Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Environmental Statement Chapter 16: Material resources and waste

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Contents

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Summary

The Environmental Statement for the Material Resources and Waste was undertaken for the Proposed Development, consists of the following:

- Construction of the Proposed WWTP and Waterbeach Pipeline;
- Operation and maintenance of the Proposed WWTP and Waterbeach Pipeline; and
- Decommissioning of the existing Cambridge WWTP.

The Institute of Environmental Management and Assessment (IEMA) guide to Materials and Waste in Environmental Impact Assessment (EIA) (The Institute of Environmental Management and Assessment, 2020) have been referenced to assess the impact on material resource use and the generation and management of waste for the Proposed Development.

Resource types required for the Proposed Development

Concrete, cement, steel and aggregate will be the primary raw materials required for the construction of the Proposed Development. According to the baseline study for UK steel import (World Steel Association, 2020), the availability of supply of concrete and cement in the UK and the regional supply of aggregates in the East of England indicates that there are no issues with supplies of resources such as steel, concrete, cement and aggregates.

Effects summary

The strategy for the construction of the Proposed Development includes design (primary mitigation) measures to re-use site-won materials within the landscape proposals to reduce impact on the availability of materials, minimise the depletion of natural resources, minimise the volumes of waste generated and minimise the temporary occupation of the waste infrastructure and avoid permanent reduction of landfill void capacities.

Industry best practices, such as the implementation of the Code of Construction Practice (CoCP) Part A and B (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2), an Outline Soil Management Plan (Appendix 6.3, App Doc Ref 5.4.6.3), Site Waste Management Plan and project specific mitigation that aligns with the Anglian Water's Net Zero 2030 strategy (Anglian Water, 2021) , are part of the secondary mitigation plans that have been incorporated to reduce the impacts on material resource use and the generation and management of waste.

The EIA indicates that the environmental effects for the construction of the Proposed Development in terms of material resource use and the generation and management of waste would not be significant.

The operation of the Proposed WWTP would be similar to that of the existing Cambridge WWTP, requiring similar types and quantities of materials and would generate biosolids and other solid waste. The operation of the Proposed WWTP will be monitored through

environmental permits, issued by the Environment Agency and are part of is its tertiary mitigation plans. The biosolids generated will be used as bio fertilisers and spread on land, therefore the environmental effects from generation and management of waste is assessed as not significant.

The decommissioning of the existing Cambridge WWTP would involve the draining down of tanks and pipelines, removal of sludge and the completion of cleaning activities. The demolition of structures is not planned and existing structures will be left in-situ in a safe state. All chemicals and wastes will be removed by licensed carriers. The process will generate some waste materials that may require landfilling, but these are not considered to be significant. The environmental effect for the decommissioning phase is assessed as not significant.

1 Introduction

1.1 Purpose of this chapter

1.1.1 This chapter of the Environmental Statement (ES) presents the findings of the EIA completed in relation to the potential impacts of the Proposed Development on Material Resources and Waste.

1.1.2 The ES has been prepared as part of the application to the Planning Inspectorate (PINS) for development consent. This chapter considers the potential impacts on quarries and non-renewable resources and waste management infrastructure and landfill void spaces for the generation and management of waste of the Proposed Development during its construction (including commissioning), operation and maintenance, and decommissioning phases.

1.1.3 This chapter summarises information from supporting studies, technical reports and publicly available data which are included within the Code of Construction Practice Part A & B (CoCP) (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2), Appendix 6.1: Agricultural Land Classification (App Doc Ref 5.4.6.1), Appendix 6.3: Outline Soil Management Plan (App Doc Ref 5.4.6.3) and Appendix 16.1: Materials and Waste Resources Estimates (Appendix 5.4.16.1).

1.1.4 For the purposes of the assessment, this Material Resources and Waste chapter discusses the:

- the provision and use of material resources, including primary, secondary, recycled and manufactured materials; and
- the generation and management of waste.

1.1.5 This chapter discusses the inert, non-hazardous and hazardous waste that is defined as follows:

- Inert waste (Government, 2022) is waste that does not undergo any significant physical, chemical or biological transformation. Examples include waste from aggregate, cement, rocks etc.
- Hazardous waste (Hazardous Waste, 2022): Waste is generally considered hazardous if it (or the material or substances it contains) are harmful to humans or the environment. Examples of hazardous waste include asbestos, batteries, solvents, pesticides, oils (except edible oils), hazardous waste containers etc.
- Non-Hazardous waste (UK, 2021): Non-hazardous waste includes any waste that causes no harm to human or environmental health. Examples of non-hazardous waste includes office waste, soil, vegetation waste etc.

1.1.6 Materials would be required to be transported to the Proposed Development for construction and operation. The generation and management of waste that cannot be reused on-site would require transport off-site. The effects of these activities

have been assessed in Chapter 7: Air Quality, Chapter 10: Carbon and Chapter 19: Traffic and Transport.

1.1.7 The effects of land contamination such as potential impacts on groundwater and human health are reported in Chapter 14: Land Quality and Chapter 20: Water Resources. Where the potential for contaminated land has been identified, this chapter addresses the management of this waste only.

1.1.8 The assessment does not consider the sterilisation of any mineral safeguarding areas or peat resources, which is assessed in Chapter 14: Land Quality.

1.2 Competency statement

1.2.1 Summaries of the qualifications and experience of the Chapter authors are set out in Table 1-1.

Table 1-1: Competent experts

Author	Qualification / Professional Membership	Years of experience	Project experience summary
[redacted]	MCIWM, Ceng, MIChemE PhD in Chemical Engineering (Anaerobic Digestion of food waste with raw sewage sludge) Master's in chemical engineering NEBOSH GC	11	The author has 4+ years of experience in authoring EIA chapters for material resources and waste generation and management for similar kinds of UK based and international projects. 7 years of experience in working as a process engineer in a waste treatment facility with anaerobic digestion and thus has professional experience in the management of waste generated by waste water treatment facilities.
[redacted]	MCIWM LLM Environmental Law BSc (Hons) Environmental Protection Chartered Wastes Manager IEMA Registered Environmental Auditor IOSH Managing Safely City and Guilds level 3 – Assessing Candidates using a range of methods	20	10 years' experience in authoring in authoring EIA chapters for material resources and waste generation and management including for National Highways major infrastructure projects (rail and energy), along with writing supporting documents for DCOs (SWMPs, MMP, CEMPs). Strong environmental permitting background working with the water industry to obtain IED installation permits for sludge treatment centres. Chartered Waste Management professional with over 20 years combined practical and technical environmental and waste

Author	Qualification / Professional Membership	Years of experience	Project experience summary
	Qualified Person under CL:AIRE CoP v2 2011		management experience in the UK and overseas.

1.3 Planning policy context

National Policy Statement (NPS) requirements

1.3.1 Planning policy on waste water Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to material resources and waste, is contained in the National Policy Statement (NPS) for Waste Water (Department of Environment, Food and Rural Affairs, 2012).

1.3.2 Table 1-2 sets out how the scope proposed in this chapter complies with the NPS for Waste Water.

Table 1-2: Scope and NPS compliance

NPS requirement	Compliance of EIA scope with NPS requirements
Paragraph 4.14.1: Government policy on hazardous and non-hazardous waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is disposed of in a way that is least damaging to the environment and to human health.	Chapter 6: Agricultural land and soils refers to requirements for a Soil Management Plan (SMP) (Appendix 6.3, App Doc Ref: 5.4.6.3). The CoCP Part A and B (Appendix 21 & 22, App Doc Ref: 5.4.2.1 & 5.4.2.2) includes a range of measures in relation to waste management. The associated Construction Environment Management Plan (CEMP) (to be developed by the appointed contractor) will remain consistent with this. Within Part A of the CoCP, Section 4.7 and Section 4.8 respectively deal with 'Emergency Procedures' and 'Preparedness and Pollution Incident Control' including measures relating to the handling and disposal of hazardous materials, and Section 7.9 (Waste Management and Resource Use) covers of waste management and the sustainable use of resources.
Paragraph 4.14.2: Sustainable waste management is implemented through the waste hierarchy.	Waste management infrastructure within Cambridgeshire or the East of England will be used for reuse, recycling and recovery of the waste generated. The Proposed Development design has been progressed to reuse excavated material for the purpose of landscaping and the development of landscape screening structure in the form of the Earth Bank. The CoCP Part A requires the appointed contractor(s) to prepare a Site Waste Management Plan (SWMP) to implement management measures higher up the waste hierarchy.
Paragraph 4.14.3:	Generated waste will be disposed of to landfill only if they are not suitable for reuse, recycle or recovery. The

NPS requirement	Compliance of EIA scope with NPS requirements
Disposal of waste should only be considered where other waste management options are not available or where it is the best overall environmental outcome.	outline SMP (Appendix 6.3, App Doc Ref: 5.4.6.3) outlines the reuse of excavated soils on-site. The CEMP (to be developed by the appointed contractor) will remain consistent with this. The CoCP Part A (Appendix 2.1, App Doc Ref: 5.4.2.1) requires that the appointed contractor(s) prepare a Materials Management Plan (MMP), if required, to allow the use of excavated waste under CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials.
Paragraph 4.14.4: All large infrastructure projects are likely to generate hazardous and non-hazardous waste during the construction, operation and decommissioning phases. The Environment Agency's Environmental Permitting (EP) regime incorporates operational waste management requirements for certain activities. When an applicant applies to the Environment Agency for an Environmental Permit, the Environment Agency will require the application to demonstrate that processes are in place to meet all relevant EP requirements.	The existing Cambridge WWTP has an Environmental Permit. The proposed WWTP will be subject to the Industrial Emissions Directive (IED) regulations, and an application will be made for an Environmental Permit. Section 2.1 of Chapter 2: Project Description describes the processes within the proposed WWTP and operational management activities. The control of decommissioning activities will be through a Decommissioning Management Plan. The Outline Decommissioning Plan (Appendix 2.3, App Doc Ref 5.4.2.3) includes the principles governing this activity and the final plan is to be agreed with the Environment Agency.
Paragraph 4.14.5: The applicant should set out the arrangements that are proposed for managing any waste produced and prepare a Site Waste Management Plan, SWMP	Section 7.9 of the CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) requires a SWMP to be developed as part of the proposed mitigation plans. The minimum content of this plan is set out in CoCP Part A.

National planning policy

1.3.3 National planning policy of relevance to the assessment of Material Resources and Waste, pertinent to the Proposed Development are:

National Planning Policy Framework 2021

1.3.4 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communites & Local Government, 2021) sets out policies for development and makes specific reference to Section 17: Sustainable use of minerals. This includes the use of secondary and recycled materials and mineral waste before considering extraction of primary materials.

National Planning Policy for Waste 2014

1.3.5 This sets out to identify need for waste management facilities and requirement for Local Authorities to identify in their Local Plans suitable sites and areas for waste management facilities (Department for Communities and Local Government, 2014).

1.3.6 The document sets out detailed waste planning policies to facilitate a more sustainable and efficient approach to resource use and management. When determining planning applications for non-waste development, the policy requires that local planning authorities should, to the extent appropriate to their responsibilities, ensure that:

- The likely impact of proposed, non-waste related development on existing waste management facilities, and on sites/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;
- New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development and, in less developed areas, with the local landscape; and
- The handling of waste arising from the operation of developments maximises reuse/recovery opportunities and minimises off-site disposal.

A Green Future: Our 25 Year Plan to improve the Environment

1.3.7 The Government's 25 Year Environment Plan (UK Government, 2021) sets out government actions to help the natural world regain and retain good health including the growing problems associated with the generation of waste. The Plan has identified six key areas on which to focus action. The policy area relevant to the assessment of waste and material resource is set out in Chapter 4 of the 25-Year Plan on increasing resource efficiency and reducing pollution and waste.

1.3.8 A number of goals and targets are set out in the 25-Year Plan. These include the aim to minimise waste, reuse materials as much as possible and manage materials at the end of their life to minimise the impact on the environment. This is intended to be done by:

- working towards the ambition of zero avoidable waste by 2050;
- working to a target of eliminating avoidable plastic waste by end of 2042;
- meeting all existing waste targets – including those on landfill, reuse and recycling – and developing ambitious new future targets and milestones;
- seeking to eliminate waste crime and illegal waste sites over the lifetime of the plan, prioritising those of highest risk. Delivering a substantial reduction in litter and littering behaviour; and
- substantially reducing and, where possible, preventing all kinds of marine plastic pollution – in particular material that came originally from land.

Our waste, our resources: a strategy for England, 2018

1.3.9 This sets out how the Government plan to double resource productivity and eliminate avoidable waste of all kinds (including plastic waste) by 2050 (Department for Environment, Food & Rural Affairs, 2018). The Strategy complements and helps deliver the 25-Year Plan, the Clean Growth Strategy, the Industrial Strategy, and the Litter Strategy. It is guided by two overarching objectives:

- to maximise the value of resource use; and
- to minimise waste and its impact on the environment.

1.3.10 The Strategy features the Government's approach to sustainable production, consumer participation, recovering resources and managing waste, waste crime, food waste, international leadership, research and innovation, and monitoring and evaluation of the Strategy.

1.3.11 The Strategy will be delivered through policies, actions and commitments, and it will contribute to the delivery of the following strategic ambitions:

- work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025;
- to work towards eliminating food waste to landfill by 2030;
- zero avoidable plastic waste by 2042;
- doubling of resource productivity by 2050; and
- zero avoidable waste by 2050.

The Waste Management Plan for England 2021

1.3.12 The Plan provides an overview of waste management in England (Department for Environment, Food & Rural Affairs, 2021). It outlines the waste hierarchy as a guide to sustainable waste management and sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. Positive planning plays a pivotal role in delivering England's waste ambitions through ensuring the reuse, recovery or disposal of waste is undertaken without endangering human health or harming the environment and delivering sustainable development and resource efficiency through all schemes.

The Waste Prevention Programme for England 2013

1.3.13 The Programme sets out the roles and actions for government and others to reduce the amount of waste produced in England and was updated in July 2020 (Department for Environment, Food & Rural Affairs, 2013). The Waste Prevention Programme for England 2013 review evaluates the actions taken in the six years since the Waste Prevention Programme was published. It also outlines progress on the ongoing programme of work as part of the resources and waste strategy for England. This strategy will be supplemented by a new waste prevention programme, to help move to a more circular economy model.

Waste Prevention Programme for England – Consultation Version 2021

- The revised Waste Prevention Programme (Department for Environment, Food & Rural Affairs, 2021) will help embed the principles outlined in the Resources and Waste Strategy including – using extended producer responsibility and other financial incentives to ensure the polluter pays principle is embedded; and
- aligning the regulatory framework with a circular economy approach.

Local planning policy

1.3.14 Local planning policy of relevance to the Proposed Development includes:

- South Cambridgeshire District Council Local Plan 2018 (South Cambridgeshire District Council, 2018) with particular reference to:
  - Policy CC/6 (Construction methods), which seeks to ensure the construction of developments manages material and waste in accordance with the waste hierarchy.
- Cambridge City Council Local Plan 2018 (Cambridge City Council, 2018) with particular reference to:
  - Policy 1 (The presumption in favour of sustainable development); and
  - Policy 28 Carbon reduction, community energy networks, sustainable design and construction, and water use.
- Cambridgeshire and Peterborough Minerals and Waste Local Plan 2036 (Adopted July 2021) (Peterborough City Council and Cambridgeshire County Council, 2021), with particular reference to:
  - Policy 1: Sustainable development and climate change;
  - Policy 3: Waste management needs;
  - Policy 4: Providing for waste management;
  - Policy 10: Waste management areas (WMAS);
  - Policy 11: Water recycling areas (WRAS);
  - Policy 14: Waste Management Needs Arising;
  - Policy 16: Consultation areas (CAS);
  - Policy 17: Design;
  - Policy 19: Restoration and aftercare; and
  - Policy 24: Sustainable Use of Soils.

1.3.15 The EIA assessment for this Proposed Development takes into consideration the findings and priorities of the:

- South Cambridgeshire's Annual Monitoring Reports (latest is 2020/2021 edition) (South Cambridgeshire District Council and Cambridge City Council) for dealing with waste and minerals; and
- Greater Cambridge Sustainable Design and Construction Supplementary Planning Document, 2020 that will help to ensure that new development makes efficient use of resources.

1.3.16 South Cambridgeshire District Council and Cambridge City Council (South Cambridgeshire District Council and Cambridge City Council) have commenced the joint preparation of both the Greater Cambridge Local Plan ('GCLP') and the North East Cambridge Area Action Plan ('NEC AAP').

1.3.17 The GCLP is intended to replace both the adopted Cambridge and South Cambridgeshire Local Plans 2018 and cover the period to 2041. In November/December 2021 public consultation was held on the Greater Cambridge Local Plan – First Proposals ('GCLP') (Regulation 18: Preferred Options) including the Greater Cambridge Local Plan: First Proposals – Sustainability Appraisal (October 2021). Accompanying these documents, the Councils published a number of supporting documents and topic papers which are referenced below where they provide relevant background.

1.3.18 Following consultation in July 2020 on Cambridge City and South Cambridgeshire Councils joint Draft Regulation 18 NEC AAP, the Councils have now completed the preparation of their Reg.19 Submission version of the NEC AAP which went through respective District and City Council Committee cycles between 30 November 2021 and 11 January 2022. The Reg.19 version of the AAP has now been approved for consultation, but on hold pending the outcome of the Development Consent Order (DCO).

1.4 Legislation

European Legislation

1.4.1 The overarching European Directives that are applicable to the assessment of material resource use and waste generation are set out below. Whilst it is acknowledged that the UK has left the European Union (EU), there is existing legislation which transposes these Directives that remains in force.

Waste Framework Directive (2008/98/EC)

1.4.2 The Waste Framework Directive sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery (European Parliament and Council, 2008). It defines when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Waste Framework Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular, without risk to water, air, soil, plants or animals, without causing a nuisance through

noise or odours, and without adversely affecting the countryside or places of special interest.

1.4.3 The Waste Framework Directive sets out a five-step waste hierarchy as to how waste should be managed as an important requirement which applies to anyone who produces or manages waste. The waste hierarchy requires that waste is dealt with in the following order of priority:

- prevention;
- preparing for re-use;
- recycling;
- other recovery (for example energy recovery); and
- disposal, only as a last resort.

1.4.4 The following considerations must be taken into account:

- environmental protection principles of precaution and sustainability;
- proximity principle for treatment and disposal of waste to be as close to its source as possible;
- technical feasibility and economic viability;
- protection of resources; and
- the overall environmental, human health, economic and social impacts.

1.4.5 The Waste Framework Directive stipulates the requirement for Member States to re-use, recycle or recover a minimum of 70% of non-hazardous construction and demolition waste by weight by 2020.

Landfill Directive (1999/31/EC)

1.4.6 The Landfill Directive (Directive, Landfill, 1999) aims to prevent, or reduce as far as possible, negative effects on the environment from the landfilling of waste and was implemented by Member States in 2001.

