produced from inert waste) are set out in the *National and Regional Guidelines for Aggregates Provision in England 2005 to 2020* (Ref 10-15) and in Annex E/1 of *LA 110* (Ref 10-29).

10.6.13 These are summarised in **Table 10-2**, with the relevant target for the Scheme being the 31% guideline (for the East of England region).

Table 10-2: National and regional guidelines for aggregates provision

Region	Total aggregate provision (million tonnes)	Alternative aggregates targets (secondary and recycled aggregates)
East of England	382	31%
England (total)	3,908	25%

10.6.14 Data on the production of aggregates is published by the Mineral Products Association which in 2018 (Ref 10-32) estimated that the supply of aggregates in Great Britain totalled 251 million tonnes, of which 71 million tonnes (28%) were from recycled (25%) and secondary (3%) sources. The East of England Aggregates Working Party (Ref 10-33) reported that, in 2017, sales of primary aggregates in the East of England totalled 12.7 million tonnes of sand and gravel and 399,000 tonnes of crushed rock.

Waste: landfill capacity and inputs

10.6.15 Environment Agency data (Ref 10-30) provides the most recent collated and published information on remaining permitted landfill capacity and waste disposed of in landfill in 2019. The data for the waste management study area and for England is summarised in **Table 10-3** and

10.6.16 **Table** 10-4.

10.6.17 For the waste management study area, total landfill capacity at the end of 2019 was approximately 84.5 million cubic metres, with inputs to landfill in 2019 totalling approximately 13.9 million tonnes.

Table 10-3: Baseline remaining permitted landfill capacity at the end of 2019 ('000s m^3)

Landfill type	Second study area for landfill capacity				England - total[3]
	East of England region[2]	Buckinghamshire	Northamptonshire	Total	
Hazardous merchant	0	0	1,156	1,156	18,443
Hazardous restricted	0	0	0	0	833
Non-hazardous with SNRHW cell[1]	4,987	18,783	1,335	25,105	69,447
Non-hazardous	22,288	9,318	200	31,806	134,291
Non-hazardous restricted	1,249	0	0	1,249	25,869
Inert	21,921	3,070	1,956	26,948	122,375
Total[4]	50,446	31,171	4,648	86,264	371,258

[1] Some non-hazardous landfill 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.

[2] The East of England region comprises the sub-regions of Bedfordshire (including Bedford and Central Bedfordshire), Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk.

[3] Second study area for hazardous waste landfill capacity.

[4] All data is rounded to the nearest '000m^3.

Table 10-4: Baseline landfill inputs in 2019 ('000s tonnes)

Landfill type	Second study area for landfill inputs				England – total[3]
	East of England region[2]	Buckinghamshire	Northamptonshire	Total	
Hazardous merchant	8	0	211	219	865
Hazardous restricted	0	0	0	0	22
Non-hazardous with SNRHW cell[1]	581	1,255	47	1,883	6,896
Non-hazardous	5,550	1,077	256	6,883	20,121
Non-hazardous restricted	0	0	0	0	490
Inert	3,414	560	955	4,929	17,465
Total[4]	9,553	2,892	1,469	13,914	45,859

[1] Some non-hazardous landfill sites can accept some SNRHW into a dedicated cell, but this is usually a small part of the overall capacity of the site.

[2] The East of England region comprises the sub-regions of Bedfordshire (including Bedford and Central Bedfordshire), Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk.

[3] Second study area for hazardous waste landfill.

[4] All data is rounded to the nearest '000 tonnes.

10.6.18 The data within **Table 10-3** and

10.6.19 **Table** 10-4 does not include waste received by closed landfills for restoration purposes, or materials used in deposit for recovery operations.

10.6.20 There is no published information on any potential changes to the regional or national permitted landfill capacity for the period within which the Scheme would be constructed. Accordingly, the existing baseline is assumed to apply from the Scheme construction start date (2022) through to the new dual carriageway being open for traffic in 2026.

Waste: waste management infrastructure

10.6.21 The *Minerals and Waste Local Plan: Strategic Sites and Policies* (Ref 10-16) does not identify any existing or proposed strategic sites for waste management within the Order Limits.

10.6.22 Minerals and waste plan documents for Cambridgeshire and Peterborough (Ref 10-17; Ref 10-18) do not identify any active or allocated sites for waste management or waste consultation areas within the Order Limits.

10.6.23 The Environment Agency's *Public Register* (Ref 10-35) does not identify any operational permitted waste management facilities as being located within the Order Limits.

10.6.24 One landfill site (Eltisley landfill site) is partially located within the Order Limits; however, this site is in closure and is no longer permitted to accept waste.