Hazardous Waste Directive *(91/689/EEC)*

1.4.7 This Directive (Waste, 1991) lays down strict controls and requirements for controlling hazardous wastes. Hazardous waste is any waste with hazardous properties that may make it harmful to human health and the environment and is defined by the European Waste Catalogue.

National legislation

European Union (Withdrawal) Act 2018

1.4.8 The Act introduces the concept of retained EU law. The Act ensures that the whole body of existing EU environmental law continues to have effect in UK law (UK

Government, 2018). Essentially any EU regulation or decision addressed to the UK in operation before the date of exit from EU will remain a part of the UK law.

The Environmental Protection Act 1990 (as amended)

1.4.9 The Environmental Protection Act defines the fundamental structure and authority for waste management and control of emissions into the environment (UK Government, 1990). It legislates for:

- the meaning of waste;
- the requirements of the duty of care in respect of waste and transferral of waste;
- a prohibition on the unauthorised or harmful depositing, treatment or disposal of waste on land; and
- waste collection and waste disposal authorities and their roles.

The Environment Act 2021

1.4.10 The Environment Act (UK Government, 2021) contains several provisions in Part 3 relating to waste which includes:

- producer responsibility obligations;
- producer responsibility for disposal cost;
- managing waste by separation of waste for domestic collection;
- managing hazardous waste; and
- electronic waste tracking

Waste (Circular Economy) (Amendment) Regulation 2020

1.4.11 The overarching European Directives that are applicable to the assessment of material resource use and waste generation are outlined in paragraphs 1.4.2to 1.4.7 of this chapter (UK Government, 2020). Whilst it is acknowledged that the UK has left the EU, it should be noted that existing legislation which transposes these Directives remains in force. English and Welsh law was updated on 1 October 2020 to include changes to the Waste Framework Directive (WFD) made in 2018. This was done through the Waste (Circular Economy) (Amendment) Regulations 2020.

The Waste and Environmental Permitting etc (Legislative Functions and Amendment etc) (EU Exit) Regulations 2020

1.4.12 These regulations were laid before Parliament on 16 December 2020 and are made in exercise of powers in section 8(1) of the European Union (Withdrawal) Act 2018 in order to ensure that the waste and environmental permitting regimes continue to operate effectively over 1 January 2021 (UK Government, 2020).

The Waste (England and Wales) Regulations 2011 (as amended)

1.4.13 The regulations (European Parliament and Council, 2008) make provision for waste prevention programme and impose duties in relation to the improved use of waste as a resource, including the application of the waste hierarchy (UK Government, 2011). Site Waste Management Plans (SWMPs) (Department for Environment, Food & Rural Affairs, 2008) are no longer mandatory for projects commencing after 1 December 2013. They are, however, recommended, and the principles behind the regulations remain best practice.

Hazardous Waste (England and Wales) Regulations 2005 (as amended)

1.4.14 The regulations provide for the control of hazardous wastes and their movements. A consignment note is required prior to the removal of any hazardous waste (UK Government, 2005). Hazardous waste is waste that exhibits certain properties (for example, it is potentially flammable, toxic or carcinogenic) such that it is or may (at or above certain concentrations) be detrimental to human health or the environment.

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

1.4.15 These regulations introduce a streamlined system of environmental permitting in England and Wales for certain installations, waste operations and mobile plants (UK Government, 2016). It is an offence to operate a regulated facility or to cause or knowingly permit a water discharge or groundwater activity except under and in accordance with an environmental permit.

Waste Electrical and Electronic Equipment (WEEE) (England and Wales) Regulations 2013

1.4.16 The WEEE Regulation 2013 applies to all Electrical and Electronic Equipment (EEE) placed on the market in the UK covered by the scope of the regulations (UK Government, 2013). There are 10 broad categories of WEEE currently outlined within the regulations (see Schedules 1 and 2 of the regulations). Relevant categories for the CWWTPR project are:

- lighting equipment, e.g. straight and compact fluorescent tubes and high intensity discharge lamps;
- electrical and electronic tools, e.g. drills, saws and sewing machines, electric lawnmowers; and
- monitoring and control equipment, e.g. smoke detectors, thermostats, heating regulators.

Controlled Waste (England and Wales) Regulations 2012

1.4.17 The Controlled Waste (England and Wales) Regulations 2012 came into force in April 2012, replacing the Controlled Waste Regulations 1992. They define household, industrial and commercial waste for environmental permitting purposes (UK Government, 2012). The Regulations replaced Schedule 1 of the 1992 regulations

with an updated schedule defining household waste, still by reference to its origin, but introducing some exceptions.

1.4.18 The regulations also specify that waste from construction or demolition works, including preparatory works should be "treated as household waste for the purposes of section 34(2) and (2A) of the Environment Protection Act 1990 only (disapplication of section 34(1) and duty on the occupier of domestic property to transfer household waste only to an authorized person or for authorized transport purposes)".

1.5 Consultation

Scoping

1.5.1 Table 1-3 provides a summary of key points raised during EIA scoping.

Table 1-3: Key points raised during scoping (November 2021)

ID	Consultee	Points raised	Response
3.12.1	PINS	The Inspectorate agrees that use of material resources during operation may be scoped out from further assessment, however the ES project description should clearly outline the likely resources to be used in operation.	The likely resources to be used in operation are outlined in Chapter 2: Project Description.
3.12.3	PINS	Inspectorate does not agree that the effects of waste generated from demolition activities at both existing sewage works can be scoped out of the assessment at this time. The assessment needs to describe the likely decommissioning works to the extent that they are foreseeable.	The effects of waste generated from demolition is addressed in Section 4.1.1, and decommissioning is addressed in Section 4.4. Demolition of both the existing Cambridge WWTP and the existing Waterbeach Water Recycling Centre (WRC) would be assessed as part of ta separate planning application pertaining to their redevelopmen. These are considered as cumualtive schemes and reported on in Chapter 22: Cumulative Effects Assessment. Demolition of the proposed WWTP would be assessed as part of a separate planning application pertaining to future redevelopment of the site, and is not part of this application
N/A	Cambridgeshire County Council	A request to identify waste-generating large scale infrastructure projects such as A428, and when assessing the significance of the effect of the proposal in respect of waste generation, that the cumulative effect of these proposals is considered.	Estimated waste arisings are stated for EIA assessment. A428 development has been considered as part of cumulative assessment for waste generation.
N/A	Cambridgeshire County Council	A request to review the list of the landfill sites use for the assessment. The following errors have been identified: Barrington Cement Works is in South	All typographical errors/information have been updated based on the remaining capacity for 2020.

ID	Consultee	Points raised	Response
		Cambridgeshire and only allowed to accept inert waste transported by rail; Kennett 2A (of the Mick George Ltd) landfill operation is complete and in restoration; Pasture House Farm is in Peterborough.	
N/A	Fen Ditton Parish Council	A request to scope in waste from Milton Works following the proposal to scope out generation of waste for demolition activities.	The effects of waste generated during the decommissioning phase includes consideration of the following activities: draining and cleaning of tanks and pipes, stopping up the Existing Outfall and removal of surplus chemicals from the existing Cambridge WWTP. This is addressed in Section 4.4 (Decommissioning of the existing Cambridge WWTP) and has also been considered as part of Chapter 22: Cumulative Effects Assessment.
N/A	HSE	The presence of hazardous substances on, over or under land at or above set threshold quantities (Controlled Quantities) will probably require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Act 1990 as amended. The substances, alone or when aggregated with others for which HSC is required, and the associated Controlled Quantities, are set out in The Planning (Hazardous Substances) Regulations 2015 as amended.	The presence of hazardous materials/waste have not been identified. If hazardous material is used during construction or hazardous waste is generated above the threshold quantities, then it will be dealt with as set out in the Planning (Hazardous Substances) Act 1990 as amended. This requirement is also reflected in the CoCP Part A Section 7.4 (Land Quality) (Appendix 2.1, App Doc Ref 5.4.2.1).
N/A	Public Health England	A request to demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal) and to consider issues associated with waste delivery and acceptance procedures (including delivery of prohibited wastes).	Compliance with the waste hierarchy is part of the approach to mitigation. Waste delivery, including prohibited waste, is part of the operation phase which has been assessed in Section 4.3.

Technical Working Groups

1.5.2 There has been no specific Technical Working Group (TWG) on material resources and waste. The Environmental Health working group have not specifically raised any waste matters.

Statutory s42 consultation

1.5.3 The applicant is engaging with the Environment Agency and Environment Health Officers (EHO) regarding the finalisation of the decommissioning strategy and plan for the existing Cambridge WWTP.

Statutory s47 local community consultation

1.5.4 No other key points were raised during statutory s47 local community consultation in regard to material resources and the management of waste.

2 Assessment Approach

2.1 Guidance

2.1.1 The following guidance has been considered in reference to the assessment of material resources and waste:

- The IEMA guide to Materials and Waste in Environmental Impact Assessment (The Institute of Environmental Management and Assessment, 2020). This provides guidance and recommendations for the impacts and effects of materials and waste on the environment. This document will be used to identify significance criteria, to support professional judgement;
- Site Waste Management Plans – Guidance for Construction Contractors and Clients Voluntary Code of Practice (Department of Trade and Industry, 2004);
- Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Department for Environment, Food & Rural Affairs, 2009); and
- CL:AIRE Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011).

2.1.2 Professional judgement has been used to provide an assessment of effects based on several factors, including the:

- availability of the material resources;
- type of materials required, e.g. primary/virgin materials, manufactured materials, recycled materials;
- type of waste generated, e.g. inert, hazardous;
- availability of suitable facilities within close proximity to the Proposed Development options to treat the waste generated; and
- compatibility of the Best Practicable Environmental Option (BPEO) for the waste within the context of the waste hierarchy, i.e. whether generation of the waste can be minimised, the waste can be recycled, landfilled etc.

2.2 Assessment methodology

2.2.1 The general approach to assessment is described in Chapter 5:EIA Methodology.

2.2.2 Following the preliminary assessment of the likely significant effects of the Proposed Development, any further mitigation measures (secondary mitigation) are identified and described. These mitigation measures would further reduce an adverse effect or enhance a beneficial one. The assessment of likely significant effects is then carried out taking into account the identified secondary mitigation measures to identify the 'residual' environmental effects.

2.2.3 This section provides specific details of the material resources use and generation and management of waste applied to the assessment of the Proposed Development.

Impact assessment criteria

2.2.4 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors. The terms used to define magnitude and sensitivity are based on IEMA's guide to Materials and Waste in EIA.

2.2.5 The assessment criteria used to assess the potential effects on material resources use and generation and management of waste arising from the Proposed Development differs from the generic EIA methodology and are described below.

2.2.6 The categories for the magnitude of impact are provided in Table 2-1, sensitivity in Table 2-2, and the effect thresholds are defined in Table 2-3.

2.2.7 For waste generation, IEMA guidance offers two methods for assessing the magnitude of impact from the generation and disposal of waste:

- W1 – Void Capacity; and
- W2 – Landfill Diversion.

2.2.8 For this assessment, the W1 – Void Capacity method has been selected and presented in Table 2-1 and Table 2-2 for assessing the magnitude and sensitivity of impact from the generation and disposal of waste for the following reasons:

- the Proposed Development is a complex project;
- it is a robust approach based on availability of industry data;
- it is a detailed methodology; and
- this method is recommended for statutory EIAs.

2.2.9 For these tables "Region" means the authority comprising the second study area, in this case East of England. "Primary materials" describes materials that are from a non-renewable source.

Magnitude of impact

2.2.10 The criteria for defining magnitude for the assessment of impacts to materials resource use and generation and management of waste are defined within in Table 2-1.

Table 2-1: Criteria to determine magnitude for material assets and waste generation

Magnitude	Description
No change	Material assets: no materials required Waste generation: • based on void capacity: for inert, non-hazardous and hazardous waste, zero waste generation and disposal from the development.
Negligible	Material assets: no individual material type is equal to or greater than 1% by volume of the regional or where justified national baseline availability

Magnitude	Description
	Waste generation: • based on void capacity, the development will reduce: – regional or where justified national landfill void capacity baseline** for inert and non – hazardous by <1%; and/or – national landfill void capacity baseline** for hazardous waste by <0.1%.
Minor	Material assets: • one or more materials is between 1-5% by volume of the regional or where justified national baseline availability; and/or • the development has the potential to adversely and substantially* impact access to one or more allocated mineral site (in their entirety), placing their future use at risk. Waste generation: • based on void capacity, the development will reduce: – regional or where justified national landfill void capacity baseline** for inert and non-hazardous by 1- 5%; and/or – national landfill void capacity baseline** for hazardous waste by <0.1-0.5%.
Moderate	Material assets: • one or more materials is between 6-10% by volume of the regional or where justified national baseline availability; and/or • the allocated mineral site is substantially* sterilised by the development rendering it inaccessible for future use. Waste generation: • based on void capacity, the development will reduce: – regional or where justified national landfill void capacity baseline** for inert and non-hazardous by 6-10%; and/or – national landfill void capacity baseline** for hazardous waste by <0.5-1%.
Major	Material assets: • one or more materials is >10% by volume of the regional or where justified, national baseline availability; and/or • more than one allocated mineral site is substantially* sterilised by the development rendering it inaccessible for future use. Waste generation: • based on void capacity, the development will reduce: – regional or where justified national landfill void capacity baseline** for inert and non-hazardous by >10%; and/or – national landfill void capacity baseline** for hazardous waste by >1%.

Source: (The Institute of Environmental Management and Assessment, 2020)
**Justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed.*
*** forecast as the worst-case scenario, during a defined construction and/or operational phase.*

Sensitivity of receptor

2.2.11 The criteria for defining receptor sensitivity for the assessment of impacts to materials resource use and generation and management of waste are defined within Table 2-2.

Table 2-2: Criteria to determine sensitivity for material assets and waste generation

Sensitivity category	Description
Negligible	Material assets for the key materials required for the construction and/or operation of a development: • are forecast (through trend and analysis and other information) to be free from known issues regarding supply and stock; • are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials; and/or • sustainable features and benefit could include materials or products that comprise reuse, secondary or recycled content (including excavated and other arisings), support the drive to a circular economy or in some other way reduce lifetime environmental impacts. Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • inert and non-hazardous landfill capacity void is expected to remain unchanged or is expected to increase through a committed change in capacity; and • hazardous landfill capacity void is expected to remain unchanged or is expected to increase through a committed change in capacity.
Low	Material assets for the key materials required for the construction and/or operation of a development: • are forecast (through trend and analysis and other information) to be generally free from known issues regarding supply and stock; and/or • are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials. Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • inert and non-hazardous landfill capacity void is expected to reduce minimally by <1% as a result of waste forecast; and/or • hazardous landfill capacity void is expected to reduce minimally by <0.1% as a result of waste forecast.
Medium	Material assets for the key materials required for the construction and/or operation of a development: • are forecast (through trend and analysis and other information) to suffer from some potential issues regarding supply and stock; and/or • are available comprising some sustainable features and benefits compared to industry-standard materials.

Sensitivity category	Description
	Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • inert and non-hazardous landfill capacity void is expected to reduce noticeably by 1-5% as a result of waste forecast; and/or • hazardous landfill capacity void is expected to reduce noticeably by 0.1-0.5% as a result of waste forecast.
High	Material assets for the key materials required for the construction and/or operation of a development: • are forecast (through trend and analysis and other information) to suffer from some potential issues regarding supply and stock; and/or • comprise little or no sustainable features and benefits compared to industry-standard materials. Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • inert and non-hazardous landfill capacity void is expected to reduce considerably by 6-10% as a result of wastes forecast; and/or • hazardous landfill capacity void is expected to reduce considerably by 0.5 – 1% as a result of wastes forecast.
Very High	Material assets for the key materials required for the construction and/or operation of a development: • are known to be insufficient in terms of production, supply and/or stock; and/or • comprise no sustainable features and benefits compared to industry-standard materials. Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national): • inert and non-hazardous landfill capacity void 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; and/or • hazardous landfill capacity void 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: (The Institute of Environmental Management and Assessment, 2020)

Significance of effect

2.2.12 The significance of the effect is determined by assigning an impact magnitude and sensitivity to the receptor. Table 2-3 and Table 2-4 set out the significance matrix used to determine significant effects.

2.2.13 For the purpose of this assessment, any effects with a significance level of minor or less are considered to be not significant.

Table 2-3: Effect threshold used in EIA

Sensitivity (or value) of receptor	Magnitude of impact				
	No change	**Negligible**	**Minor**	**Moderate**	**Major**
Very high	Neutral	Minor*	Moderate or large	Large or very large	Very Large
High	Neutral	Minor*	Minor* or Moderate	Moderate or large	Large or very large
Medium	Neutral	Minor*	Minor*	Moderate	Moderate or large
Low	Neutral	Minor*	Neutral or Minor*	Minor*	Minor* or Moderate
Negligible	Neutral	Minor*	Neutral or Minor*	Neutral or Minor*	Minor*

Source: (The Institute of Environmental Management and Assessment, 2020)
**Modified based on professional judgement and project requirement.*

Table 2-4: Significance of effect

Effect	Materials	Waste
Neutral	Not Significant	Not Significant
Minor*		
Moderate	Significant	Significant
Large		
Very Large		

Source: (The Institute of Environmental Management and Assessment, 2020)
**Modified based on professional judgement and project requirement.*

Residual effect

2.2.14 The assessment of effects follows the approach set out within Chapter 5: EIA Methodology. Effects have been assessed to take into account for both embedded (primary) mitigation, best practice and measures secured by legal requirements (tertiary mitigation), and after the application of further mitigation measures (secondary mitigation). Effects after mitigation are referred to as 'residual effects'.

2.3 Study area

2.3.1 Professional judgement has been used to define the study area to examine the use of material resources and the generation and management of waste.

2.3.2 The use of material resources and generation of waste is within the Scheme Order Limits, as this constitutes the area within which construction materials would be consumed (used, reused and recycled) and where waste would be generated.

2.3.3 The study area for the EIA is much wider:

- to identify the suitable waste infrastructure that could accept arisings or waste generated by the Proposed Development; and
- that is feasible for sources and availability of construction materials typically required for construction works of this nature.

2.3.4 Therefore, for the purposes of this assessment, the study area for the sources and availability of construction materials would be the Cambridgeshire and, where necessary, the East of England region.

2.3.5 The study area to sufficiently identify suitable waste infrastructure including landfills, considering the proximity principle and value for money, has been assessed based on an initial search area of 10km from the Scheme Order Limits. Where sufficient capacity is not available, the search area has been extended accordingly but kept within the boundaries of the East of England region.

2.4 Temporal scope of assessment

Construction

2.4.1 For the assessment, construction effects will be taken to be those for which the source begins and ends during the construction and commissioning stages prior to the proposed WWTP becoming fully operational, as set out in Chapter 2 Project Description.

2.4.2 The assumed assessment years for construction are from Year 1 to Year 4 (currently assumed to be 2024 until 2028).

Operation and maintenance

2.4.3 For the operational assessment, these are the effects that start once the proposed WWTP is commissioned and fully operational. It includes the effects of the physical presence of the infrastructure, its operation, use and maintenance, including the permanent change in land use.