Future baseline conditions

10.6.25 As detailed in **Chapter 4, Environmental assessment methodology** of the Environmental Statement **[TR010044/APP/6.1]**, a review has been undertaken to determine whether the existing baseline conditions might change between the time of undertaking the assessment and the future years in which the Scheme is planned to be constructed, as a result of future planned development.

10.6.26 Consideration was given to the following changes that could potentially alter the material assets and waste baseline in the future:

a. Changes to existing permitted landfill capacity and/or the status of existing landfill sites – for example through the planned closure of such sites or increased demands placed on such sites from other planned development projects being constructed in the area.

b. Changes to existing mineral extraction operations – for example the planned closure of existing sites and/or their restoration.

10.6.27 The review evaluated the planned development projects summarised in **Chapter 15**, **Assessment of cumulative effects** of the Environmental Statement **[TR010044/APP/6.1]** and involved:

a. The identification of any permitted (i.e. consented) projects within the assessment study area that have yet to be implemented.

b. Analysis of the likely environmental effects and planned timescales for each identified project.

c. An assessment of the potential for each identified project to change the existing baseline conditions in the Construction Year (2022) in the manner described above.

10.6.28 Although a small number of the development projects are expected to form part of, and influence, the future baseline conditions, the review concluded that there is sufficient landfill capacity to accommodate the likely waste arisings from these projects at the time construction of the Scheme would commence.

10.6.29 There is no published information on any potential changes to the regional or national permitted landfill capacity for the period within which the Scheme would be constructed.

10.6.30 The review also identified that it is unlikely that the existing (closed) landfill site at Eltisley would reopen and be operational at the time construction of the Scheme would commence.

10.6.31 The review also identified that the Black Cat permitted mineral site is currently being restored, and that restoration of the whole site is expected to be completed prior to commencement of construction of the Scheme, as described in **Appendix 10.1** of the Environmental Statement **[TR010044/APP/6.3]**. The assessment has accordingly assumed that this site would be inactive and fully restored at the time construction of the Scheme would commence.

10.6.32 Apart from the restoration of the Black Cat permitted mineral site, the existing baseline is assumed to apply in the Construction Year (2022).

10.7 Potential impacts

10.7.1 The scoping exercise identified that the introduction and/or modification of road infrastructure associated with construction of the Scheme would potentially result in different types and durations of impact on material assets and waste.

Construction

10.7.2 The scoping exercise identified that construction of the Scheme would potentially result in the following types of impact:

a. Material assets:

   i. Impacts on primary material resources.

   ii. Impacts on the availability and use of reused, recycled and secondary aggregate materials for construction.

b. Waste:

   i. Impacts from on-site generated materials (for example excavated materials and soils) and waste arisings on the capacity of existing landfill infrastructure.

   ii. Direct, physical impacts on the operation and capacity of existing waste management infrastructure.

10.8 Design, mitigation and enhancement measures

Embedded mitigation

10.8.2 Through the design development process, the Scheme has been designed, as far as possible, to avoid effects on material assets and waste through option identification, appraisal, selection and refinement, as described in **Chapter 3, Assessment of alternatives** of the Environmental Statement **[TR010044/APP/6.1]**.

10.8.3 The design of the Scheme and the planned approach to its construction have been developed with an overarching principle of achieving efficiencies in materials and waste where possible, for example by designing-out and preventing waste arising where possible, and diverting waste from landfill through on-site and off-site recycling and recovery.

10.8.4 Mitigation measures have been integrated (embedded) into the Scheme for the purpose of minimising effects on material assets and waste. These measures are described in **Chapter 2, The Scheme** of the Environmental Statement **[TR010044/APP/6.1]** and in summary comprise the following, which focus on implementing the waste hierarchy through the reuse and recycling of site-won materials on-site where possible to minimise the need to import construction materials to site, and to reduce the quantity of waste to be exported off-site:

a. Designing the Scheme in a manner that facilitates the reuse of acceptable material arisings, for example those associated with earthworks cuttings and other excavations.

b. Achieving an earthworks balance (cut and fill material) within the design of the Scheme, where possible, to minimise the need to import and export material.

c. The inclusion of borrow pits within the Order Limits to obtain materials local to the Scheme and minimise the need to import and export material.

d. The inclusion of land within the Order Limits for the temporary on-site storage of soils, excavated materials and other materials.

e. The appropriate sizing of construction compounds to enable the segregation and storage of waste, and to facilitate off-site recovery.

f. The retention of existing highways infrastructure within the Scheme design where feasible, to minimise the need for the demolition of components and infrastructure and the associated generation of waste material.

g. The reuse of excavated materials and the recycling of demolition and construction materials within the Scheme.

h. The optimisation of junction designs, for example Black Cat junction to reduce the height of retaining walls and pile lengths and their associated material requirements.

i. The optimisation of bridge, underpass and culvert designs through the incorporation of precast concrete elements to reduce on-site waste arisings.

j. Importing alternative (recycled and secondary) aggregate materials during construction, where practicable.

Essential mitigation

10.8.5 Best practice mitigation measures have been identified which would be implemented by the Principal Contractor to reduce the impacts and effects that construction of the Scheme is likely to have on material assets and waste.

10.8.6 These measures are reported within the First Iteration EMP **[TR010044/APP/6.8]** which provides a framework to facilitate good practice in materials and waste management. This requires that the Principal Contractor is competent in the storage, handling and management of materials and waste (including hazardous waste), and sets out their responsibilities in relation to ensuring compliance with all legal requirements, both on-site and off-site, including Duty of Care.

10.8.7 The First Iteration EMP **[TR010044/APP/6.8]** contains a framework Waste Management Plan (WMP) which sets out measures relating to waste management that would be implemented during construction of the Scheme. These include:

a. The implementation of procedures relating to the coding, source segregation and containment of waste on-site to facilitate a high proportion and high quality recycling.

b. Materials requiring removal from the site would be transported using licensed carriers, and records would be kept detailing the types and quantities of waste moved and the destinations of this waste, in accordance with the relevant regulations.

c. Any waste effluent would be tested and, where necessary, disposed of at a correctly licensed facility by a licensed specialist contractor(s).

d. All hazardous materials including fuels, chemicals, cleaning agents, solvents and solvent containing products to be properly sealed in containers at the end of each day prior to storage in appropriately protected and bunded storage areas.

e. All demolition and construction workers would be required to use appropriate personal protective equipment whilst performing activities on-site.

10.8.8 The WMP sets out measures relating to construction materials and waste reduction and management through the implementation of the following approaches, where practicable, to minimise the quantity of waste arising and requiring disposal:

a. Implementing a ‘just-in-time’ material delivery system to avoid materials being stockpiled.

b. Reviewing material quantity requirements to avoid over-ordering and the generation of waste materials due to surplus.

c. The reuse of materials on-site wherever feasible, for example the reuse of excavated soil for landscaping, and the recycling of demolition materials into aggregates.

d. Undertaking off-site prefabrication, where practical, including the use of prefabricated structural elements.

e. Implementing agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme.

f. Where reuse of materials and waste on-site is not practical, implementing off-site reuse, recycling and recovery through the use of off-site waste segregation or treatment facilities or for direct reuse or reprocessing off-site.

10.8.9 The First Iteration EMP **[TR010044/APP/6.8]** also contains a framework for the preparation of a Materials Management Plan (MMP) which sets out the approaches and procedures for the management of site generated materials used within the Scheme and thereby not classifying materials suitable for on-site reuse as waste.

10.8.10 The MMP would be prepared under the CL:AIRE Definition of Waste: Code of Practice (Ref 10-36). The Principal Contractor would be responsible for preparing the MMP prior to the commencement of construction and for obtaining all necessary approvals.

10.8.11 The First Iteration EMP **[TR010044/APP/6.8]** sets out the following performance targets for material assets and waste:

a. At least 31% (by weight) of aggregates imported to site for use within the Scheme should comprise alternative (reused, recycled or secondary) aggregates, for those applications where it is technically and economically feasible to substitute these alternatives to primary aggregates. Where primary aggregate materials are mandated within DMRB they would be excluded from the target.

b. Recovery of at least 70% (by weight) of non-hazardous construction and demolition waste (excluding naturally occurring materials with European Waste Catalogue Code 17 05 04 (Ref 10-3)), with the aim to achieve recovery of 90% (by weight).

10.8.12 Construction of the Scheme would be subject to measures and procedures defined within the Second Iteration EMP, which would be produced prior to the commencement of construction by the Principal Contractor and would be based on, and incorporate, the content and requirements of the First Iteration EMP **[TR010044/APP/6.8]**, its associated WMP and MMP, and other industry standard practice and control measures as necessary.

10.8.13 Delivery of the mitigation measures contained within the Second Iteration EMP **[TR010044/APP/6.8]** would be secured through Requirement 2 of the DCO **[TR010044/APP/3.1]**.

10.8.14 Based on the effectiveness of best practice mitigation, no additional or offsetting mitigation measures would be required during construction of the Scheme.

Enhancement measures

10.8.15 No enhancement measures relating to material assets and waste have been incorporated into the design of the Scheme.

10.8.16 Notwithstanding this, enhancement opportunities would be further considered and implemented where applicable post-consent of the DCO application during the detailed design phase and subsequent construction work.