2.4.4 The assessment of operational effects covers the first full 12 months of operation, which provides an indication of the material resources required and waste generated throughout the lifetime of the proposed WWTP (excluding any commissioning period for the proposed WWTP as this is part of the Construction Phase). The proposed WWTP is expected to be operational in 2028, therefore the assessment year for the Operational Phase is 2028. Phase 2 of operation associated with the additional PST and FST at year 7 of operation (as described in Chapter 2) would not materially alter waste effects as the addition tanks represent a relatively small increases or variations and would not result in different effects or new significant effects.)

Duration of effects

2.4.5 Timescales associated with these effects, regardless of phase are as follows:

- Short-term – endures for up to 12 months after construction or decommissioning

- Medium-term – endures for 1-5 years
- Long-term – endures for 5-15 years
- Permanent effects – endures for more than 15 years and / or effects which cannot be reversed (e.g. where buried archaeology is permanently removed during construction)

2.5 Baseline study

Desktop data

2.5.1 Baseline information within the study area was collected through a detailed desktop review of existing studies and datasets. These are summarised in Table 2-5.

2.5.2 The baseline study for the use of material resources identified:

- Regional and/or national availability (stocks, production, sales, other) of the main materials – by volume or weight, as available or deemed appropriate – required for the site preparation, construction and/or operation of a development.

2.5.3 The baseline study for waste identified:

- The availability and capacity of regional and – where appropriate – national landfill facilities to be utilised by the Proposed Development. Landfill void data has been collated for both inert and non-inert (non-hazardous and hazardous) landfill types, where available;
- Regional (or other relevant geographic scale) presence and capacity of material recovery/recycling facilities to be utilised by the Proposed Development; and
- Historical and future trends in waste processing, recovery and/or landfill void capacity (especially where increases can be forecast or otherwise ascertained) to provide a useful insight as to the capability of these facilities, especially during the planned construction phase of a Proposed Development.

Table 2-5: Desktop information sources

Item or feature	Year	Source
Regional and/or national availability (stocks, production, sales, other) of the main materials	2020	Mineral Association Products (Mineral Products Association, 2020)
	2020	World Steel Association (World Steel Association, 2020)
	2021	Cambridgeshire County Council (Cambridgeshire County Council and Peterborough City Council, 2021)
Landfill locations and capacity	2022	Historic Landfill Sites (Environment Agency, 2022)

Item or feature	Year	Source
	2022	Permitted Waste Sites – Authorised landfill Site Boundaries (Environment Agency, 2022)
	2022	Remaining Landfill Capacity (Environment Agency, 2022)
Waste received /removed by Cambridgeshire	2022	Waste Data Interrogator (Environment Agency, 2022)
Material recovery and recycling facilities	2022	Environmental permitting Regulations – Waste Operations
Landfill void capacity – trends	2022	Remaining Landfill Capacity (Environment Agency, 2022)
Future processing facilities	2019	Cambridgeshire and Peterborough Minerals and Waste Local Plan 2036 2019 (Peterborough City Council, 2019)

Surveys

2.5.4 No surveys were required to be carried out for the purposes of the assessment of impacts on Material Resources and Waste.

2.6 Maximum design envelope (Rochdale) parameters for assessment

2.6.1 The design parameters and assumptions presented are in line with the 'maximum design envelope' approach (base scheme design). For each element of this chapter, the maximum design envelope parameters detailed within Table 2-6 have been selected as those with the potential to result in the greatest effect on an identified receptor or receptor group.

2.6.2 The assessment parameters are based on the design of the proposed WWTP and access, transfer tunnel route and outfall location, Waterbeach Pipeline route and connections within the existing Cambridge WWTP and decommissioning of the existing Cambridge WWTP, as described in Chapter 2: Project Description. The assessment considers a realistic maximum design envelope based on the maximum scale of the elements and, as a result, no effects greater significance than those assessed are likely.

Table 2-6: Maximum design envelope parameters for material resources use and generation and management of waste assessment

Potential impact	Maximum design scenario	Justification
Material resources		
Impact on the availability of the raw materials	The estimated volume of materials required for the construction of the Proposed Development is detailed within 'Material resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).	Represents maximum volume of materials required for construction.
Depletion of non-renewable resources	The estimated volume of non-renewable materials required for the construction of the Proposed Development is detailed within 'Material resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).	Represents maximum volume of materials required for construction.
	Use of materials with 31% percent recycled content where technically appropriate and financially feasible.	Represents maximum recycled content target.
	Site won topsoil and subsoil material will be used for the construction of the earth bank and landscape masterplan to avoid import of material. Although the cut/fill balance would be adjusted to provide a neutral cut/ fill, as a worst case it is estimated 4,373m^3 of material would need to be imported.	Represents maximum amount of material that might be required to supplement site won material.
	All concrete is brought to site and there is no on site batching plant	Represents worst case in relation to the potential for the generation of waste concrete arisings.
Waste generation		
Waste generated resulting in temporary occupation of waste infrastructures and permanent loss of landfill void capacity	Estimated volume of waste material types and quantities that may be generated from construction and decommissioning (for permit surrender) of the Proposed Development is detailed within 'Material resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1). All waste identified for disposal is landfilled.	Represents maximum volume of estimated waste from the construction of the Proposed Development.
	For the Waterbeach Pipeline, excavation of the trench considers a 1.3km section of the pipeline of 6m width with an average depth of 5m. 5% of the excavated material from this footprint considered as potentially contaminated and therefore hazardous.	Represents maximum volume of estimated waste from construction that could be hazardous / contaminated.

Potential impact	Maximum design scenario	Justification
	For the transfer tunnel, the section through the footprint of the existing Cambridge WWTP represents up to 35% the route. 35% of the excavated material volume has been considered in determining hazardous waste potential with 5% of the proportion of material from this footprint considered as potentially contaminated and therefore hazardous. All of the material excavated from the River Cam for the construction of the proposed outfall could be potentially contaminated and would be landfilled following treatment.	
Reduction in the East of England void capacity	Excavated material, identified for disposal is landfilled. 5% of the excavated material identified for disposal is hazardous and is landfilled. 2% of the concrete and cement brought on-site may not be suitable for construction and is landfilled as inert waste. 5% of the aggregate or aggregate based material brought on-site may not be suitable for construction and is landfilled as inert waste. All grit, screenings and rag waste arising from the operational phase of the proposed WWTP/decommissioning of the existing Cambridge WWTP is landfilled as non-hazardous waste.	Represents maximum volume of estimated waste that will require to be landfilled.

2.7 Impacts scoped out of the assessment

2.7.1 The potential impacts that have been scoped out of the assessment for material resources are provided in Table 2-7.

Table 2-7: Impacts scoped out for material resources

Potential impact	Justification
Use of materials and resources for operational phase resulting in the depletion of non-renewable resources	This is because the need for relatively negligible quantities of both primary raw materials and manufactured construction products and infrequent site maintenance.
Use of materials and resources for decommissioning phase resulting in the depletion of non-renewable resources	The need for additional material resources to enable the decommissioning activities will be negligible.
Access to one or more allocated mineral sites (construction and operation)	The Scoping Report provides evidence that there will be sufficient aggregates capacity in Cambridgeshire and Peterborough in the future.
Demolition of the proposed WWTP	Demolition of the proposed WWTP would be assessed as part of the planning application pertaining to the redevelopment of the site in the future and has not been considered in this chapter.

2.7.2 Raw materials required for prefabricated items such as geotextiles, steel for structures and barriers, signage, bunting poles, lighting columns and ducts, cables, cable ducts, flap valves, pipelines, iron pipe fittings, plastic or rubber waterstops, steel trowels, fences, gates, manholes, mechanical and electrical installations, stairways landings, ladders, open grid flooring, HDPE/PVC pipes etc. have not been assessed. The quantities required for the proposed WWTP are relatively small compared to concrete, cement, aggregate and steel volumes and they may be subject to their own separate consenting and regulatory controls at the place of production.

2.8 Mitigation measures adopted as part of the Proposed Development

2.8.1 This section refers to the mitigation types as defined in Chapter 5: EIA Methodology, and how they apply to the assessment of material resources use and generation and management of waste.

2.8.2 Through an iterative process including consultation and engagement with consultees and through the EIA, The Applicant has sought to identify and incorporate suitable measures and mitigation to address potentially significant adverse effects, as well as seeking to maximise beneficial effects where possible.

2.8.3 Some measures are **'embedded'** in the design of the Proposed Development for which consent is sought by virtue of the scope of the authorised development as set out in Schedule 1 to the DCO and the accompanying Works Plans. These are considered **primary mitigation**. For example, reuse of site won material for the construction of earth banks.

2.8.4 Secondary measures are detailed activities, for example the preparation of detailed Site Waste Management Plan (SWMP) in accordance with the CoCP (Appendix 2.1, App Doc Ref 5.4.2.1), the preparation and delivery of a monitoring plan for specific matters (air quality, water quality) or the preparation and delivery of specific environmental management plans (for example air, noise, water) where the preparation and implementation is secured through the CoCP. These secondary measures are differentiated from good practice measures

2.8.5 Tertiary measures comprise good practice measures (such as measures within Considerate Contractors Scheme) and measures integrated into legal requirements secured through environmental permits and consents (considered least flexible as either the legislation exists to create the mitigation or does not (i.e. compliance with the Waste (England and Wales) Regulations 2011 (as amended)).

2.8.6 Other Consents and Permits Register (App Doc Ref 7.1) sets out required permits and consents related to the Proposed Development.

2.8.7 Where beneficial effects are voluntarily introduced without the requirement to mitigate an effect, these are termed 'enhancement measures'.

2.8.8 The remainder of this section sets out the embedded measures (primary), legal requirements (tertiary) and additional measures (secondary) relevant to the assessment of material resources use and generation and management of waste.

2.8.9 Primary and tertiary mitigation form part of the Proposed Development and therefore, the preliminary assessment of effects takes account of these measures.

Primary (embedded) and tertiary measures

2.8.10 Primary and tertiary mitigation form part of the Proposed Development and therefore, the preliminary assessment of effects takes account of these measures.

2.8.11 Table 2-8 sets out the embedded mitigation measures that will be adopted during the construction, operation, maintenance and decommissioning of the Proposed Development. It should be noted that there is substantial overlap in the mitigation for both aspects (material resource use and waste generation) due to the synergy between the reuse of materials and the avoidance of waste generation.

Table 2-8: Primary and tertiary mitigation measures relating to material resources use and generation and management of waste adopted as part of the Proposed Development

Mitigation measures		Type	Applied to	Justification
Construction				
Excavated material	Re-use of all suitable excavated material in the construction of the Proposed Development, in particular for the creation of landscape earth works, to reduce the requirement to import materials for construction and reducing the need to remove surplus materials (waste generated) from site.	Primary	Proposed Development	Reduce the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.
	Re-engineering of excavated material to make it suitable for use from the construction of the Proposed Development thereby avoiding the need for imported recycled or virgin aggregates and reduce the proportion of waste generated on-site.	Primary	Proposed Development	Reduce the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.
Use of pre-cast elements	Use of pre-cast elements to be used where practicable to ensure efficient use of materials and avoid the generation of waste arisings from off-cuts. Pre-cast elements are likely to be used in many of the large water retaining structures.	Primary	proposed WWTP	Reduce the impact on the depletion of non- renewable resources.
On site concrete batching plant	Use of on-site batching plant to control production of concrete for construction and minimise generation of concrete risings.	Primary	proposed WWTP	Minimise the generation of concrete waste.
Recycling of steel off-cuts	Off-cuts from steel off generated during the construction process will be recycled in line with the Waste Framework Directive (WaFD) and complying with industry best practice.	Tertiary	Proposed Development	Reduce the permanent reduction to landfill capacity.
Composting of green waste	Vegetation removal during site clearance will be composted in line with the WaFD and complying with industry best practice.	Tertiary	Proposed Development	Reduce the permanent reduction to landfill capacity.
Operation				

Mitigation measures		Type	Applied to	Justification
Use of sludge	The sludge produced by the proposed WWTP will be used as bio fertilisers and spread on land. Arrangements and procedures in place, that are used for the existing Cambridge WWTP will also be used to manage the waste generated during the waste water and sludge treatment process.	Tertiary	proposed WWTP	Prevent wastes sent to landfill. Sludge wastes may be suitable for agricultural benefit.
Use of biogas	The biogas produced can be utilised to generate power for on-site activities or exported to grid.	Tertiary	proposed WWTP	Reduction of energy requirement on-site.
Decommissioning				
Treatment of material from tanks	The liquid and / or residual sludge from the existing tanks will be transferred to a Sludge Treatment Centre (STC) for treatment under existing permit	Tertiary	existing Cambridge WWTP	Reduce the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.

Secondary measures

Construction

2.8.12 During the construction phase, the CoCP (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2) and associated management plans specify the range of measures to avoid and minimise impacts that may occur in construction (CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1). Post granting of the DCO, and prior to commencement of construction of specific works packages, the contractor will prepare the CEMP and associated sub-plans as specified in the COCP Part A. These detailed plans will be approved by the Employer. The CEMP and associated management plans will remain 'live' documents and will be periodically modified throughout the duration of construction.

2.8.13 Section 7.8.16 of the CoCP Part A (Waste Management and Resource Use) requires that materials being imported or removed comply with all necessary legislative requirements, and that resource efficiency is maximised throughout the construction process in line with the principles of the waste hierarchy. The CoCP Part A requires the appointed contractor(s) to prepare and implement a SWMP, which will detail the types of waste and the quantities likely to be generated, measures to be adopted to minimise waste, opportunities for recycling and/or material reuse as well as include proposed treatment and disposal methods.

2.8.14 Compliance with the CoCP (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2) would be secured via a requirement included within the DCO. The CoCP (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2) would then form the basis of more detailed plans and method statements, to be prepared during the pre-construction period by the appointed contractor. These detailed plans would include a detailed Construction Environment Management Plan (CEMP) together with a suite of management plans for specific controls, such as a SWMP and the detailed SMP. The detailed plans would be subject to agreement with relevant stakeholders.

2.8.15 An outline Soil Management Plan (SMP) (Appendix 6.3, App Doc Ref 5.4.6.3) has been prepared in a manner specific to the site in accordance with the guidance in the Construction Code of Practice (CCoP) for the Sustainable Use of Soils on Construction Sites ((Defra, 2018)). The CCoP (Department for Environment, Food & Rural Affairs, 2018)provides general measures that are required to be in place to ensure that soil is appropriately managed during construction and suitable for its final use.

2.8.16 Application of a SMP sets out how soils are to be managed in accordance with Defra's CCoP. This will ensure that the quality of soil resources, won from the site, is maintained during construction so that they remain suitable for reuse, do not become contaminated and do not become waste. A copy of the outline SMP is provided within Appendix 6.3 (App Doc Ref 5.4.6.3), this outline SMP will be developed into a detailed SMP by the appointed contractor.

2.8.17 Application of CL:AIRE Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) for the reuse of excavated waste materials.

2.8.18 Specific measures in the CoCP Part A relevant to material resources and generation and management of waste are described below:

- waste from the construction areas will be stored securely to prevent escape of waste from wind blow and segregated to facilitate recycling.
- Emergency Procedure and Preparedness Plans include guidance on the storage and use of hazardous materials with the aim of preventing and containing spills and releases of potentially hazardous material.
- Pollution Incident Control Plan includes the storage, handling, use and disposal of any potentially hazardous materials will comply with the relevant statutory provisions, Environment Agency and HSE's codes of practice and guidance notes, together with any relevant manufacturers' recommendations.
- where HDD/mirco tunnelling takes place drilling and tunnelling wastes would comprise solids and associated drilling muds. Arisings will be stored in a bunded area on an impermeable geotextile where necessary. Materials will be reused on site where possible. If this is not feasible, they will be removed from site.
- measures are in place for waste storage and segregation in section 7.9, 'Waste storage and segregation 'and for waste minimisation in section 7.9, 'Waste minimisation'.

Operation

2.8.19 Operation and maintenance activities would be subject to operational management plans and procedures. The management plans and procedures will sit within the EMS required under the environmental permitting regime. These would be 'live' documents that identify the environmental risks and legal obligations associated with the operations of the Proposed Development once construction has been completed. These specify the management measures the operator will implement in order to prevent or minimise the environmental effects associated with the Proposed Development.

Decommissioning

2.8.20 Decommissioning of the existing Cambridge WWTP would be subject to a Decommissioning Management Plan which is to be agreed with the Environment Agency. An outline Decommissioning Management Plan is provided (Appendix 2.3, App Doc Ref 5.4.2.3). Post grant of the DCO and prior to commencement of decommissioning, a detailed plan will be prepared by the Applicant and agreed with the Local Planning Authority and the Environment Agency in accordance with activities to surrender the existing environmental permit for the existing Cambridge WWTP.

2.8.21 Para 5.1.14 of the outline DMP requires that decommissioning will be undertaken in accordance with the Code of Construction Practice Parts A and B (Appendix 2.1 & 2.2, App Doc Refs 5.4.2.1 and 5.4.2.2) to manage risks to the environment'.

2.9 Assumptions and limitations

Data limitations and assumption

2.9.1 All assumptions related to material resources and waste generation estimates are stated in material resources and waste estimates (Appendix 16.1, App Doc Ref 5.4.16.1).

Assessment assumptions

2.9.2 Where materials are consumed and waste is generated, indirect adverse effects may arise from haulage, noise, dust, nuisance, vehicle emissions and water pollution. Such effects are assessed by other EIA chapters.

2.9.3 This EIA has not assessed the impact of material resources use and waste associated with the manufactured goods required by the Proposed Development as these will be subject to their own separate consenting and regulatory controls at the place of production.

2.9.4 The estimates for soil volumes re-used within the landscape masterplan are initial estimates and the ultimate volume will be dependent on the actual thickness of the topsoil encountered.

2.9.5 The information available in Chapter 2: Project Description has been used to assess the type of material resources required and the waste generated by the Proposed Development.

2.9.6 The estimate of the quantities of waste generated has been based on the estimated Bill of Quantities for resource and material usage and volume of soil to be excavated and used for on-site (filling/ landscaping) activities. These forecasts will be refined and subject to change at the construction stage. For that reason, the forecasts have been made on a reasonable worst-case scenario basis, informed by professional judgement and experience on similar projects.

2.9.7 The amount of waste that will arise during the construction phase of the proposed WWTP will be subject to change as the construction progresses and, on any efficiencies required to be achieved by the appointed contractor. Forecasts have been made for this assessment on a reasonable worst-case scenario basis, informed by experience on similar projects.

2.9.8 Information on permitted capacity of waste management facilities has been used in the assessment, based on current publicly available data (at the time of writing). However, it should be noted that the capacity information obtained from the Environment Agency for the sites and regions identified does not necessarily mean that the capacity detailed would be available for use by the Proposed Development.