10.9 Assessment of significant effects

10.9.1 In accordance with *LA 104* (Ref 10-28), the prediction of impacts and the assessment of effects (and their significance) on material assets and waste associated with construction of the Scheme has taken account of the effectiveness of both the embedded and essential mitigation measures summarised in Section 10.8.

10.9.2 Where applicable the assessment reports the temporary and permanent impacts and effects on material assets and waste that would be directly or indirectly affected by the Scheme by virtue of their proximity to the works, or through a shared relationship or inter-dependency.

Construction

10.9.3 **Table 10-5** summarises the likely types of materials that will be used and wastes that are likely to be generated during the construction of the Scheme.

Table 10-5: Estimated materials used and waste types arisings from the construction of the Scheme

Construction activity	Materials used	Waste types arisings
Site remediation / preparation / earthworks	Fill material for construction purposes. Primary / secondary / recycled aggregates for ground stabilisation. Topsoil and subsoil for landscaping and restoration.	Surplus excavated materials. Surplus topsoil and subsoil. Unsuitable and contaminated soils and excavated materials. Vegetation from site clearance. Clearance of redundant highway infrastructure, including lighting columns, camera poles, emergency telephones, electrical cabinets, marker posts.
Demolition	Materials are not required for demolition works.	Waste arisings from the required demolition of existing buildings, infrastructure and structures, including: Asphalt planings Concrete Brick and block Aggregates Steel Timber

Construction activity	Materials used	Waste types arisings
		Other materials, from strip out of buildings, structures and infrastructure.
Site construction	Main construction materials including: Aggregates (including well graded materials, structural fill, pipe bedding and drainage media) Asphalt and bituminous materials In-situ cast concrete (structures and piles) Precast concrete products (structural components, kerbs, drainage pipes, chambers and channels) Structural steelwork (bridges and gantries) Steel reinforcing bar (for reinforced concrete) Other construction materials and construction products including: Geotextile Plastic pipework (drainage, filter drains, ducting) Timber (fencing, formwork) Safety barriers/road restraint system Pedestrian guard rails and handrails Traffic signs, road markings, road studs, lighting columns Electrical distribution infrastructure (cable ducts, cable, chambers) Communications infrastructure (cable ducts, cable, chambers, equipment) Pavement tack coat Steelwork corrosion protection Waterproofing to concrete structures	Excess, offcuts and broken / damaged construction materials. Existing highway infrastructure and technology removed during works. Packaging from materials delivered to site. Construction worker wastes from offices and rest areas / canteens. Waste oils from construction plant.

10.9.4 The estimated main types and quantities of aggregate materials anticipated to be used during construction of the Scheme have been obtained from the appointed buildability advisor for the Scheme, as presented in **Table 10-6**.

10.9.5 For the proportion of aggregates estimated to be required to be imported to site, the potential alternative aggregate content (comprising reused, recycled or secondary materials) has been estimated based on industry good practice benchmarks (Ref 10-37).

Table 10-6: Estimated main types and quantities of aggregates to be used during the construction of the Scheme and potential alternative aggregate content

Material category	Material subcategory	Quantity required for construction (tonnes)	Quantity to be imported to site (tonnes)	Alternative aggregate content	
				(% by weight) (1)	**(tonnes)**
Temporary works					
Unbound aggregates	Class 6F2 aggregate	85,000	Site-sourced materials	Site-sourced materials	Site-sourced materials
Permanent works					
Unbound aggregates	Sub-base	710,000	710,000	50	355,000
	Pipe bedding	140,000	140,000	50	70,000
Asphalt	Asphalt	500,000	500,000	25	125,000
Total		1,435,000	1,350,000	40.7	550,000

(1) The estimated alternative aggregate content for each material is based on the "good practice" recycled content rates from the Waste & Resources Action Programme's *Designing Out Waste Tool for Civil Engineering* (Ref 10-37). The total alternative aggregate content is calculated as a percentage by weight.

10.9.6 The main types and quantities of excavated materials estimated to arise during construction of the Scheme are shown in **Table 10-7**. This information has been provided by Highways England's appointed buildability advisor for the Scheme, and is based on the Scheme design and mass haul and includes the estimated cut and fill including material sourced from engineering earthworks (for example those associated with junctions and the new dual carriageway), and from borrow pits. An additional 1 million cubic metres of topsoil and subsoil materials would be stripped and stored on-site in the designated soil storage areas, prior to reuse in the Scheme's landscaping and reinstatement works.

10.9.7 No major sources of potentially contaminated excavated material have been identified and therefore there is expected to be minimal requirement for any off-site management of contaminated excavated materials.