2.9.9 It is noted that any future changes to the permitted capacity and throughput of the waste infrastructures are uncertain. It is also difficult to assess the available capacity, due to the commercial sensitivity of existing contracts, and the timescales over which waste would be produced. It is likely that additional capacity would become available. However, it is not currently possible to predict the timeframes for when these new waste management facilities would become available and how many of these sites would be available to accommodate waste arisings from the Proposed Development. Similarly, it is also possible that some of the existing waste management facilities might close or be unavailable.

2.9.10 The volumes of bentonite or other drilling substances required for tunnel works are not quantified at present. It is likely that bentonite/ drilling fluid will be fully recycled. It is assumed, as a worst case scenario, any bentonite used during construction will be treated as hazardous waste and disposed of.

2.9.11 The volume of excavated material that may be hazardous is unknown and will be informed by ground investigations. For the purpose of assessment, it is conservatively assumed that 5% of the excavated material identified for disposal is hazardous. For excavated material for the tunnel and shafts, it is assumed that 35% of the pipeline route is within the footprint of the Existing WWTP. For the excavation of the trenches for the Waterbeach Pipeline, it is assumed that material from excavation over a 1.3km section within 500m of historic landfill with a width is 6m to an average depth of 5m could be contaminated. In both cases, it is assumed that 5% of the excavated volume is potentially hazardous.

2.9.12 It is assumed that disposal of excavated material other than topsoil, rock or artificial hard material, as stated in Bill of Quantities (BoQ), refers to non-hazardous waste such as redundant pipework, land drain debris etc.

2.9.13 It is assumed all waste identified in the BoQ “for disposal” during the construction phase is to be sent to landfill – this would be the worst case for the impact assessment leading to a reduction in the East of England void capacity.

3 Baseline Environment

3.1 Current baseline

Use of material resources

3.1.1 Information on the availability and demand for key construction materials within the UK and within Cambridgeshire has been used to provide the baseline for material resources. This information has been determined through a desk-study using a number of readily available resources, in particular from the British Geological Society's (BGS) Minerals UK, World Steel Association and Cambridgeshire County Council.

3.1.2 Table 3-1 outlines the UK's sales, of minerals and mineral products in 2020.

Table 3-1: UK's sales of materials and minerals/mineral products

Mineral	UK Demand (year)
Primary Aggregates of which:	174.8 million tonnes
Crushed rock	117.3 million tonnes
Sand and gravel	57.7 million tonnes
Recycled and secondary aggregates (GB, 2018)	71 million tonnes
Cementitious products, of which:	15.0 million tonnes
Cement Clinker	6.9 million tonnes
Cement Finished	8.0 million tonnes
Ready-mixed concrete (GB)	19.4 million cubic meters
Concrete products (GB, 2018)	32.0 million tonnes
Asphalt (GB, 2018)	25.4 million tonnes
Dimension stone (GB, 2018)	1.0 million tonnes
Slag (2018)	2.5 million tonnes
China Clay (2018)	0.996 million tonnes
Apparent Steel use	11.2 million tonnes

Source: (Mineral Products Association, 2020), (World Steel Association, 2020)

3.1.3 The East of England Aggregate Working Party annual report provides data for each of the sub-regions in the East of England:

- Bedfordshire;
- Cambridgeshire;
- Essex;
- Hertfordshire;
- Norfolk; and
- Suffolk.

3.1.4 The Cambridgeshire sub-region comprises the Cambridgeshire County Council and Peterborough City Council.

3.1.5 The Cambridgeshire and Peterborough Minerals and Waste Development Plan: Local Aggregates Assessment, Local Aggregate Assessment 2021 (Cambridgeshire County Council and Peterborough City Council, 2021) assesses the demand for and supply of aggregates in the region of the Proposed Development. Table 3-2 outlines the aggregate sales and reserves in the region for 2020. Raw aggregates extracted across Cambridgeshire and Peterborough include sand and gravel (river sand and gravel, glacial deposits, head deposits and bedrock sand) and crushed rock (Lincolnshire Limestone).

3.1.6 The former National and Regional Guidelines for Aggregates Provision in England (June 2003 and June 2009) specified that the East of England region should provide 117 million tonnes of alternative aggregate materials between 2005 and 2020, equating to 31% of the region's total aggregate supply.

Table 3-2: Aggregate sales and reserves in Cambridgeshire and Peterborough for 2020

Aggregate	Sales (Mt)	Average 10-year Sales (Mt)	Average 3-year sales (Mt)	LAA* Rate (Mtpa)	Reserves (Mt)	Land-bank (years)
All sand and gravel	2.82	2.59	3.15	3.0	36.06	12.02
Crushed rock	0.07	0.26	0.13	0.3	3.2	10.5
Recycled / Secondary aggregates	0.32	0.54	0.55	**	-	-

Source: (Cambridgeshire County Council and Peterborough City Council, 2021)
** Local Aggregates Assessment (LLA) rate is the planned rate level of provision in the adopted Core Strategy.*
*** 31% of total aggregate supply.*

3.1.7 In Cambridgeshire and Peterborough there are currently 18 sand and gravel sites with planning permission of which 14 were active sites in 2020. Table 3-3 shows that the site production capacities across Cambridgeshire and Peterborough is sufficient to ensure the future provision of sand and gravel supply at levels above the minimum requirement.

3.1.8 A list of both active and inactive aggregate sites in 2020 is provided in Table 3-3. Sites which are closed are not listed therein.

3.1.9 When the Cambridgeshire and Peterborough Minerals and Waste Core Strategy was produced there were six limestone quarries in the plan area. Some of these sites have since been closed and are in restoration, whilst the reserves of others are not viable. By the end of 2020 there were only two active limestone sites remaining. There were 35 active sites with recycled and secondary aggregate production capacity in the plan area in 2020.

Table 3-3: The aggregate sites available in Cambridgeshire and Peterborough in 2020

Site name	Operator name	Facility type	Status
Willow Hall Farm, Peterborough	P J Thory	Sand and gravel quarry	Active
Cooks Hole Quarry, Peterborough	Mick George Ltd	Sand and gravel quarry	Active
Eyebury Quarry (Tanholt Farm), Peterborough	CEMEX UK Materials Ltd	Sand and gravel quarry	Inactive (aftercare)
Maxey Quarry, Peterborough	Tarmac Ltd – Anglia and South East	Sand and gravel quarry	Active
Must Farm Quarry	Fonterra	Sand and gravel quarry	Active
Pode Hole Quarry, Peterborough	Aggregate Industries UK Ltd	Sand and gravel quarry	Active
Pasture House Farm, Peterborough	Land Logical Ltd	Sand and gravel quarry	Active
Block Fen Quarry II, Cambridge	Tarmac	Sand and gravel quarry	Active
Sutton Gault (also now known as Mepal Reservoirs), Cambridge	Frimstone	Sand and gravel quarry	Active
Block Fen Quarry, Cambridge	Hanson Aggregates	Sand and gravel quarry	Inactive
Lyons Farm Reservoir, Cambridge	Mick George Ltd	Sand and gravel quarry	Active
Kennett, Cambridge	Mick George Ltd	Sand and gravel quarry	Inactive
Needingworth Quarry, Cambridge	Hanson UK	Sand and gravel quarry	Active
Little Paxton, Cambridge	Aggregate Industries UK Ltd	Sand and gravel quarry	Active
Marsh Lane Quarry, Cambridge	Tarmac	Sand and gravel quarry	Inactive
Colne Fen Quarry, Earith, Cambridge	Mick George Ltd	Sand and gravel quarry	Active
Bridge Farm Reservoir, Cambridge	Mick George Ltd	Sand and gravel quarry	Active
Mitchel Hill Farm North	Mick George Ltd	Sand and gravel quarry	Active
Dimmock's Cote Quarry, Cambridge	Francis Flower Ltd	Limestone quarry	Active
Cook's Hole, Peterborough	Mick George Ltd	Limestone quarry	Active
Thornhaugh IIB, Peterborough	Bullimores	Limestone quarry	Inactive
Alconbury Waste Recycling Centre and Transfer Station, Cambridge	Amey Cespa (East) Ltd	Recycled / Secondary aggregates	Active
Buckden Material Recycling Facility, Cambridge	Acorn Transport and Plant Hire Ltd	Recycled / Secondary aggregates	Active

Site name	Operator name	Facility type	Status
Cambridge Transfer Station, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
Chapsmith Services Recycling Centre, Bluntisham, Cambridge	Chapsmith Services Ltd	Recycled / Secondary aggregates	Active
County Highways Depot, March, Cambridge	Cambridgeshire County Council	Recycled / Secondary aggregates	Active
Dawson Recycling Facility, Swavesey, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
Dockerill (Plant Hire) Ltd, Cambridge	Dockerill (Plant Hire) Ltd	Recycled / Secondary aggregates	Active
First Furlong Farm, Cambridge	S R Harradine Haulage Ltd	Recycled / Secondary aggregates	Active
Highways Depot, Whittlesford, Cambridge	Cambridgeshire County Council	Recycled / Secondary aggregates	Active
Highways Depot, Stanton Way, Huntingdon, Cambridge	Cambridgeshire County Council	Recycled / Secondary aggregates	Active
Highways Depot, Stirling Way, Witchford, Cambridge	Cambridgeshire County Council	Recycled / Secondary aggregates	Active
Pitt Farm, Little Paxton, Cambridge	Eaton Tractors Ltd	Recycled / Secondary aggregates	Active
Kennett Soil And Aggregate Treatment Facility, Red Lodge, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
March Waste Recycling and Transfer Station, March, Cambridge	Amey Cespa Ltd	Recycled / Secondary aggregates	Active
Mepal Soil and Aggregate Treatment Centre, Ely, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
Mepal Soil and Waste Treatment Centre EPR/EP3492SP, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
National Track Recycling Centre, Whitemoor Rail Yard, March, Cambridge	Network Rail Infrastructure Ltd	Recycled / Secondary aggregates	Active
Padnal Sidings MRF, Ely, Cambridge	Ellgia Recycling Ltd	Recycled / Secondary aggregates	Active
Plantation Farm, Kennett, Cambridge	D Haird & Company Ltd	Recycled / Secondary aggregates	Active
Sherwood Park Ltd (also known as Land at Britannia Way, Wisbech), Cambridge	Sherwood Park Ltd	Recycled / Secondary aggregates	Active

Site name	Operator name	Facility type	Status
St Ives Aggregates Facility, St Ives, Cambridge	Midland Quarry Products Ltd	Recycled / Secondary aggregates	Active
St Ives Transfer Station EPR/MP3139FY, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
St. Neots Transfer and Recycling Facility, Cambridge	Biffa Waste Services Ltd	Recycled / Secondary aggregates	Active
Warboys Waste Transfer Station, Cambridge	Woodford Recycling Services Ltd	Recycled / Secondary aggregates	Active
Waterbeach Recycling Facility, Cambridge	Frimstone Ltd	Recycled / Secondary aggregates	Active
Waterbeach Waste Management Park EPR/LP3593LM, Cambridge	Amey Cespa Ltd	Recycled / Secondary aggregates	Active
White Walls, Eldernell Lane, Coates, Cambridge	P J Thory Ltd	Recycled / Secondary aggregates	Active
Wisbech Waste Transfer Station, Algores Way, Cambridge	Frimstone Ltd	Recycled / Secondary aggregates	Active
Woodhatch Farm WTS, Cambridge	Mick George Ltd	Recycled / Secondary aggregates	Active
Eye Material Recycling Facility, Peterborough	Biffa Waste Services Ltd	Recycled / Secondary aggregates	Active
FCC Dogsthorpe, Peterborough	Construction & Environmental Services Ltd	Recycled / Secondary aggregates	Active
Fengate Waste Treatment Facility, Peterborough	M G Recycling Ltd	Recycled / Secondary aggregates	Active
Oxney Road Industrial Estate, Peterborough	Aggregate Industries UK Ltd	Recycled / Secondary aggregates	Active
Rose Plant Hire Transfer Station, Peterborough	Rose Aggregates Ltd	Recycled / Secondary aggregates	Active
Unit 2 Vicarage Farm Road, Peterborough	Bourne Skip Hire & Recycling Ltd	Recycled / Secondary aggregates	Active

Source: (Cambridgeshire County Council and Peterborough City Council, 2021)

3.1.10 The stock of reserves with planning permission is known as the landbank. Government policy requires landbanks to be maintained for all primary aggregate minerals, with a required landbank period for sand and gravel of at least seven years.

3.1.11 The estimated sand and gravel reserves in Cambridgeshire and Peterborough as of 31 December 2020 are 36.06 million tonnes. The scale and location of permitted reserves, together with the associated site production capacities across the region are sufficient to ensure the future provisions of sand and gravel supply at levels above the minimum requirements.

3.1.12 Cambridgeshire and Peterborough Minerals and Waste Core Strategy Policy CS6 seeks to maintain a limestone landbank of at least 10 years, to meet the requirement to supply limestone throughout the plan period.

3.1.13 Table 3-4 shows the landbanks for sand and gravel and crushed rock (limestone) from 2017 to 2020, in addition to the permitted reserves.

Table 3-4: Landbanks for sand and gravel and crushed rock (limestone) in Cambridgeshire and Peterborough from 2017 to 2020

Aggregate Type	2017	2018	2019	2020
Sand and gravel sales estimate (Mt)	3.56	3.20	3.42	2.82
Permitted reserves as at 31 December 2018 (Mt)	41.43	41.83	39.17	36.06
Limestone sales (calendar year) (Mt)	0.25	0.11	0.22	0.07
Permitted reserves as at 31 December 2018 (Mt)	2.53	2.45	3.2	3.16

Source: (Cambridgeshire County Council and Peterborough City Council, 2021)
Mt = million tonnes.

3.1.14 Cambridgeshire and Peterborough are dependent on imports of crushed rock to meet demand that cannot be met locally. Crushed rock is imported into the region from quarries in the East Midlands via rail heads in Peterborough, Cambridge, Ely and March. Supplies are then distributed by road.

3.1.15 The region has reserves of recycled aggregates from construction, demolition and excavation wastes comprising brick, concrete and other similar materials. Secondary aggregates are by-products from construction or industrial processes. In 2020 (the latest available Waste Data Interrogator (WDI) data) sales of secondary and recycled aggregates in Cambridgeshire and Peterborough were approximately 0.32Mt, this figure is likely to be underestimated as complete data is unavailable due to inaccuracies in reporting. In 2020, the production of recycled and secondary aggregates was below the 31% of the total aggregate supply in the region which is based on the UK Government's National and Regional guidelines for aggregates 2005-2020 (Ministry of Housing, Communities and Local Government, 2009).

3.1.16 Road planers are one of several methods that can be utilised to remove a road when it has reached the end of its functional life. If the road surface material is processed according to controlled specifications, the end material (road planings) can be a highly valuable resource that can be used in a variety of civil engineering applications. Table 3-5 shows the volume of road planings (where known) arising in Cambridgeshire and Peterborough in 2017 to 2020.

Table 3-5: Road planings arising in Cambridgeshire and Peterborough, 2017-2020

Authority	Road planing arisings (tonnes)			
	2017	2018	2019	2020
Cambridgeshire County Council	27,053	85,000	60,918	27,518
Peterborough City Council	16,151	13,712	15,632	NA

Authority	Road planing arisings (tonnes)			
	2017	2018	2019	2020
Total	43,204	98,712	76,550	27,518

Source: (Cambridgeshire County Council and Peterborough City Council, 2021)

Generation and management of waste

3.1.17 The latest data from the Environment Agency indicated that England received over 209 million tonnes of waste in 2020, which was managed in 6,026 permitted waste facilities. The waste facilities in East of England region received over 29 million tonnes of waste in 2020, and Cambridgeshire Council received over 4.6 million tonnes (as shown in Table 3-6).

Table 3-6: Waste breakdown by site type (2020)

Site Type	Cambridgeshire (tonnes)	East of England (tonnes)	England (tonnes)
Landfill	1,564,566	8,421,943	40,034,198
Transfer	677,495	4,698,420	42,439,790
Treatment (excluding metal recycling sector)	1,801,320	10,687,376	86,817,098
Metal Recovery	202,838	2,129,618	14,318,173
Incinerated	88,492	1,231,034	16,271,706
Use of Waste	-	-	147,921
Land Disposal	100,693	1,862,484	9.859,302
Total*	**4,608,015**	**29,719,444**	**220,440,796**

Source: (Environment Agency, 2022)
**Waste generated from combustion, storage, mining, mobile plant and processing are included in Total waste tonnage*

3.1.18 With respect to construction and demolition (C&D) waste in 2020, the Environment Agency recorded that 12,089,553 tonnes of inert C&D waste were received in the East of England region, with 1,493,184 tonnes received in Cambridgeshire. The WDI (Environment Agency, 2022) states that 1,545,331 tonnes of inert C&D waste were removed (as defined by Environment Agency) in East of England region with 274,354 tonnes removed from Cambridgeshire. A total of 76.6 million tonnes of non-hazardous C&D waste was generated in England in 2020, of which 14.6 million tonnes were removed.

3.1.19 Excavation and site clearance activities generate a significant quantity of waste arisings. The baseline target for recovery of C&D waste is 70% by weight, as set out in the EU Waste Framework Directive 2008/98/EC and the Waste Plan for England. Uncontaminated excavated soil and stones (List of Waste Code 17 05 04) are specifically excluded from this target. 61.4 million tonnes and of non-hazardous C&D waste were generated in England, of which 57.5 million tonnes was recovered, equating to a recovery rate of 93.8% England (Department for Environment Food & Rural Affairs, 2021).

Hazardous waste

3.1.20 Table 3-7 outlines the quantities of hazardous waste received and removed in 2020 in Cambridgeshire, East of England and England. According to the WDI, 230,336 tonnes of hazardous waste were received in permitted waste facilities in Cambridgeshire in 2020, of which 141,788 (62%) tonnes were specified as C&D waste. Of the 63,084 tonnes of hazardous waste received in landfills in the Cambridgeshire 62,167 tonnes were specified as C&D waste. Of the 36,633 tonnes of hazardous waste removed from permitted waste facilities in the Cambridgeshire, 4,113 tonnes were classified as C&D waste.

Table 3-7: Hazardous C&D waste received and removed in 2020

Hazardous waste	Cambridgeshire (tonnes)	East of England (tonnes)	England (tonnes)
Received	141,788	257,275	1,070,182
Removed	4,113	70,613	428,500

Source: (Environment Agency, 2022)

Potential hazardous waste arisings

3.1.21 To identify potential sources of contamination, a review of authorised and historic landfill sites that are in close proximity to the Proposed Development was undertaken using the using the Environment Agency's 'Historic Landfill Sites' web map (Environment Agency, 2022) and 'Permitted Waste Sites – Authorised Landfill Site Boundaries' web map (Environment Agency, 2022). Potential sources of contamination that are greater than 500m away from the Scheme Order Limits have not been considered, as these are considered unlikely to affect the Proposed Development owing to the distance from the potential source.

3.1.22 There are three historic landfills within 500m of the Scheme Order Limits, see Table 3-8, for details of these landfills (Book of Figures – Material Resources and Waste (App Doc Ref 5.3.16)). For more information on the potential contamination risks see Chapter 14: Land Quality.

Table 3-8: Landfill sites within 500m of the Scheme Order Limits

Site	Location (Postcode/ Easting/Northing)	Distance from the Scheme Order Limit	Landfill Type
Clayhithe Cottages	550100/264100	200m west	Historical
Northfields Farm landfill	550200/264100	112m west	Historical
Winship Industrial Estate	547600/263000	360m north	Historical

Source: (Environment Agency, 2022)

Waste management facilities

3.1.23 The Environment Agency reported that in 2020, 792 sites accepted waste in the East of England, and at the end of 2020, 1,141 sites in the region had environmental

permits to accept waste. There were 132 active sites receiving waste in Cambridgeshire in 2020.

3.1.24 Table 3-9 outlines the remaining capacity of landfill within Cambridgeshire, East of England and England at the end of 2020. There are currently 28 effective landfills in Cambridgeshire with 20 landfills having remaining capacity at the end of 2020. The county has 15 inert landfills and 13 non-hazardous landfills. There are no permitted hazardous landfill sites in the county and one permitted non-hazardous landfill site to take some Stable Non-Reactive Hazardous Wastes (SNRHW). The regions that have capacities to accommodate hazardous waste are listed in Table 3-12.

3.1.25 The remaining capacity for the Cambridgeshire at the end of 2020 was 6,424,193m^3 for non-hazardous landfill, 4,500,953m^3 for inert landfill, and 1,845,270m^3 for non-hazardous landfill with SNRHW cell.

Table 3-9: Remaining landfill capacity at the end of 2020

Landfill Type	Cambridgeshire (cubic metres)	East of England (cubic metres)	England (cubic meters)
Hazardous Merchant	-	-	15,571,171
Hazardous Restricted	-	-	809,640
Non-Hazardous with SNRHW* cell	1,845,270	5,246,356	66,969,897
Non-Hazardous	6,424,193	22,268,303	164,824,065
Non-Hazardous Restricted	-	-	27,368,000
Inert	4,500,953	24,979,617	140,191,731
Total	**12,770,416**	**52,494,276**	**388,366,504**

Source: (Environment Agency, 2022)
**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.*

3.1.26 There are nine inert and nine non-hazardous landfills in Cambridgeshire, with remaining capacity that are outlined in Table 3-10 and Table 3-11. Not all of the listed landfill sites may be suitable for receiving waste transported by road (for e.g. Barrington Works Landfill site is only allowed to accept inert waste transported by rail) but the lists indicate that there are sufficient landfills to accept inert and non-hazardous waste within Cambridgeshire region.

Table 3-10: Cambridgeshire permitted sites for inert landfill

Facility Name	Local Authority	Remaining capacity at the end of 2020 (cubic metres)
Mepal Airfield Inert Landfill	East Cambridgeshire	32,403
Kennett Hall Farm	East Cambridgeshire	49,582
Kennet Phase 2A	East Cambridgeshire	104,756
Land at Pasture House Farm	Cambridgeshire	1,921,255
Mepal Landfill Southern Extension	Fenland	335,661

Facility Name	Local Authority	Remaining capacity at the end of 2020 (cubic metres)
Willow Hall Quarry and Landfill	Peterborough	1,009,215
Cow Lane Inert Landfill	Huntingdonshire	226,293
Park Farm	Huntingdonshire	433,416
Colne-Fen Quarry	Huntingdonshire	388,372

Source: (Environment Agency, 2022)

Table 3-11: Cambridgeshire permitted sites for non-hazardous landfill

Facility Name	Local Authority	Site Type	Remaining capacity at the end of 2020 (cubic metres)
Waterbeach Waste Management Facility	South Cambridgeshire	L04: Non-hazardous	1,974,612
Eye North Eastern Landfill	Peterborough	L04: Non-hazardous	462,000
Barrington Works Landfill	South Cambridgeshire	L04: Non-hazardous	545,795
Milton Landfill	South Cambridgeshire	L04: Non-hazardous	194,311
March Landfill Site	Fenland	L04: Non-hazardous	1,077,604
Grunty Fen Landfill Site	East Cambridgeshire	L04: Non-hazardous	246,314
Witcham Meadlands Landfill	Fenland	L04: Non-hazardous	263,043
Buckden Landfill Site	Huntingdonshire	L04: Non-hazardous	1,660,514
Thornhaugh Landfill Site	Peterborough	L02: Non-hazardous Landfill with SNRHW cell	1,845,270

Source: (Environment Agency, 2022)

3.1.27 The regions that have capacity to accommodate hazardous waste are listed in Table 3-12.

Table 3-12: Regions with remaining void capacities for hazardous waste

Region	Site Type	Number of sites with remaining capacities	Remaining capacity at the end of 2020 (cubic metres)
East Midlands	Hazardous Merchant	1	962,110
	Hazardous Restricted	1	7,550
North East	Hazardous Merchant	2	4,643,903
North West	Hazardous Merchant	4	6,122,589

Region	Site Type	Number of sites with remaining capacities	Remaining capacity at the end of 2020 (cubic metres)
	Hazardous Restricted	1	150,000
South East	Hazardous Merchant	1	146,325
	Hazardous Restricted	1	117,042
South West	Hazardous Merchant	2	1,309,630
West Midlands	Hazardous Restricted	2	535,048
Yorkshire & Humber	Hazardous Merchant	2	2,386,614
Total	Hazardous Merchant	12	15,571,171
	Hazardous Restricted	5	809,640

Source: (Environment Agency, 2022)

3.1.28 A search on the public registers for permitted waste facilities showed that there are 17 waste management facilities that are able to treat or transfer C&D waste within a 10km distance from the Proposed Development at CB25 9AT (Table 3-13). Not all treatment facilities may be suitable for the Proposed Development, but it demonstrates that sufficient treatment facilities are available for the waste that will be generated in this project.

Table 3-13: Permitted sites within 10km of Proposed Development (CB25 9AT) for construction and demolition waste recycling and recovery

Treatment facility name	Treatment facility type	Distance (km)
Skips R Us	S0803 No 3: 75kte HCI Waste TS + treatment	2.5
Cambridge Waste Management Centre	S0803 No 3: 75kte HCI Waste TS + treatment	3.0
Cambridge Transfer Station	A11: Household, Commercial & Industrial Waste T Station	3.4
Mobile Plant S R 2010 No5	SR2010 No5: Mobile plant for reclamation, restoration	3.5
Barnwell Junction Railway Sidings	A20: Metal Recycling Site (mixed MRS's)	3.6
Stowmarket Skips	A11: Household, Commercial & Industrial Waste T Stn	7.9
Liberty Barn	SR2010 No12: Treatment of waste to produce soil <75,000 tpy	7.9
Waterbeach Waste Management Park	A22: Composting Facility	8.0
Waterbeach Recycling Facility	SR2010 No12: Treatment of waste to produce soil <75,000 tpy	8.0
Amey Cespa Waste Management Park	A9: Special Waste Transfer Station	8.1

Treatment facility name	Treatment facility type	Distance (km)
Waterbeach Materials Recycling Facility	A15: Material Recycling Treatment Facility	8.3
Donarbon Ltd – Cambridge Recycling Centre	A22: Composting Facility	8.9
Cottenham Oil Treatment Plant	A11: Household, Commercial & Industrial Waste T Station	9.2
Dockerill (Plant Hire) Ltd	A16: Physical Treatment Facility	9.7
Mitchell Hill Farm	A25: Deposit of waste to land as a recovery operation	9.8

Source: (Environment Agency, 2022)

3.1.29 The Cambridge Waterbeach Waste Management Park (at CB25 9PG) comprises a number of waste management operations including a transfer station, materials recycling facility, composting facility, production of secondary aggregates and a landfill site. The Park is run by Amey Cespa (East) Ltd to treat wastes generated in the county from households and commercial and industrial businesses (including construction and demolition). In addition, Amey offer skip and bin hire service for waste collection (Amey, 2022).

3.1.30 The permitted landfills sites (Table 3-14) will also be within the proximity of the existing Cambridge WWTP in relation to disposal of waste occurring from decommissioning (Figure 16.1, Book of Figures – Material Resources and Waste (App Doc Ref 5.3.16).

Table 3-14: Permitted landfills within 10km of the existing Cambridge WWTP

Landfill name	Landfill type	Distance (km)
Eversden Landfill – Quy Landfill	A5: Landfill taking non-biodegradable wastes	1.6
Milton Landfill	A02: Other landfill site taking hazardous waste	4.6
Donarbon Ltd (nearby to Waterbeach Waste Management Park)	A02: Other landfill site taking hazardous waste	7.6
Wilbraham Chalk Quarry	L05: Inert LF	8.8

Source: (Environment Agency, 2022)

3.1.31 In addition to permitted C&D waste management sites, inert material is also managed on-sites that have an Environment Agency waste management license exemption. These exempt sites generally comprise land restoration activities such as restoring mineral voids, engineering/landscaping proposed developments and for agricultural improvements on farmland and can accommodate C&D waste.

3.1.32 Although small tonnages of waste from other waste streams (e.g. biodegradable waste) may be managed at locations with an exemption, the largest tonnage of exempt activities is likely to involve construction and demolition material.

3.1.33 There are 321 waste exempt sites listed by the Environmental Agency within 10km of the proposed WWTP and the existing Cambridge WWTP, measured from postcode CB25 9AT of which 125 are U1 exempt sites (allowed to use suitable waste material in construction, in place of virgin materials) (Environment Agency, 2022). These U1 exempt sites are used to manage waste produced on-site only as a one-off event and could accept waste from the Proposed Development. These exempt sites are often short-lived, and therefore, should be identified upon commencement of construction.

3.1.34 Reuse, recycling and recovery of wastes will be prioritised. However, if these options are not available or feasible, the following alternative is to adopt the Proximity Principle. Within the 10km radius of the Proposed Development, there are four landfill sites that may be suitable for C&D waste (Table 3-14) and these should be considered first as means of disposal before arranging for waste to be transported at greater distance.

3.2 Future baseline

3.2.1 The methodology relating to the CWWTPR project's approach to future baseline is presented in Chapter 5: EIA Methodology, alongside a list of proposed developments that, at this time, are expected to fall into this category. As such, these developments form part of the baseline for assessment within the EIA.

3.2.2 Where the future baseline presents new environmental receptors or a change to the current baseline specific to materials, resources and waste, this is discussed further below.

3.2.3 For the aspect of materials, resources and waste, the future baseline has been assessed on the basis of a desktop review of the waste forecast data from the Minerals and Waste Local Plan March 2019 (Cambridgeshire County Council, 2019).

- Waste forecasts indicate that waste arisings from within the Plan area could increase to 3.157Mtpa by the end of the Plan period (2036).
- The adopted London Plan sees household and commercial & industrial waste exports to the East of England gradually reducing from the current (estimated at 3.449Mt in 2015) and ceasing completely in 2026.
- The present capacity gap (indicated by a '-' figure) or a surplus (indicated by a '+' figure) for non-hazardous waste management, -recovery, and for deposits to land and disposal are given in Table 3-15 and Table 3-16.

3.2.4 Changes to existing conditions were also considered with due regard to committed developments, existing and proposed land uses. On the basis of a review of committed developments that are assumed to form part of future baseline, no significant changes to the material resource use and waste baseline were identified.

Table 3-15: Non-hazardous waste management – recovery (Mtpa)

Recovery	Type		2017	2026	2036
Preparing for re-use and recycle	Materials recycling (Mixed – Municipal, C&I)	Forecast arising	0.660	0.753	0.850
		Existing capacity	0.661	0.887	0.887
		Capacity gap	+0.001	+0.134	+0.237
	Composting (Mixed – Municipal, C&I)	Forecast arising	0.199	0.225	0.249
		Existing capacity	0.324	0.373	0.373
		Capacity gap	+0.125	+0.148	+0.124
	Inert recycling (C,D&E)	Forecast arising	0.087	0.067	0.068
		Existing capacity	0.184	0.600	0.600
		Capacity gap	+0.097	+0.533	+0.532
Other Recovery	Treatment energy and recovery processes (Mixed Municipal, C&I)	Forecast arising	0.160	0.312	0.415
		Existing capacity	0.327	0.994	1.002
		Capacity gap	+0.167	+0.682	+0.587
	Soil treatment (C,D&E)	Forecast arising	0.112	0.097	0.099
		Existing capacity	0.278	0.315	0.315
		Capacity gap	+0.166	+0.2217	+0.216

Source: (Peterborough City Council, 2019)

Table 3-16: Non-hazardous waste management – deposit to land and disposal (Mtpa)

Management	Type	Fate	2017	2026	2036	Total need (2016-2036)	Estimated void space (2016-2036)	Balance
Other recovery	C,D&E	Inert recovery (fill)*	0.728	0.776	0.776	16.061	14.058	-2.003
Disposal	C,D&E	Inert landfill*	0.262	0.176	0.174	3.856	1.932	-1.924
	Mixed – Municipal, C&I	Non-hazardous landfill	0.536	0.601	0.475	11.174	12.466	+1.292

Management	Type	Fate	2017	2026	2036	Total need (2016-2036)	Estimated void space (2016-2036)	Balance
		(including SNRHW)						
		Non-hazardous landfill	0.507	0.580	0.460	10.804	8.525	-2.278
		Non-hazardous (SNRHW) landfill	0.028	0.021	0.015	0.370	3.940	+3.570

Source: (Peterborough City Council, 2019)
**Inert recovery and landfill have a total indicative need of 19.917Mt over the plan period, with estimated remaining void space of 15.99Mt, leaving a deficit of 3.927Mt. This deficit is able to be accommodated however through void space created from mineral extraction operations that are or will be permitted over the plan period.*

Impacts of climate change on future baseline

3.2.5 The use of material resources is assessed based on information on known sustainability credentials of materials, given in paragraphs 1.2.2 and 1.2.3. of 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).

3.2.6 As part of mitigation plans, re-use of all suitable excavated material in the construction of the Proposed Development has been proposed to reduce the requirement to import materials for construction and reducing the need to remove surplus materials (waste generated) from site. This would produce less carbon emission for the transportation of materials on-site and removal of waste for disposal. Use of appropriately permitted waste treatment and disposal facilities located as close to the Proposed Development as possible has been considered to minimise the impacts of transportation, in particular the release of carbon emissions.

3.2.7 Climate change is expected to lead to increases in extreme weather, such as prolonged periods of hot and dry weather, or heavy rainfall. Mitigation measures for heavy rainfall has been accounted for in Chapter 9: Climate Resilience that includes waste water network drainage model including an appropriate uplift factor to account for the increased peak rainfall intensities due to climate change of [20%], in line with Environment Agency guidance.

4 Assessment of Effects

4.1.1 The section presents the assessment of effects and sets out a preliminary assessment that takes into account primary and tertiary mitigation in determining effects and then considers secondary mitigation and the assessment of residual effects.

4.2 Construction phase

Proposed WWTP

4.2.1 This section sets out the assessment of effects in relation to the construction of the proposed WWTP including the landscaping proposals, final effluent pipeline, outfall, transfer tunnel and new access connection with the B1047 Horningsea Road.

Use of material resources

Magnitude of impact

4.2.2 Infrastructure projects, like waste water treatment plants, require large quantities of both primary raw materials and manufactured construction products. Many material resources may originate off-site, purchased as construction products. Thus, there is potential for permanent, direct, adverse effects on the environment due to a reduction in the availability of material resources and potentially the depletion of natural resources. However, excavated materials will arise on-site (referred to as 'site won') that will be re-used, notably excavated soils and sub-strata.

4.2.3 The assessment relating to use of materials resources considers the following:

- types and quantities of materials required for the proposed WWTP, where known;
- details of the source or origin of materials, site-won materials to replace virgin materials, materials from secondary or recycled sources, or virgin or non-renewable sources, if known;
- information on any known sustainability credentials of materials to be consumed;
- the volume or weight of excavated arisings that will be reused or recycled (or stockpiled for future reuse or recycling) either on-site or off-site;
- the type and volume of materials that will be recovered from off-site for use on the proposed WWTP;
- cut and fill balance; and
- details of on-site storage and stockpiling arrangements, and any supporting logistical details for materials.

4.2.4 The main types of materials required for the construction of the proposed WWTP are listed below (although the list is not exhaustive):

- steel;
- aggregate;
- cement;
- concrete;
- bitumen;
- ductile iron for pipelines;
- wood;
- clay for bricks; and
- plastic.

4.2.5 In addition to these materials, there will be a need for materials such as water and drilling substances (such as bentonite) required for works associated with the construction of the transfer tunnel and trenchless techniques for pipeline construction.

4.2.6 Where possible, recovered aggregates, recycled timber may be used for the construction of the proposed WWTP and material resources sourced locally would be used where possible.

4.2.7 The receptors likely to be subject to impacts as a result of the requirement for material resources during the construction of the proposed WWTP include quarries and other sources of minerals, and other finite raw material resources. The potential impacts associated with the use of material resources for the Proposed Development are the:

- reduction in the availability of material resources and the subsequent impact on the demand for materials; and
- depletion of non-renewable resources.

4.2.8 Estimated quantities of resource materials required for the construction of the proposed WWTP are provided within Table 2-1 and 2-2 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).

4.2.9 Information from the cut and fill balance (given in Table 2-'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) estimates that 260,627m^3 of site won excavated material can be reused within the Proposed Development. Based on the volume of material required for the proposed Earth Bank, as a worst case there will be a deficit of 4,373m^3 of material that will need to be imported. Table 2-7 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1), estimates that the volume of excavated material other than topsoil, rock or artificial hard material that requires disposal is 26,241m^3. The volume of excavated material identified for disposal equates to 9.1% of the site-won material.

4.2.10 Some materials such as aggregate, stones, granular materials, concrete, cement etc., will be required, which will need to be imported.

4.2.11 The applicant aims to work in partnership with supply chain to specify and demand materials with low capital carbon including use of new materials such as low carbon concretes. All timber will be procured from Forest Stewardship Council (FSC) certified sources. The procurement of material will be aligned with the Applicants Net Zero Strategy to 2030 (Anglian Water, 2021).

4.2.12 Aggregate is available in the East of England without any known issues regarding supply and stock (paragraphs 3.1.7 to 3.1.9).

4.2.13 Table 3-1 states that sufficient concrete, cement and steel are available within the UK.

4.2.14 Impacts are more likely to arise from those materials or waste which:

- are associated with the largest quantities;
- are primary/virgin materials; and
- have hazardous properties.

4.2.15 Table 2-3 within 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) identifies aggregate / aggregate based material, cement concrete and steel as raw materials required for the construction of the proposed WWTP in large quantities and thus have been assessed in this EIA.

4.2.16 Table 2-3, within 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) identifies 17,259m^3 of aggregate and aggregate based material will be required for the proposed WWTP. Using the aggregate density of 2,900kg/m^3, this equates to 50,051 tonnes of aggregate required, which is calculated to be 1.56% of the aggregate supply available within East of England.