Table 10-7: Estimated main types and quantities of excavated materials arising and used during the construction of the Scheme

Excavated material	Source		Description
	Engineering earthworks	**Borrow pits**	
Cut required (million m^3)	2.50	-	Cut required to construct the Scheme.
Cut material suitable for use as engineering fill (million m^3)	2.00	0.52	Cut material used to meet engineering fill requirements.
Cut material unsuitable for use as engineering fill (million m^3)	0.50	0.13	'Cut material unsuitable for use as engineering fill', used for borrow pit restoration (where suitable).
Engineering fill required (million m^3)	2.52		Requirement met from 'cut material suitable for use as engineering fill' from engineering earthworks and borrow pits.

10.9.8 The main types and quantities of demolition waste and construction waste estimated to arise during construction of the Scheme and the potential management routes and recovery rates have been obtained from Highways England's appointed buildability advisor and are summarised in **Table 10-8** and **Table 10-9** respectively. The management routes and recovery rates are based on their experience on highways projects similar to the Scheme and the application of industry good practice approaches, with resulting high levels of forecast diversion from landfill.

10.9.9 Construction site operations will also generate waste streams from offices, welfare facilities, material packaging and construction plant maintenance. The quantities are anticipated to be small compared to the main demolition and construction wastes summarised in **Table 10-8** and **Table 10-9** and are not included in the assessment. Procedures for the storage and management of these wastes will be set out in the Second Iteration EMP **[TR010044/APP/6.8]**.

Table 10-8: Estimated main types and quantities of demolition waste arising during the construction of the Scheme including estimated management routes and recovery rates

Waste	Density (tonnes/m^3)	Waste arising (tonnes)	Reuse / recycle / recover on-site		Reuse / recycle / recover off-site		Disposal to landfill off-site	
			(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Non-hazardous wastes								
Subgrade (unbound aggregate)	2.3	106,901	80%	85,521	20%	21,173	0%	207
Asphalt planings	2.3	81,223	43%	34,741	39%	31,759	18%	14,723
Concrete	2.4	9,708	83%	8,044	16%	1,534	1%	130
Bricks / blocks	2.3	984	80%	787	20%	197	0%	0
Metal	7.85	407	0%	0	100%	407	0%	0
Soft strip (mixed waste)	1.5	660	4%	24	88%	578	9%	58
Total non-hazardous waste		199,883 (86,758m^3)	65%	129,117 (55,998m^3)	28%	55,648 (24,176m^3)	8%	15,118 (6,584m^3)
Hazardous wastes								
Materials containing coal tar	2.3	1,311	50%	655	30%	393	20%	262
Total hazardous waste		1,311 (570m^3)	50%	655 (285m^3)	30%	393 (171m^3)	20%	262 (114m^3)

Table 10-9: Estimated main types and quantities of construction waste arising during the construction of the Scheme including estimated management routes and recovery rates

Construction material	Waste type	Density (tonnes/ m^3)	Quantity of construction material required (tonnes)	Wastage rate (%)	Waste arising (tonnes)	Reuse / recycle / recover on-site		Reuse / recycle / recover off-site		Disposal to landfill off-site	
						(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Temporary works materials (1)											
Class 6F2 aggregate (for piling platforms) (1)	Aggregate	2.3	85,000	5.0%	89,250	80%	71,400	20%	17,850	0%	0
Formwork (1)	Formwork	0.8	500	2.0%	510	0%	0	100%	510	0%	0
Permanent works materials											
Sub-base	Aggregate	2.3	710,000	5.0%	35,500	100%	35,500	0%	0	0%	0
Pipe bedding	Aggregate	2.3	140,000	15.0%	21,000	80%	16,800	20%	4,200	0%	0
Asphalt	Asphalt	2.3	500,000	5.0%	25,000	50%	12,500	50%	12,500	0%	0
Concrete for piles	Concrete	2.4	76,000	5.0%	3,800	95%	3,610	5%	190	0%	0
Concrete for structures	Concrete	2.4	61,000	5.0%	3,050	95%	2,898	5%	153	0%	0

Construction material	Waste type	Density (tonnes/ m^3)	Quantity of construction material required (tonnes)	Wastage rate (%)	Waste arising (tonnes)	Reuse / recycle / recover on-site		Reuse / recycle / recover off-site		Disposal to landfill off-site	
						(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Concrete for V-channel	Concrete	2.4	67,000	5.0%	3,350	95%	3,183	5%	168	0%	0
Concrete for RCB	Concrete	2.4	35,000	5.0%	1,750	95%	1,663	5%	88	0%	0
Kerbs	Concrete	2.4	1,000	2.0%	20	95%	19	5%	1	0%	0
Drainage pipes	Concrete	2.4	15,000	2.0%	300	95%	285	5%	15	0%	0
Manhole rings	Concrete	2.4	500	2.0%	10	95%	10	5%	1	0%	0
Steel for structures	Metal	7.85	6,500	2.5%	163	0%	0	100%	163	0%	0
Geotextile	Geotextile	0.5	100	15.0%	15	80%	12	20%	3	0%	0
Total			1,697,600 (732,024m^3)		183,718 (80,044m^3)	80%	147,878 (64,102m^3)	20%	35,840 (15,942m^3)	0%	0 (0m^3)

(1) Material required for temporary works is assumed to require management after use.