4.2.17 Table 2-3 within 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) identifies 40,256m^3 of cement will be required for the proposed WWTP. Using the cement density of 1,440kg/m^3, this equates to 57,967 tonnes of cement required, which is calculated to be 0.38% of the cement supply available within the UK.

4.2.18 Table 2-3 within 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) identifies 39,345m^3 of concrete (mass/reinforced) will be required for the proposed WWTP. Using the reinforced cement concrete density of 2,500kg/m^3, this equates to 98,362 tonnes of concrete required, which is calculated to be 0.3% of the concrete supply available within the UK.

4.2.19 The amount of steel required for the proposed WWTP is given in Table 2-4, within 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1) and the use of steel bars will be 0.06% of the apparent steel use in UK in 2019. Steel required for the pre-fabricated items like pipes, trowel, tanks, etc. have already been subject to relevant assessments for securing consents for the facilities' operation and not considered as part of this assessment.

4.2.20 The assessment of the magnitude of impact for material resource is provided in Table 4-1.

Table 4-1: Assessment of the magnitude of impact for material resource use for the Proposed WWTP

Activity	Potential impacts associated	Magnitude of impact
Material resource use for the construction of the proposed WWTP	The availability of material resources and the subsequent impact on the demand for materials	The aggregate required for construction will be 1.56% by volume of the regional baseline availability. The cement and concrete required for construction will be 0.38% and 0.3% respectively by volume of the national baseline availability. The steel bars required for the proposed WWTP will 0.06% of the available steel in UK. Based on Table 2-1, the effect of magnitude on the availability of material resources is **minor**.
Material resource use for the construction of the proposed WWTP	Impact on the depletion of non-renewable resources	More than 90% of site-won materials will be reused on-site where technically appropriate and economically feasible, so it will reduce the requirement of virgin non-renewable the impact on the depletion of non-renewable resources. The aggregate required for construction will be 1.56% by volume of the regional baseline availability. The cement and concrete required for construction will be 0.38% and 0.3% respectively by volume of the national baseline availability. The steel bars required for the proposed WWTP will be 0.06% of the available steel in UK. Based on Table 2-1, the effect of magnitude on the depletion of non-renewable resources is **minor**.

Sensitivity of receptor

4.2.21 The assessment of receptor sensitivity on material resource is provided in Table 4-2.

Table 4-2: Assessment of the sensitivity on materials resources use for the Proposed WWTP

Activity	Potential impacts associated	Description of sensitivity of impacts
Material resource use for the construction of the	The availability of material resources and the subsequent impact on the demand for materials	Baseline study indicated that aggregate resources are available in East of England without any known issues and adequate cement (15mT), concrete (32mT) and steel resource (11.2mT) are available within the UK.

Activity	Potential impacts associated	Description of sensitivity of impacts
proposed WWTP		Based on Table 2-2, the sensitivity on the availability of material resources is **negligible.**
Material resource use for the construction of the proposed WWTP	Impact on the depletion of non- renewable resources	Baseline study indicated that aggregate resources are available in East of England without any known issues and adequate cement (15mT), concrete (32mT) and steel resource (11.2mT) are available within the UK. Based on Table 2-2, the sensitivity on the depletion of non-renewable resources is **negligible.**

Significance of effect

4.2.22 The significance of effects on material resource use is provided in Table 4-3.

Table 4-3: Significance of effects on the materials resources use for the Proposed WWTP

Activity	Potential impacts associated	Significance of effects
Material resource use for the construction of the proposed WWTP	The availability of material resources and the subsequent impact on the demand for material	Based on Table 2-3, the effect on the availability of material resources and the impact on the depletion of non-renewable resources is **neutral or minor**. Based on Table 2-4, the environmental effects is **not significant**.
	Impact on the depletion of non-renewable resources	

Secondary mitigation or enhancement

4.2.23 There is no secondary mitigation relevant for the material resources use and the effect remains as neutral or minor, which is **not significant.**

Residual effect

4.2.24 The residual effect remains is neutral or minor, which is **not significant.**

Generation and management of waste

4.2.25 The generation of waste will occur through different construction stages these are summarised in Table 4-4.

4.2.26 Waste from construction activities is likely to be generated from surplus site-won materials (from excavations of natural and made ground), and materials brought to site which are not used for their original purpose.

Table 4-4: Waste types arising from the construction of the proposed WWTP (including landscaping, transfer tunnel, permanent access, final effluent / storm pipeline and outfall)

Activity	Expected waste types	Waste classification
Site clearance from ground preparation	Debris and rubbish lying on ground	Non-hazardous
	Excavated material (natural and made ground) which may be contaminated or unsuitable for reuse without treatment	Non-hazardous
	Green waste from vegetation clearance and small quantities of unsorted non-hazardous waste like timber	Non-hazardous
	Hazardous waste arising from the footprint of the Proposed Development	Hazardous
	Surplus material from site preparation (including any remediation) and excavation works	Cement, sand, aggregates: inert waste
Temporary access construction	Surplus of material brought to site which are not required.	Aggregates: inert waste
Earthworks and excavations	excavated topsoil, subsoil and rocks	Topsoil: non-hazardous sub soil, rocks: inert
	Excavated material (natural and made ground) which may be contaminated or unsuitable for reuse without treatment;	Non-hazardous
Civil works for proposed WWTP	Concrete, cement	Inert
	Aggregate	Inert
	Bitumen/ planings	Non-hazardous
	Damaged stock material/ cut off	Non-hazardous
	Temporary fences	Non-hazardous
	Small quantities of surplus materials generated from materials brought to site which are not required	Cement, sand, aggregates: inert waste
Excavation at the river margin for the construction of the outfall	River sediments	Non-hazardous
	Debris in the river including aquatic litter	Non-hazardous
	Soils and subsoils from bank	Non-hazardous
	Concrete	Inert
Landscaping	Vegetation waste	Non-hazardous

4.2.27 For the assessment of waste generation, the following information (where available) was used:

- the amount of waste that will be recovered and reused either on-site or off-site (i.e. for use on other projects);

- types and quantities of waste arising from the proposed WWTP (demolition, excavation arisings and remediation) requiring disposal to landfill;
- forecast of non-hazardous, hazardous, and inert waste arisings;
- wastes to be pre-treated on-site for re-use within the Proposed Development;
- details of on-site storage and segregation arrangements for waste, and any supporting logistical information; and
- any physical, chemical or other processing requirements that should be deployed to ensure waste is managed to retain utility and value.

4.2.28 Waste from construction activities is likely to be generated from surplus site-won materials (from excavations of natural and made ground), and materials brought to site which are not used for their original purpose.

4.2.29 Without mitigation measures, the generation of waste may result in significant adverse effects as a result of:

- direct effects on waste infrastructure locally, through temporary occupation of sites;
- indirect effects if disposal in landfill is required, which could result in a permanent reduction in landfill void capacity; and
- unsustainable use or loss of resources to landfill that results in the temporary or permanent degradation of the natural environment.

4.2.30 It is the intent to minimise the generation of waste during construction by implementing the principles of the waste hierarchy in line with the Waste Framework Directive and complying with industry best practice.

4.2.31 The baseline study has indicated that the waste infrastructure within 10km of the proposed WWTP has sufficient capacity to accommodate waste from the proposed WWTP (Table 3-13).

Inert waste

4.2.32 Steel waste that may be generated from construction works will be minimal. It is estimated that there will be 3.5% to 5.5% of wastage from reinforcement steel and 15% of wastage from structural steel (given in Table 2-8 within 'Materials resources and waste estimates' in Appendix 16.1, App Doc Ref 5.4.16.1), equating to 447 tonnes of inert waste. Assuming the density of steel as 8,050kg/m^3, this is equivalent to 55m^3 of inert waste.

4.2.33 It is assumed that all metal waste would be recycled by local waste infrastructure and not landfilled, as this complies with industry best practice and is in line with the principles of the Waste Framework Directive. Based on research, it is assumed that 2% of cement, 2% of concrete and 5% of the aggregate or aggregate based material brought on-site given in Table 2-8 within 'Materials resources and waste estimates'

(Appendix 16.1, App Doc Ref 5.4.16.1) may not be suitable for construction and would require removal off-site equating to 2,455m^3 of inert waste.

4.2.34 If all the inert waste (cement, concrete and aggregate material) is landfilled, this will reduce the Cambridgeshire's inert landfill void capacity, given in Table 3-9 and paragraph 3.1.25 by 0.05% and that of East of England by 0.009%.

Non-hazardous waste

4.2.35 It is the aim for construction of the proposed WWTP is to achieve a cut and fill balance by utilising all excavated material for the formation of the access road, and Earth Bank and within the landscaping works.

4.2.36 The formation of the Earth Bank will require a phased approach as suitable material becomes available from excavations and topsoil stripping as part of the Proposed Development.

4.2.37 The estimated volume of excavated material other than topsoil, rock or artificial hard material that would require disposal off-site equates to an estimated volume of 26,241m^3 of non-hazardous waste (see Table 2-7 and 3-2 in Appendix 16.1: Materials resources and waste estimates (App Doc Ref 5.4.16.1)).

4.2.38 Vegetation waste is assumed to be composted, as this complies with industry best practice and is in line with the principles of the Waste Framework Directive.

4.2.39 Non-hazardous excavated soil will be reused on-site for landscaping works. Considering a worst-case scenario, where excavated material (except topsoil) is unacceptable for reuse, it will be managed in accordance with the waste hierarchy. The reduction in the Cambridgeshire's non-hazardous landfill void capacity, given in Table 3-9 and paragraph 3.1.25, would be by 0.4% in the event that the entire estimated 26, 241m^3 of material did require disposal, the reduction in East of England's non-hazardous landfill void capacity will be 0.11%.

Hazardous and contaminated waste

4.2.40 The volume of hazardous waste that may be generated by the proposed WWTP is currently unknown.

4.2.41 One historic landfill site (Winship Industrial Estate) is at 360m north of the Scheme Order Limits. There is no risk from the historic landfill for the area of land required for the proposed WWTP, transfer tunnel or treated effluent pipeline due to its distance from this site.

4.2.42 There are no known sources of contaminated land adjacent, or within the Scheme Order Limit. Therefore, there are no potential sources of hazardous waste. As a precautionary basis, taking into account the long standing use of the site, the existing Cambridge WWTP is considered as a potential contaminant source. Therefore, for the purpose of assessment, to allow for unidentified contaminated land, 5% of excavated material originating from the tunnel excavation within the area of the existing Cambridge WWTP is assumed hazardous and this equates to

330m^3 and would be required to be landfilled (see Table 2-8 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).

4.2.43 Other sources of hazardous waste may occur in construction as a result of pollution incidents such as spills and leaks whereby the response and clean up and or remediation would result in small quantities of hazardous waste which would be required to be landfilled.

4.2.44 All of the material excavated from the River Cam for the construction of the outfall is assumed to be potentially contaminated. The volume required for removal is estimated as 150m^3 and would be required to be landfilled after treatment, see Table 2-8 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1)

4.2.45 The baseline has identified that the waste infrastructure in East of England does not have capacity to accommodate hazardous waste, if disposal of hazardous waste to landfill is required. Any hazardous waste would therefore need to be transported to neighbouring regional landfills, listed in Table 3-12 . Based on the estimates completed, disposal would reduce the national hazardous landfill void capacity by 0.002%.

Magnitude of impact and sensitivity of receptor

4.2.46 The assessment of the magnitude of impact and sensitivity of generation and management of waste is provided in Table 4-5.

Table 4-5: Assessment of the magnitude of impact and sensitivity of generation and management of waste for the proposed WWTP

Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
Generation and management of waste for the construction of the proposed WWTP	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Even if all non-hazardous excavated waste requires disposal to landfill, it would occupy 0.4% of Cambridgeshire's non-hazardous landfill void space and 0.11% of the regional (East of England's) non-hazardous landfill void space resulting in <1% reduction or alteration in the capacity of waste infrastructure. The magnitude of impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity on the receptor (waste landfill) is classed as low based on Table 2-2. As the intention is to reuse excavated material within the landscape masterplan the void space loss would be even smaller.
	Production of hazardous waste resulting in the temporary occupation of waste management	The worst-case scenario is based on 5% of excavated material being hazardous and that this would require disposal to landfill. If 5% of the excavated material is hazardous (based on Table 2-6) and requires landfilling, it would reduce the national hazardous landfill void capacity by 0.002%, which results in <0.1%

Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
	infrastructure capacity or permanent reduction to landfill capacity	reduction or alteration in the capacity of hazardous waste infrastructure. The magnitude of the impact on the receptor (landfill) is classed as negligible. The sensitivity on the receptor (landfill) is classed as low based on Table 2-2.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	If 5% of the aggregate or aggregate based material, 2% of cement and concrete imported becomes waste (2,425 m^3) and is landfilled, it will occupy 0.05% of the Cambridgeshire's inert landfill void capacity, resulting in <1% reduction or alteration in the capacity of waste infrastructure. The magnitude of the impact of the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity on the receptor (landfill) is classed as low based on Table 2-2. As the intention is to reuse inert excavated material within the landscape masterplan the void space loss would be even smaller.

Significance of effect

4.2.47 The significance of effect on generation and management of waste is provided in Table 4-6.

Table 4-6: Significance of effects on generation and management of waste for the Proposed WWTP

Proposed WWTP Activity	Potential impacts associated	Significance of effects
Generation and Management of waste for the construction of the proposed WWTP	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect on generation and management of waste is neutral or **minor**. Based on Table 2-4, the environmental effect is **not significant.**
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect on generation and management of waste is **neutral** or **minor**. Based on Table 2-4, the environmental effect is **not significant.**
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect d on generation and management of waste is **neutral** or **minor**. Based on Table 2-4, the environmental effect is **not significant.**

Secondary mitigation or enhancement

4.2.48 The application of measures within section 7.9 of the CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) would further mitigate the potential effects associated with waste generation during construction.

4.2.1 The application of measures within the outline Soil Management Plan (SMP) (Appendix 6.3, App Doc Ref 5.4.6.3) will further minimise the generation of inert waste through controls that ensure that soil is appropriately managed during construction and suitable for its final use.

4.2.2 The residual effect remains neutral or minor and is **not significant**.

Residual effect

4.2.3 The residual effect remains is **neutral** or **minor**, which is **not significant.**

Waterbeach Pipeline

4.2.4 This section sets out the assessment of effects in relation to the Waterbeach Pipeline which consists of a transfer section running from the north near Waterbeach to Low Fen Drove Way, a section crossing the area of land required for the construction of the proposed WWTP and a section south of the A14 which connects to the area of land where the existing Cambridge WWTP is located.

Use of material resources

Magnitude of impact

4.2.5 Information provided in paragraphs 4.2.2 to 4.2.7 for the proposed WWTP is also relevant for the construction of the Waterbeach Pipeline.

4.2.6 Estimated quantities of resource materials required for the construction of the Waterbeach Pipeline are provided in Table 3-1 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1). The raw materials required for the construction of the Waterbeach Pipeline are High Performance Polyethylene (HPPE) pipes and aggregates for road surfacing works. The HDPE pipes are considered a manufactured product and are not included in the assessment based on the assumption given in section 2.7.

4.2.7 Excavated material from the trenching associated with the installation of the Waterbeach Pipeline will be used to back fill the trench/HDD launch/recovery pits. Topsoil will be reinstated as per the design requirement. In the event there are small quantities of excess material, excluding topsoil, this will be used for landscaping works. Hence for the Waterbeach Pipeline element of the Proposed Development, it is assumed that all of the excavated material will be naturally occurring material and reused within the Proposed Development.

4.2.8 Construction of all temporary access roads for the construction of the Waterbeach Pipeline will use recycled aggregates, where technically appropriate and economically feasible. Aggregate is available in East of England without any known issues regarding supply and stock (paragraphs 3.1.7 to 3.1.9).

4.2.9 The construction of the Waterbeach Pipeline does not require importing of the fill material. The aggregate and aggregate based material required is estimated to be a small volume, as required for the surfacing improvement works of a 50m length of road.

4.2.10 Based on availability for total aggregate of 3.21Mt (Table 3-2) within East of England, the use of aggregate stated in paragraph 4.2.9 will be less than 1% by volume of the regional baseline availability.

4.2.11 The assessment of the magnitude of impact on material resource use is provided in Table 4-7.

Table 4-7: Assessment of the magnitude of impact on material resource use for the Waterbeach Pipeline

Waterbeach Pipeline Activity	Potential impacts associated	Magnitude of impact
Material resource use for the construction of the Waterbeach Pipeline	The availability of material resources and the subsequent impact on the demand for materials	The aggregate required for construction will be <1% by volume of the regional baseline availability. 100% of all site-won materials will be reused on-site where technically appropriate and economically feasible.	Based on Table 2-1, the magnitude of impact on the availability of material resources is negligible.
	Impact on the depletion of non-renewable resources	The aggregate required for construction will be <1% by volume of the regional baseline availability. 100% of all site-won materials will be reused on-site where technically appropriate and economically feasible, so it will reduce the impact on the depletion of non-renewable resources.	Based on Table 2-1, the magnitude of impact on the depletion of non-renewable resources is negligible

Sensitivity of receptor

4.2.12 The assessment of the sensitivity of receptor on material resource use is provided in Table 4-8.

Table 4-8: Assessment of the sensitivity on material resource use for the Waterbeach Pipeline

Waterbeach Pipeline Activity	Potential impacts associated	Description of sensitivity of impacts
Material resource use for the construction of the	The availability of material resources and the subsequent impact on the demand for materials	Aggregate is the primary raw material that will be required for the construction of the Waterbeach Pipeline. Baseline study indicated that the aggregate resource is available in East of England

Waterbeach Pipeline Activity	Potential impacts associated	Description of sensitivity of impacts
Waterbeach Pipeline		without any known issues. Based on Table 2-2, the sensitivity on the availability of material resources is negligible.
	Impact on the depletion of non-renewable resources	Aggregate is the primary raw material that will be required for the construction of the Waterbeach Pipeline. Baseline study indicated that the aggregate resource is available in East of England without any known issues. Based on Table 2-2, the sensitivity on the depletion of non-renewable resources is negligible.

Significance of effect

4.2.13 The significance of effect on material resource use is provided in Table 4-9.

Table 4-9: Significance of effects on the materials resources use for the Waterbeach Pipeline

Waterbeach Pipeline Activity	Potential impacts associated	Significance of effects
Material resource use for the construction of the Waterbeach Pipeline.	The availability of material resources and the subsequent impact on the demand for materials.	Based on Table 2-3, the effect on material resources use is neutral. Based on Table 2-4, the environmental effect is not significant.
	Impact on the depletion of non-renewable resources.	Based on Table 2-3, the effect on material resources use is neutral. Based on Table 2-4, the environmental effect is not significant.

Secondary mitigation and enhancement

4.2.14 There are no secondary mitigation relevant for the material resources use and the effect remains as neutral and is not significant.

Residual effect

4.2.15 The residual effect is neutral, which is not significant.

Generation and management of waste

Magnitude of impact

4.2.16 Information provided in paragraph 4.2.25 to 4.2.31 for generation and management of waste is relevant for the construction of the Waterbeach Pipeline.

4.2.17 Inert waste has not been forecasted to be generated during the construction of Waterbeach Pipeline. As such, the reduction of the East of England inert landfill void capacity given in Table 3-9 and paragraph 3.1.25 is not likely to occur.

4.2.18 During the construction of the Waterbeach Pipeline, non-hazardous waste is likely to be vegetation waste arising from land clearance and is assumed to be composted, based on industry best practices.

4.2.19 There will be a need for materials, such as water and bentonite or other drilling substances required to for HDD drilling activities associated with trenchless techniques. The volumes required are not quantified at present and will be considered as non-hazardous waste after its use.

4.2.20 Excess non-hazardous excavated soil and sub soils are assumed to be reused on-site for landscaping works. A small quantity of non-hazardous construction waste may arise, but will be less than the non-hazardous waste that has been estimated to arise from the construction of the Proposed Development). Hence the reduction in the East of England non-hazardous landfill void capacity, given in Table 3-9 and paragraph 3.1.25, will be by less than 1%.

4.2.21 Two historic inert waste landfill sites (Clayhithe Cottage, at 200m west and Northfields Farm at 112m west of the proposed pipeline) are within the 500m of the Scheme Order Limits for the Waterbeach Pipeline. There is a low likelihood that the excavated material during the installation of the Waterbeach Pipeline will be contaminated. If excavated material is identified as or suspected of being hazardous, will be dealt with in accordance with the CoCP (document reference 7.14) (and would require either to be sent to a hazardous waste treatment facility or to a hazardous waste landfill site).

4.2.22 All excavated material from the trench used for the installation of the Waterbeach Pipeline will be used to back fill the trench/HDD launch/recovery pits and is unlikely to generate any hazardous waste.

4.2.23 There are no confirmed sources of contaminated land adjacent, or within the Scheme Order Limits. Therefore, it is likely that there are no potential sources of hazardous waste. However, for the purpose of assessment, to allow for unidentified contaminated land, a conservative figure of 5% of excavated material from the trench section within 500m of an identified historic landfill (at Clayhithe Cottage and Northfields Farm) is assumed hazardous and equates to 1,950m^3 and would be required to be landfilled (see Table 3-2 in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1).

4.2.24 The baseline has identified that the waste infrastructure in East of England does not have capacity to accommodate hazardous waste if disposal to landfill is required. If hazardous waste is generated and requires to be landfilled, it would require landfilling in neighbouring regional landfills given in Table 3-12.

Magnitude of impact and sensitivity of receptor

4.2.25 The assessment of the magnitude of impact and sensitivity of generation and management of waste is provided in Table 4-10.

Table 4-10: Assessment of the magnitude of impact and sensitivity of generation and management of waste for the Waterbeach Pipeline

Waterbeach Pipeline Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
Generation and management of waste for the construction of the Waterbeach Pipeline.	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Under the worst-case scenario all non-hazardous waste requiring disposal is landfilled, it will occupy <1% of the Cambridgeshire's and East of England's non-hazardous landfill space which will result in <1% reduction or alteration in the capacity of waste infrastructure. The magnitude of impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as low based on Table 2-2.
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	The worst-case scenario would be that all hazardous excavated waste requires disposal to landfill. If 5% of the excavated material is hazardous and requires landfilling, it would reduce the national hazardous landfill void capacity by 0.13%, which results in <0.1% reduction or alteration in the capacity of national hazardous waste infrastructure. The baseline has identified that the waste infrastructure in East of England does not have capacity to accommodate hazardous waste from the Waterbeach Pipeline. If hazardous waste is generated, it would require landfilling in neighbouring regional landfills, given in Table 3-12. The magnitude of the impact on the receptor (landfill) is classed as minor. The sensitivity on the receptor (landfill) is classed as low based on Table 2 2.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Inert waste is unlikely to be generated from the construction of the Waterbeach Pipeline. The magnitude of impact on the receptor (waste landfill) is classed as no change impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as negligible based on Table 2-2.

Significance of effect

4.2.26 The significance of effect on generation and management of waste is provided in Table 4-11.

Table 4-11: Significance of effects on generation and management of waste for the Waterbeach Pipeline

Waterbeach Pipeline Activity	Potential impacts associated	Significance of effects
Generation and Management of waste for the construction of the Waterbeach Pipeline.	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Based on Table 2-3, the effect on generation and management of waste is neutral or minor. Based on Table 2-4, the environmental effect is not significant.
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Based on Table 2-3, the effect on generation and management of waste is minor. Based on Table 2-4, the environmental effect is not significant.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Based on Table 2-3, the effect on generation and management of waste is neutral. Based on Table 2-4, the environmental effect is not significant.

Secondary mitigation or enhancement

4.2.27 The application of measures within section 7.9 of the CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) would further mitigate the potential effects associated with waste generation during construction.

4.2.28 The application of measures within the outline Soil Management Plan (SMP) (Appendix 6.3, App Doc Ref 5.4.6.3) will further minimise the generation of inert waste through controls that ensure that soil is appropriately managed during construction and suitable for its final use.

4.2.29 The residual effect remains neutral or minor and is **not significant**.

Residual effect

4.2.30 The residual effect is neutral or minor and is **not significant.**

Existing Cambridge WWTP

4.2.31 This section sets out the assessment of effects in relation to activities within the existing Cambridge WWTP.

4.2.32 There are no construction activities at the existing Cambridge WWTP and therefore, no material resources would be required and no waste from construction would be generated. Activities associated with decommissioning of the existing Cambridge WWTP are discussed in Section 4.4.

Monitoring

4.2.33 For material resources use and generation and management of waste, monitoring for construction of the Proposed Development will be set out in the SWMP and CEMP (as part of secondary mitigation), both to be developed by the appointed contractor(s).

4.3 Operation phase

Proposed WWTP

4.3.1 This section sets out the assessment of effects in relation to the operation and maintenance of the proposed WWTP including the landscaping proposals, final effluent pipeline, outfall, transfer tunnel and new access connection connecting with Horningsea Road.

Generation and management of waste

Magnitude of impact

4.3.2 During the operation phase, waste is likely to be generated from maintenance activities and operation of the treatment process.

4.3.3 For maintenance activities, major maintenance, repairs and replacements would be infrequent and unlikely to generate large volumes of waste requiring disposal or treatment.

4.3.4 In terms of treatment process, the proposed WWTP will operate similarly to the e

4.3.5 Existing Cambridge WWTP and produce similar waste streams. Details of the treatment process are provided in Chapter 2: Project Description. The proposed WWTP would treat waste water coming into the plant and as a result will generate:

- sludge for further treatment; and
- water discharged as treated final effluent.

4.3.6 The sludge is further treated in the integrated STC to generate biogas and form a bio-fertiliser. The integrated STC is designed to treat sludge produced at the Proposed Development along with imported liquid sludge, up to the amount of 16,000 tonnes of dry solids (TDS) per year. The STC will produce an 'Enhanced Treated Biosolids' product (not considered as waste) for spreading on agricultural land, anticipated to be 80,391 wet tonnes/annum or 40,196 m^3/annum. Biogas generated by the process will be firstly burned within the steam raising boilers to generate heat for use in the sludge treatment process. The surplus biogas will be cleaned and then exported to the national natural gas network. The water removed from the sludge (centrate) after it has been converted to bio-solid will be treated within the proposed WWTP. Therefore, waste from sludge dewatering is not generated by normal operation of the proposed WWTP.

4.3.7 Use of bio-fertiliser on agricultural land is the most sustainable option and is guided by The Sludge (Use in Agriculture) Regulation (The Sludge (Use in Agriculture) Regulation, 1998).

4.3.8 The volume of operational waste that is likely to be generated is outlined in Table 4-12, and will be landfilled.

Table 4-12: Operational waste from Inlet works for the proposed WWTP

Waste type	m^3/week	t/m^3	Anticipated vehicle type	Estimated vehicles/week
Screening	12.6	1	6 yard skip	4
Grit and rag	6.1	2.65	7 yard skip	2

Source: Project Description

4.3.9 The operational waste generated from inlet works (as stated in Table 4-2) equates to 972.4 tonnes per annum and would require landfilling. This would result in a reduction of 0.004%, by volume (per year), of the East of England's baseline availability of 22,268,303m^3 of non-hazardous landfill void space.

4.3.10 The treatment process for waste water and sludge within the proposed WWTP will remain similar to the existing Cambridge WWTP. The waste types and volumes associated with operational processes related to the proposed WWTP would be similar to the existing Cambridge WWTP. Similar arrangements and procedures would be in place, including those in place as a requirement of the environmental permit, to appropriately manage wastes generated during the treatment process within the proposed WWTP.

4.3.11 Hazardous and inert waste will not be generated during the operation of the proposed WWTP. Maintenance activities that would be infrequent may generate very small quantities of contaminated or non-hazardous waste (for example cleaning of spills and the use of oils, lubricants, chemicals, etc.).

Magnitude of impact and sensitivity of receptor

4.3.12 The assessment of the magnitude of impact and sensitivity of generation and management of waste is provided in Table 4-13.

Table 4-13: Assessment of the magnitude of impact and sensitivity of generation and management of waste for the operation of the proposed WWTP

Proposed WWTP Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
Generation and management of waste for the operation of the proposed WWTP	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or	The proposed WWTP will convert sludge to biogas and bio fertilizer diverting an estimated 80,931m^3 of sludge from landfill annually. Landfilling of operational waste (screening, grit, rag) will result in the decrease of East of England's non-hazardous landfill void space by 0.004% per year. The magnitude of impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The

Proposed WWTP Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
	permanent reduction to landfill capacity	sensitivity of the receptor (waste landfill) is classed as low based on Table 2-2.
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Small quantity of hazardous waste will be generated and disposed from the operation of the proposed WWTP. The magnitude of the impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as low based on Table 2-2 The baseline has identified that the waste infrastructure in East of England does not have capacity to accommodate hazardous waste if it is generated by the proposed WWTP and would require landfilling in neighbouring regional landfills given in Table 3-12.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Inert waste is unlikely to be generated from the operation of the proposed WWTP. The magnitude of the impact on the receptor (landfill) is classed as no change impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as negligible based on Table 2-2.

Significance of effect

4.3.13 The significance of effect on the generation and management of waste is provided in Table 4-14.

Table 4-14: Significance of effects on generation and management of waste for the operation of the proposed WWTP

Proposed WWTP Activity	Potential impacts associated	Significance of effects
Generation and Management of waste for the construction of the proposed WWTP.	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Based on Table 2-3, the effect on generation and management of waste is neutral or minor. Based on Table 2-4, the environmental effect is not significant.
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Based on Table 2-3, the effect on generation and management of waste is neutral or minor. Based on Table 2-4, the environmental effect is not significant.
	Production of inert waste resulting in the temporary occupation of waste	Based on Table 2-3, the effect on generation and management of waste

Proposed WWTP Activity	Potential impacts associated	Significance of effects
	management infrastructure capacity or permanent reduction to landfill capacity.	is neutral. Based on Table 2-4, the environmental effect is not significant.

Secondary mitigation or enhancement

4.3.14 The application of measures within section 7.9 of the CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) would further mitigate the potential effects associated with waste generation during construction.

Residual effect

4.3.15 On the basis that no secondary mitigation or enhancement measures are proposed, the residual effect remains neutral or minor and is **not significant**.

Waterbeach Pipeline

4.3.16 This section sets out the assessment of effects in relation to the operation and maintenance of the Waterbeach Pipeline which consists of a transfer section running from the north near Waterbeach to Low Fen Drove Way, a section crossing the area of land required for the construction of the proposed WWTP, a section south of the A14 which connects to the area of land where the existing Cambridge WWTP is located.

Generation and management of waste

4.3.17 The Waterbeach Pipeline is unlikely to generate significant waste during its operation and maintenance. However, in the case of rare instances of pipeline blockage, there may be some small quantities of waste generated, which will be taken to the proposed WWTP for treatment. Any infrequent maintenance will generate negligible volumes of waste and therefore impacts on the generation and management of waste are unlikely.

4.3.18 The water used for wet commissioning of the Waterbeach Pipeline will be treated within a WWTP and will not generate any waste.

Existing Cambridge WWTP

4.3.19 The existing Cambridge WWTP would be decommissioned and would not operate after the proposed WWTP has been commissioned and becomes fully operational.

Monitoring

4.3.20 During the operational phase, monitoring of waste generation and management by the proposed WWTP will be a requirement of the environmental permits and discharge consents, issued by the Environment Agency. The proposed WWTP will require:

- an Industrial Emission Directive (IED) Permit to operate the integrated STC;

- a waste activity permit in relation to accepting commercial liquid waste from industrial processes;
- a Medium Combustion Plant Directive (MCPD) permit as the combustion plant is of 1.2MW capacity and exceeds 1MW thermal input;
- a permitted activity to operate biomethane plant and to supply biomethane to the National Grid; and
- a discharge consent for the treated effluent.

4.3.21 The permit, acquired by the Applicant, will specify the monitoring parameters, duration, frequency and reporting requirements and the operational responsibilities. Monitoring data would be used by the regulator to determine permit compliance.

4.4 Decommissioning the existing Cambridge WWTP

4.4.1 This section sets out the assessment of effects in relation to activities to be completed to surrender the environmental permit at the existing Cambridge WWTP. Demolition activities and intrusive works to prepare the existing Cambridge WWTP site for redevelopment are considered within the cumulative assessment. Decommissioning of the Existing Waterbeach WRC is also considered within the cumulative assessment.

Generation and management of waste

Magnitude of impact

4.4.2 All structures will be left in-situ on site. Demolition and removal of structures will not be undertaken by the Applicant. The contents of the tanks and pipelines will be removed, cleaned, and the power isolated from the equipment and made safe.

4.4.3 The draining down of tanks, removal of sludges and cleaning activities at the existing Cambridge WWTP is likely to result in the following waste arisings:

- liquid sludge;
- sludge cake;
- rag and grit;
- waste water from cleaning of tanks and pipelines;
- fuels, oils and chemicals; and
- electrical waste as part of power isolation works.

4.4.4 For the assessment of waste generation, the following information (where available) was used:

- the amount of waste (by volume) that will be recovered and diverted from landfill either on-site or off-site (i.e. for use on other projects);

- where information does not exist and it is not possible to assess compositions, it is assumed that all waste is disposed to landfill, in order to ensure a worst-case assessment is applied;
- types and quantities of waste arising from the draining down of tanks requiring disposal to landfill;
- forecast of non-hazardous, hazardous, and inert waste arisings;
- wastes that require storage on-site prior to re-use, recycling and disposal;
- wastes to be pre-treated on-site for re-use within the Proposed Development; and
- the impacts that will arise from the issues identified in relation to waste.

4.4.5 There will be legal obligation for the Applicant to surrender the environmental permit for the existing Cambridge WWTP. In order to do this a Site Condition Report (SCR) will be required. Before a regulator (in England this is the Environment Agency) will accept the surrender or partial surrender of an environmental permit it must be satisfied that the permit holder has taken all measures to:

- avoid any pollution risk resulting from the operation of a regulated facility; and
- to return the site at the regulated facility to a satisfactory state, having regard to the condition of the site before the permit was granted.

4.4.6 An approved DMP would support the development of the SCR and is, therefore, associated with the legal requirement for the surrender of the environmental permit for the existing Cambridge WWTP.

4.4.7 This assessment takes account of the requirement for the Applicant to obtain an approved DMP and to complete the decommissioning activities in accordance with the approved plan and associated regulations including actions to comply with the Waste (England and Wales) Regulations 2011 (as amended).

4.4.8 The receptors affected and thus assessed due to the generation and management of waste are listed in paragraph 4.2.29.

4.4.9 Some materials and waste would require removal off-site. These quantities will be identified in the detailed Decommissioning Plan, but are likely to include:

- waste water derived from the flushing and draining of associated infrastructure within the existing Cambridge WWTP;
- ferrous dosing compounds (ferric chloride) and other unused chemicals (removed by certified carrier either for re-use or disposal);
- material from redundant sand filter;
- detritor grit; and

- media from biofilter or chemicals used for odour control.

4.4.10 All sludge would be removed from the tanks and sent to the Sludge Treatment Centre (STC) within the proposed WWTP for treatment which is estimated to be approximately 5000m^3. The residual sludge volume from the STC tanks may either be treated on-site (in the form of temporary liming) before taken off-site or would require to be taken off-site as raw sludge for treatment at another Advanced Anaerobic Digestion (AAD) facility (waste treatment facility) or liming plant (third party).

4.4.11 After the removal of sludge from the STC tanks, rags, screenings and grit would require to be removed off-site, along with liquors tankered off-site for treatment or disposal. Rags, screenings and grits would be sent to a non-hazardous landfill for disposal.

4.4.12 Unused chemicals, including ferric chloride, would be removed from the tank and taken to a treatment facility for recovery.

4.4.13 The generation of waste that cannot be reused on-site will require transport off-site these vehicle movements are considered with in Chapter 19: Traffic and Transport.

4.4.14 The waste generated by decommissioning would be liquids, sludges and grit (see Table 4-1, in 'Materials resources and waste estimates' (Appendix 16.1, App Doc Ref 5.4.16.1). For the impact assessment of waste, a worst-case scenario is assumed, where all solid waste identified for disposal are landfilled, leading to a reduction in the East of England void capacity.

4.4.15 In the absence of information, professional judgement has been used to determine the percentage decrease in the non-hazardous landfill void space if waste arisings from the decommissioning phase is landfilled. East of England has 22,268,303m^3 of available non-hazardous landfill void space. Therefore, it is unlikely that non-hazardous waste arising from the decommissioning phase requiring landfilling will amount to 222,683m^3. Consequently, the reduction in the East of England non-hazardous landfill void capacity given in Table 3-9 and paragraph 3.1.25 will be <1%.

4.4.16 No hazardous or inert waste is anticipated to be generated during the draining and cleaning of tanks. If hazardous waste is generated and requires to be landfilled, it would require disposal in neighbouring regional landfills, given in Table 3-12.

Magnitude of impact and sensitivity of receptor

4.4.17 The assessment of the magnitude of impact and sensitivity of generation and management of waste is provided in Table 4-15.