Material assets: mineral safeguarding sites and peat resources

10.9.10 The assessment of effects on mineral safeguarding sites is presented within the Mineral Safeguarding Report in **Appendix 10.1** of the Environmental Statement **[TR010044/APP/6.3]**.

10.9.11 This assessment has concluded that:

a. There would be no effect on peat resources arising from construction of the Scheme as no such resources are found within the Order Limits.

b. There would be no effect on the safeguarded sand and gravel resources within the Black Cat Strategic Mineral Site arising from construction of the Scheme, as the extraction and restoration operations are scheduled to be completed prior to commencement of Scheme construction.

c. There would be no effect in relation to the limited sand and gravel resources identified at Hen Brook, given there are no allocated Strategic Mineral Sites within this area and accounting for the fact that the resources are already largely sterilised by the presence of Hen Brook.

d. There would be no effect in relation to the MSA for sand and gravel extending across parts of the Order Limits between Bedford Road and the existing A1, as it contains no allocated Strategic Mineral Sites. Furthermore, the assessment has identified that there are existing constraints to mineral extraction across much of this area (for example the presence of existing developments and the existing A1) which mean that extraction of minerals in this location are unlikely to be practically or economically viable.

10.9.12 As no effects of the Scheme are expected on mineral safeguarding sites and peat resources, no significant effects are predicted.

Material assets: recovery of non-hazardous construction and demolition waste

10.9.13 **Table 10-8** and **Table 10-9** set out the main types and quantities of demolition and construction waste expected to arise during construction of the Scheme and the associated management routes and recover rates, as estimated by Highways England's appointed buildability advisor. These indicate that the estimated total quantity of non-hazardous demolition and construction waste expected to arise during construction is 383,600 tonnes. Of this, an estimated 368,482 tonnes, equivalent to 96% by weight, is forecast to be recovered via either on-site or off-site uses.

10.9.14 This recovery percentage exceeds the national target to recovery at least 70% (by weight) of non-hazardous construction and demolition waste.

10.9.15 Accordingly, the effects of the Scheme in relation to the recovery of non-hazardous construction and demolition waste are assessed as being of slight significance, which are not significant.

Material assets: alternative aggregates

10.9.16 **Table 10-6** provides an assessment of the potential for alternative (reused / recycled / secondary) aggregates to be used in the construction of the Scheme. Based on the assessment findings, professional judgement strongly indicates that the application of good industry practice would enable the 31% alternative aggregate target to be delivered.

10.9.17 Final material specifications would be confirmed post-consent of the DCO application at the detailed design stage and would be used to inform the forecasting and monitoring of the use of alternative aggregates as required by the First Iteration EMP **[TR010044/APP/6.8]**.

10.9.18 Accordingly, the effects of the Scheme in relation to the use of alternative aggregates are assessed as being of slight significance, which are not significant.

Waste: landfill capacity

10.9.19 The main types and quantities of excavated materials estimated to arise during construction of the Scheme are set out in **Table 10-7**.

10.9.20 The Scheme has been designed so that a balance of cut and fill is achieved where possible. The use of site-sourced excavated material within the Scheme engineering works and borrow pit restoration activities would be undertaken in accordance with a Materials Management Plan within the Second Iteration EMP, a framework for which is presented within the First Iteration EMP **[TR010044/APP/6.8]**. The Materials Management Plan would be prepared by the Principal Contractor under CL:AIRE publication *The Definition of Waste: Development Industry Code of Practice* (Ref 10-36), with the material not being classified as waste. As such, there are expected to be minimal requirements for any off-site management of excavated materials or disposal to landfill.

10.9.21 Construction of the Scheme is expected to generate approximately 383,600 tonnes (166,802m^3) of non-hazardous construction and demolition waste, of which an estimated 15,118 tonnes (6,584m^3) is forecast to require off-site disposal to landfill, as set out in **Table 10-8** and **Table 10-9**. This equates to 0.008% of the 86.3 million cubic metres of landfill capacity within the waste management study area, as detailed in **Table 10-3**.