Table 4-15: Assessment of magnitude of impact and sensitivity of generation and management of waste for the decommissioning of existing Cambridge WWTP

Decommissioning Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
Generation and management of waste from the	Production of non-hazardous waste resulting in the	It is likely that rag and grit would be landfilled at a non-hazardous landfill and would reduce the East of England's landfill void space by <1%. The

Decommissioning Activity	Potential impacts associated	Description of magnitude of impacts and sensitivity of receptor
draining down of the existing Cambridge WWTP tanks.	temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	magnitude of impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as low based on Table 2-2.
	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	It is anticipated that hazardous waste would not be generated and disposed from the decommissioning of the existing Cambridge WWTP. All chemical (waste) is likely to be reused or treated prior to disposal. The magnitude of impact on the receptor (landfill) is classed as negligible impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as low based on Table 2-2. The baseline has identified that the waste infrastructure in East of England does not have capacity to accommodate hazardous waste, if it is generated, from the decommissioning phase, it would require landfilling in neighbouring regional landfills given in Table 3-12.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	Inert waste is unlikely to be generated from the decommissioning of the existing Cambridge WWTP. The magnitude of impact on the receptor (landfill) is classed as no change impact based on Table 2-1. The sensitivity of the receptor (landfill) is classed as negligible based on Table 2-2.

Significance of effect

4.4.18 The significance of effect on the generation and management of waste is provided in Table 4-16.

Table 4-16: Significance of effects on the generation and management of waste for the decommissioning of the existing Cambridge WWTP

Proposed WWTP Activity	Potential impacts associated	Description of sensitivity of impacts
Generation and Management of waste for the draining down of the	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect on generation and management of waste is neutral or minor. Based on Table 2-4, the environmental effects is not significant.

Proposed WWTP Activity	Potential impacts associated	Description of sensitivity of impacts
existing Cambridge WWTP tanks	Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect on generation and management of waste is neutral or minor. Based on Table 2-4, the environmental effects is not significant.
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity	Based on Table 2-3, the effect on generation and management of is neutral. Based on Table 2-4, the environmental effect is not significant.

Secondary mitigation or enhancement

4.4.19 The application of measures within section 7.9 of the CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) would further mitigate the potential effects associated with waste generation during decommissioning.

Residual effect

4.4.20 The residual effect remains neutral or minor and reamins **not significant**.

Monitoring

4.4.21 For generation and management of waste, monitoring for decommissioning phase will be set out in the approved Decommissioning Management Plan, an outline document as part of the DCO application (Outline Decommissioning Plan, Appendix 2.3, App Doc Ref 5.4.2.3).

4.5 Cumulative effects

4.5.1 Cumulative effects are those arising from impacts of the Proposed Development in combination with impacts of other proposed or consented development projects that are not yet built or operational. An assessment of cumulative effects for material resources and waste has been completed and is reported in Chapter 21: Cumulative Effects Assessment.

4.6 Inter-related effects

4.6.1 Inter-relationships are the impacts and associated effects of different aspects of the construction, operation of the Proposed Development and the decommissioning of the existing Cambridge WWTP on the same receptor. The assessment of inter-related effects for has been completed and is reported in Chapter 22: Cumulative Effects Assessment.

4.6.2 The following summarises the inter-related effects identified for material resources and waste:

- Materials would require transport on-site. The generation and management of waste that cannot be reused on-site will require transport off-site and the effects of this activity have been assessed with in Chapter 7: Air Quality, Chapter 10: Carbon and Chapter 19: Traffic and Transport.
- The effects of land contamination such as impact on groundwater and human health have been assessed with in Chapter 11: Health, Chapter 14: Land Quality, and Chapter 20: Water Resources. Where the potential from contaminated land is identified, this chapter addresses the management of this waste only.
- Sterilisation of any mineral safeguarding areas or peat resources has been assessed with in Chapter 14: Land Quality.

5 Conclusion and Summary

5.1.1 This assessment of the effects and their significance of the Proposed Development as it applies to material resources use and generation and management of waste has been carried out based on the information currently available.

5.1.2 The approach to assessment has applied IEMA guidance (The Institute of Environmental Management and Assessment, 2020).

5.1.3 For each impact, the magnitude of impact and significance of effect with a description of the mitigation measures is provided. The residual effects are also indicated.

5.1.4 During construction, there will be a requirement for mitigation measures to be implemented through the application of management plans as specified by the CoCP (Appendix 2.1 & 2.2, App Doc Refs 5.4.2.1 & 5.4.2.2),

5.1.5 In addition to the requirements of the CoCP (Appendix 2.1 & 2.2, App Doc Refs 5.4.2.1 & 5.4.2.2), there will also be a requirement for the appointed contractor(s) to follow the SMP, and Decommissioning Plan to control the use of soils and the decommissioning activities respectively. The Decommissioning Plan would be agreed with the Environment Agency.

5.1.6 The project design has identified the reuse of more than 90% of the site won material during the construction of the proposed WWTP and 100% of the site won materials during the construction of the Waterbeach Pipeline, thus reducing the impact on the depletion of non-renewable resources.

5.1.7 The design has identified the potential need to import up to 4,373m3 of material for the purpose of landscaping earthworks to create the Earth Bank.

5.1.8 With the implementation of mitigation measures the construction effects on material resources would be neutral to minor adverse and not significant.

5.1.9 With the implementation of mitigation measures the construction effects on material resources use and generation and management of waste would be neutral to minor adverse and not significant.

5.1.10 During operation, the main waste streams would be similar to the existing Cambridge WWTP and include rag and grit, office waste and waste from operational activities and maintenance. The effects of the Proposed Development on waste generation during operation would be negligible prior to mitigation, which would not be significant.

5.1.11 The proposed WWTP would treat waste water coming into the facility, and as a result will generate sludge which will be further treated to generate biogas and form a bio-fertiliser for reuse on agricultural land.

5.1.12 Environmental compliance during the operational phase will be monitored under an environmental permit. The permit also requires the operator to have a written Environmental Management System (EMS), which includes a set of plans and

procedures describing measures to avoid, reduce and eliminate potential environmental impacts associated with the activities covered by the permit.

5.1.13 Overall, the significance of effects in relation to waste would be negligible to no change for the operational phase, and not significant.

5.1.14 The potential impacts as a result of decommissioning the existing Cambridge WWTP, for the purpose of surrendering the Existing environmental permit, are related to the cleaning and draining of tanks and removal of raw materials and chemicals. Liquid waste where possible would be transferred for treatment at a WWTP and sludge would be removed for treatment at the STC within a WWTP. There would be waste grit and rag requiring disposal to landfill.

5.1.15 The decommissioning activities would be subject to a Decommissioning Management Plan, which would be agreed with the Environment Agency.

5.1.16 A summary of potential environmental effects, mitigation and monitoring is provided in Table 5 1. The delivery of mitigation will be controlled through the 'Development Consent Order (DCO) requirements' which:

- identify parameters within which certain works activities can be located and constructed (e.g. maximum and minimum building dimensions (including below ground), or locational zones);
- sets requirements for construction, operation and maintenance of the Proposed Development to be undertaken in accordance with 'control plans / documents' (including those that are related to compliance with environmental permits); and
- sets requirements for the control of specific issues or works (e.g. time limits around the completion of the outfall construction).

5.1.17 Table 5 1 summarises all mitigation in relation to material resources use and generation and management of waste, how these measures are secured, the party responsible for the implementation of the measure, when the measure would be delivered and any mechanisms to deliver the measure.

5.1.18 Table 5-2 sets out how mitigation would be secured.

Table 5-1: Summary of material resources use and generation and management of waste effects

Description of effect	Design/mitigation measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional/ Secondary mitigation measures	Residual effect significance	Proposed monitoring
Construction							
The availability of material resources and the subsequent impact on the demand for materials for the construction of the proposed WWTP.	Reuse of 90% of excavated material within landscape masterplan limiting required imported fill material to 4,373m^3 in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials	Minor	Negligible	Neutral or Minor, Not Significant		Neutral or Minor, Not Significant	None
The depletion of non- renewable resources due to the construction of the proposed WWTP.	Reuse of excavated material within landscape masterplan to reduce depletion of non-renewable resources in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials. Use for precast structures for treated effluent pipework. Use of materials with 31% percent recycled content where technically appropriate and financially feasible.	Minor	Negligible	Neutral or Minor, Not Significant	None	Neutral or Minor, Not Significant	None
The availability of material resources and the subsequent impact on the demand for materials for the construction of the Waterbeach Pipeline.	Reuse of excavated material as bedding material within trench or reuse of material works for the landscape masterplan to reduce demand for materials in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials. Use of materials with 31% percent recycled content where technically appropriate and financially feasible.	Negligible	Negligible	Neutral, Not Significant	None	Neutral, Not Significant	None
The depletion of non- renewable resources due to the construction of the Waterbeach Pipeline.	Reuse of excavated material as bedding material within trench or reuse of material works for the landscape masterplan to reduce demand for materials in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials.	Negligible	Negligible	Neutral, Not Significant	None	Neutral, Not Significant	None
Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the proposed WWTP.	Reuse of excavated material within landscape masterplan to reduce generation of waste in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials	Negligible	Low	Neutral or Minor, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP. Implementing SMP to avoid deterioration in soils and prevent waste.	Neutral or Minor, Not Significant	SWMP, CEMP
Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the proposed WWTP.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Negligible	Low	Neutral or Minor, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP.	Neutral or Minor, Not Significant	SWMP, CEMP

Description of effect	Design/mitigation measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional/ Secondary mitigation measures	Residual effect significance	Proposed monitoring
Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the proposed WWTP.	Reuse of excavated material within landscape masterplan to reduce generation of waste in accordance with CL: AIRE Definition of Waste: Development Industry Code of Practice, v2 (2011) for the reuse of excavated waste materials. Use of precast structures and on-site concrete batching to reduce concrete waste.	Negligible	Low	Neutral or Minor, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP.	Neutral or Minor, Not Significant	SWMP, CEMP
Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the Waterbeach Pipeline.	Reuse of excavated material as bedding material within trench or reuse of material works for the landscape masterplan to reduce generation of waste.	Negligible	Low	Neutral or Minor, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP Implementing SMP to avoid deterioration in soils and prevent waste.	Neutral or Minor, Not Significant	SWMP, CEMP
Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the Waterbeach Pipeline.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Minor	Negligible	Neutral, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP.	Neutral, Not Significant	SWMP, CEMP
Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the construction of the Waterbeach Pipeline.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	No change	Negligible	Neutral, Not Significant	CoCP Part A and B to be followed for minimising and managing wastes through preparation of CEMP, and SWMP	Neutral, Not Significant	SWMP, CEMP
Operation							
Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the operation and maintenance of the proposed WWTP.	The proposed WWTP will be operated with the help of environmental permits and discharge consents issued by Environment Agency. Operating in accordance with the permit including the associated EMS procedures. The sludge produced by the proposed WWTP will be treated for use as a bio fertiliser and spread on land.	Negligible	Low	Neutral or Minor, Not Significant	None	Neutral or Minor, Not Significant	In accordance with the Environmental Permits and discharge consents issued by EA.
Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the operation and maintenance of the proposed WWTP.	The proposed WWTP will be operated with the help of environmental permits and discharge consents issued by Environment Agency. Operating in accordance with the permit including the associated EMS procedures.	Negligible	Low	Neutral or Minor, Not Significant	None	Neutral or Minor, Not Significant	In accordance with the Environmental Permits and discharge consents issued by EA.

Description of effect	Design/mitigation measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional/ Secondary mitigation measures	Residual effect significance	Proposed monitoring
Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the operation and maintenance of the proposed WWTP	The proposed WWTP will be operated with the help of environmental permits and discharge consents issued by Environment Agency. Operating in accordance with the permit including the associated EMS procedures.	No change	Negligible	Neutral, Not Significant	None	Neutral, Not Significant	In accordance with the Environmental Permits and discharge consents issued by EA.
Decommissioning							
Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the decommissioning of the Existing WWTP.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Negligible	Low	Neutral or Minor, Not Significant	Implementing the approved Decommissioning Management Plan. The liquid and/ or residual sludge from the existing tanks will be transferred to a STC within a WWTP for treatment.	Neutral or Minor, Not Significant	As required by the approved Decommissioning Management
Production of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the decommissioning of the Existing WWTP.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Negligible	Low	Neutral or Minor, Not Significant	Implementing the approved Decommissioning Management Plan.	Neutral or Minor, Not Significant	As required by the approved Decommissioning Management
Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity during the decommissioning of the Existing WWTP.	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	No change	Negligible	Neutral, Not Significant	Implementing the approved Decommissioning Management Plan.	Neutral, Not Significant	As required by the approved Decommissioning Management

5.2 Securing mitigation

5.2.1 The delivery of mitigation will be controlled through the 'Development Consent Order (DCO) requirements' which:

- identify parameters within which certain works activities can be located and constructed (e.g. maximum and minimum building dimensions (including below ground), or locational zones);
- sets requirements for construction, operation and maintenance of the Proposed Development to be undertaken in accordance with 'control plans / documents' (including those that are related to compliance with environmental permits); and
- sets requirements for the control of specific issues or works (e.g. time limits around the completion of the outfall construction).

5.2.2 Table 5-2 summarises all mitigation in relation to material resources use and generation and management of waste, how these measures are secured, the party responsible for the implementation of the measure, when the measure would be delivered and any mechanisms to deliver the measure.

Table 5-2: Material resource use and generation and management of waste mitigation summary

Description of impacts	Residual Effect	Mitigation measure	Mitigation type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
Construction							
Depletion of material resources due to the construction of the Proposed Development	Neutral or Minor	Reuse of 90% of excavated material within landscape masterplan limiting required imported fill material to 4,373m^3 for proposed WWTP, 100% reuse of the excavated material within trench reinstatement or landscape masterplan for Waterbeach Pipeline Use of precast structures for treated effluent pipework	Embedded (primary)	Sections 7.9, CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) secured through a requirement of the draft DCO (App Doc Ref 2.1). Approval and implementation of a Construction Environmental Management Plan secured through a requirement of the draft DCO (App Doc Ref 2.1). Approval and implementation of a Site Waste Management Plan secured through a requirement of the draft DCO (App Doc Ref 2.1). Compliance with the Waste (England and Wales) Regulations 2011 (as amended)).	Appointed contractor(s)	Prior to start of construction	Approved phasing plan Approved CEMP Approved materials management plan
Impact on the availability of material resources due to the construction of the Proposed Development	Neutral or Minor	Reuse of 90% of excavated material within landscape masterplan limiting required imported fill material to 4,373m^3 for proposed WWTP. 100% reuse of the excavated material within trench reinstatement or landscape masterplan for Waterbeach Pipeline.	Embedded (primary)	As above	Appointed contractor(s)	Prior to start of construction	Approved phasing plan Approved CEMP Approved materials management plan
Production of inert waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the construction phase of the Proposed Development.	Neutral or Minor	Implementation of the waste hierarchy	Tertiary	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Appointed contractor(s)	Prior to start of construction	Approved phasing plan Approved of CEMP Approved SWMP Approved materials management plan
		CoCP to be followed for minimising and managing waste through preparation of CEMP, SWMP	Secondary	Sections 7.9, CoCP Part A (Appendix 2.1, App Doc Ref 5.4.2.1) secured through a requirement of the draft DCO (App Doc Ref 2.1). Approval and implementation of a Construction Environmental Management Plan secured through a requirement of the draft DCO (App Doc Ref 2.1). Approval and implementation of a Site Waste Management Plan secured through a requirement of the draft DCO (App Doc Ref 2.1).			
Production of non-hazardous waste resulting in temporary	Neutral or Minor	Implementation of the waste hierarchy.	Tertiary	As above	Appointed contractor(s)	Prior to start of construction	Approved phasing plan Approved of CEMP

Description of impacts	Residual Effect	Mitigation measure	Mitigation type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
occupation of waste infrastructures and/or permanent reduction of landfill capacity during the construction phase of the Proposed Development.		CoCP to be followed for minimising and managing waste through preparation of CEMP, SWMP.	Secondary	As above.			Approved SWMP
Production of hazardous waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the construction phase of the Proposed Development.	Neutral or Minor	Implementation of the waste hierarchy	Tertiary	As above	Appointed contractor(s)	Prior to start of construction	Approved phasing plan Approved of CEMP Approved SWMP
		CoCP to be followed for minimising and managing waste through preparation of CEMP, SWMP	Secondary	As above			
Operation							
Production of inert waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the operation of the proposed WWTP.	Neutral or Minor	Implementation of the waste hierarchy.	Tertiary	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Operator (AW)	Prior to start of operation	Approved phasing plan Approved of CEMP
		Operating in accordance with the environmental permit including the associated EMS procedures.	Tertiary	Environmental permit issued by EA		Prior to start of operation	Approved management plans and procedures under environmental permit
Production of non-hazardous waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the operation of the proposed WWTP.	Neutral or Minor	Implementation of the waste hierarchy.	Tertiary	Waste (England and Wales) Regulations 2011 (as amended	Operator (AW)	Operation	Duty of care requirements under the Waste (England and Wales) Regulations 2011 (as amended).
		Operating in accordance with the environmental permit including the associated EMS procedures.	Tertiary	Environmental permit issued by EA		Prior to start of operation	Approved management plans and procedures under environmental permit
		Sludge produced by the proposed WWTP will be used as bio-fertilizer and spread on land.	Tertiary	Environmental permit issued by EA		Prior to operation	Approved management plans and procedures under environmental permit

Description of impacts	Residual Effect	Mitigation measure	Mitigation type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
Production of hazardous waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the operation of the proposed WWTP.	Neutral or Minor	Implementation of the waste hierarchy.	Tertiary	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Operator (AW)	Operation	Duty of care requirements under the Waste (England and Wales) Regulations 2011 (as amended).
		Operating in accordance with the permit including the associated EMS procedures.	Tertiary	The Environmental Permit will include conditions requiring a written EMS which will includes management systems to cover waste management.		Prior to start of operation	Approved management plans and procedures under environmental permit
Decommissioning							
Production of inert, non-hazardous and hazardous waste resulting in temporary occupation of waste infrastructures and/or permanent reduction of landfill capacity during the decommissioning of the existing Cambridge WWTP	Neutral or Minor	Implementation of the waste hierarchy.	Tertiary	Compliance with the Waste (England and Wales) Regulations 2011 (as amended)	Operator (AW)	Prior to start of decommissioning During decommissioning	Approved Phasing Plan Existing environmental permits and approval of Decommissioning Management Plan prior to the commencement of the works. Approved CEMP
		Controls required by the existing environmental permit waste management, pest control, emergency response)	Tertiary	The Environmental Permit sets out conditions relating to the management system which cover waste management practices and procedures. Compliance with the Waste (England and Wales) Regulations 2011 (as amended)).	Operator – existing Cambridge WWTP	Prior to start of decommissioning	Approved Phasing Plan Existing environmental permits and approval of Decommissioning Management Plan prior to the commencement of the works. Approved CEMP
		Implementation of the Decommissioning Management Plan	Secondary	Approval and implementation of a Decommissioning Management Plan (Appendix 2.3, App Doc Ref 5.4.2.3). Secured through a requirement in the draft DCO (App Doc Ref 2.1) to comply with the Decommissioning Management Plan (Appendix 2.3, App Doc Ref 5.4.2.3). Compliance with the Waste (England and Wales) Regulations 2011 (as amended)).	Contractor	Prior to start of decommissioning	Approved Phasing Plan Decommissioning Management Plan prior to the commencement of the works. Approved CEMP

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