10.9.22 If a more conservative assumption is taken, where 70% recovery of non-hazardous construction and demolition waste is assumed (in accordance with the national recovery target), then an estimated 115,080 tonnes (50,041m^3) of non-hazardous construction and demolition waste would require off-site disposal to landfill, equating to 0.058% of the landfill capacity within the waste management study area.

10.9.23 Based on the above, the Scheme would result in less than a 1% reduction of landfill capacity within the waste management study area. There is considered to be adequate disposal capacity available to accommodate the non-hazardous waste predicted to arise from construction of the Scheme.

10.9.24 Construction is expected to generate approximately 1,311 tonnes (570m^3) of hazardous construction and demolition waste, of which an estimated 262 tonnes (114m^3) is forecast to require off-site disposal to landfill, as set out in **Table 10-8** and **Table 10-9**. These totals equate to 0.01% of the 1,156,000m^3 of hazardous (merchant) landfill capacity within the waste management study area, and 0.0006% of the 18.4 million cubic metres of hazardous (merchant) landfill capacity within England, as detailed in **Table 10-3**. If a more conservative assumption is taken, where all hazardous construction and demolition waste is assumed to require disposal to landfill, then this would equate to 0.05% of the hazardous (merchant) landfill capacity within the waste management study area, and 0.003% of the hazardous (merchant) landfill capacity within England.

10.9.25 The effects of the Scheme on landfill capacity are therefore assessed as being of slight significance, which are not significant.

Waste: waste management infrastructure

10.9.26 The review and assessment of waste management infrastructure has concluded that there are no strategic waste management facilities, safeguarded strategic waste management sites or waste management consultation areas located within the Order Limits.

10.9.27 There are no operational permitted waste management facilities located within the Order Limits.

10.9.28 The south-western corner of Eltisley landfill site is located within the Order Limits; however, the site is in closure and is no longer permitted to accept waste.

10.9.29 The Scheme is not expected to require the construction of new (permanent) waste management infrastructure to accommodate waste generated from its construction.

10.9.30 As no effects of the Scheme are predicted on the operation of waste management infrastructure, no significant effects are predicted.

10.10 Monitoring

Construction effects

10.10.2 As the assessment has concluded that the Scheme would not result in significant effects being generated, no monitoring of these effects is required.

10.10.3 The First Iteration EMP **[TR010044/APP/6.8]** sets out monitoring to be undertaken during the construction stage to ensure that the mitigation measures embedded in the Scheme design, and those considered essential to mitigate the effects of construction activities, are appropriately implemented.

10.11 References

Ref 10-1 The Waste (England and Wales) Regulations 2011. The Stationary Office (2011). http://www.legislation.gov.uk/uksi/2011/988

Ref 10-2 Directive 2008/98/EC of the European parliament and of the council of 19 November 2008 on waste and repealing certain directives. The European Parliament and the Council of the European Union (2008). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098

Ref 10-3 Waste Classification. Guidance on the classification and assessment of waste (1st Edition v1.1.GB): Technical Guidance WM3. Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency (2021). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/948735/Waste_classification_technical_guidance_WM3.pdf

Ref 10-4 Waste Management Plan for England. Department for the Environment Food and Rural Affairs (2013). https://www.gov.uk/government/publications/waste-management-plan-for-england

Ref 10-5 Environmental Permitting (England and Wales) Regulations 2016. The Stationary Office (2016). http://www.legislation.gov.uk/uksi/2016/1154/contents

Ref 10-6 Hazardous Waste (England and Wales) Regulations 2005. The Stationary Office (2005). http://www.legislation.gov.uk/uksi/2005/894/contents

Ref 10-7 Environmental Protection Act 1990. The Stationary Office (1990). http://www.legislation.gov.uk/ukpga/1990/43/contents

Ref 10-8 National Policy Statement for National Networks. Department for Transport ((2014). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf

Ref 10-9 Overarching National Policy Statement for Energy (EN-1). Department of Energy & Climate Change (2011). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Ref 10-10 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). Department of Energy & Climate Change (2011). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf

Ref 10-11 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2019). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

Ref 10-12 Planning Practice Guidance: Minerals. Ministry of Housing, Communities & Local Government (2014). https://www.gov.uk/guidance/minerals

Ref 10-13 Planning Practice Guidance: Waste. Ministry of Housing, Communities & Local Government (2015). https://www.gov.uk/guidance/waste

Ref 10-14 National Planning Policy for Waste. Department for Communities and Local Government (2014). https://www.gov.uk/government/publications/national-planning-policy-for-waste

Ref 10-15 National and regional guidelines for aggregates provision in England 2005 to 2020. Department for Communities and Local Government (2009). https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020

Ref 10-16 Minerals and Waste Local Plan: Strategic Sites and Policies. Adopted January 2014. Bedford Borough Council, Central Bedfordshire Council and Luton Borough Council (2014). https://www.centralbedfordshire.gov.uk/info/48/minerals_and_waste/450/development_framework

Ref 10-17 Cambridgeshire and Peterborough Minerals and Waste Development Plan Core Strategy Development Plan Document. Adopted 19 July 2011. Cambridgeshire County Council and Peterborough City Council (2011). https://www.cambridgeshire.gov.uk/business/planning-and-development/planning-policy/adopted-minerals-and-waste-plan

Ref 10-18 Cambridgeshire and Peterborough Minerals and Waste Local Plan Proposed Submission (Publication) Draft. November 2019. Cambridgeshire County Council and Peterborough City Council (2019). https://www.peterborough.gov.uk/council/planning-and-development/planning-policies/minerals-and-local-waste-plan

Ref 10-19 Bedford Borough Local Plan 2030. Adopted January 2020. Bedford Borough Council (2020). https://bbcdevwebfiles.blob.core.windows.net/webfiles/Planning%20and%20Building/local-plan-2030/Local%20Plan%202030%20ADOPTED%20VERSION.pdf

Ref 10-20 Central Bedfordshire Pre-submission Local Plan 2015-2035. January 2018. Central Bedfordshire Council (2018). https://www.centralbedfordshire.gov.uk/migrated_images/pre-submission-local-plan-compressed-v2_tcm3-27081.pdf

Ref 10-21 Huntingdonshire's Local Plan to 2036. May 2019. Huntingdonshire District Council (2019). https://www.huntingdonshire.gov.uk/media/3872/190516-final-adopted-local-plan-to-2036.pdf

Ref 10-22 South Cambridgeshire Local Plan. Adopted September 2018. South Cambridgeshire District Council (2018). https://www.scambs.gov.uk/media/12740/south-cambridgeshire-adopted-local-plan-270918_sml.pdf

Ref 10-23 Design Manual for Roads and Bridges: Volume 11. Highways England (1993 – 2019) [WITHDRAWN]

Ref 10-24 Interim Advice Note 125/15: Environmental Assessment Update. Highways England (2015) [WITHDRAWN]

Ref 10-25 Interim Advice Note 153/11: Materials. Highways Agency (2011). [WITHDRAWN]

Ref 10-26 A428 Black Cat to Caxton Gibbet: Environmental Scoping Report. Highways England (2019). https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010044/TR010044-000006-BCCG%20-%20Scoping%20Report.pdf

Ref 10-27 Design Manual for Roads and Bridges. Highways England (2019 – 2020). http://www.standardsforhighways.co.uk/dmrb

Ref 10-28 Design Manual for Roads and Bridges: LA 104 Environmental assessment and monitoring (Revision 1). Highways England (2020). https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a

Ref 10-29 Design Manual for Roads and Bridges: LA 110 Material assets and waste (Revision 0). Highways England (2019). https://www.standardsforhighways.co.uk/dmrb/search/6a19a7d4-2596-490d-b17b-4c9e570339e9

Ref 10-30 2019 Waste Data Interrogator. 2019 Waste Summary Tables for England. Version 2. Dated: 13 November 2020. Environment Agency (2020). https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator

Ref 10-31 Geoindex Onshore – Mineral resources: Peat. British Geological Survey (undated). https://mapapps2.bgs.ac.uk/geoindex/home.html#

Ref 10-32 The Contribution of Recycled and Secondary Materials to Total Aggregates Supply in Great Britain in 2018. Mineral Products Association (2020). https://mineralproducts.org/documents/Contribution_of_Recycled_and_Secondary_Materials_to_Total_Aggregates_Supply_in_GB_in_2018.pdf

Ref 10-33 Annual Monitoring Report 2017. East of England Aggregates Working Party (undated). https://www.centralbedfordshire.gov.uk/migrated_images/2017-annual-monitoring-report_tcm3-29394.pdf

Ref 10-34 UK Statistics on Waste, 19 March 2020. Department for the Environment Food and Rural Affairs (2020). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf

Ref 10-35 Public registers. Environment Agency. https://environment.data.gov.uk/public-register/view/index

Ref 10-36 The Definition of Waste: Development Industry Code of Practice. Version 2. March 2011. Contaminated Land: Applications in Real Environments (CL:AIRE) (2011). https://www.claire.co.uk/projects-and-initiatives/dow-cop/28-framework-and-guidance/111-dow-cop-main-document

Ref 10-37 Designing Out Waste Tool for Civil Engineering. Waste & Resources Action Programme (2020). http://dowtce.wrap.org.uk/