

Connah's Quay Low Carbon Power

Environmental Statement Volume II Chapter 23: Materials and Waste

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23. Materials and Waste

23.1 Introduction

Overview

23.1.1 This chapter of the Environmental Statement (ES) presents an assessment of the likely significant environmental effects of the Connah's Quay Combined Cycle Gas Turbine (CCGT) fitted with Carbon Capture Plant (CCP) (hereafter referred to as the Proposed Development) with respect to Materials and Waste during the construction and operation (including maintenance) phases of the Proposed Development. A description of the Proposed Development, including details of maximum parameters, is set out in **Chapter 4: The Proposed Development (EN010166/APP/6.2.4)**. Decommissioning is scoped out of the assessment, as outlined in paragraph 23.2.15 of this chapter.

23.1.2 The assessment has been undertaken in accordance with current best practice guidance and follows the methodology set out in the Institute of Sustainability and Environmental Professionals (ISEP) (formerly the Institute of Environmental Management Assessment (IEMA))¹ Guide to Materials and Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach (referred to herein as the 'IEMA Guidance') (Ref 23-1), as outlined in the Scoping Report and Scoping Opinion.

23.1.3 This chapter is supported by the following figures in **ES Volume III (EN010166/APP/6.3)**:

- **Figure 3-3: Areas Described in the ES.**

23.1.4 This figure identifies the different components of the Order limits which are referenced throughout this chapter.

23.1.5 This chapter is supported by the following appendices (**EN010166/APP/6.4**):

- **Appendix 1-A: Scoping Report;**
- **Appendix 1-B: Scoping Opinion;**
- **Appendix 2-B: Scoping Opinion Response;**
- **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics;** and
- **Appendix 23-A: Materials and Waste Baseline Data Report.**

23.1.6 This chapter is also supported by the following documents within the Application:

¹ The Institute of Environmental Management Assessment (IEMA) has changed its name to the Institute of Sustainability and Environmental Professionals (ISEP). Where general reference is made to the institute in this document, the following distinction has been made: ISEP (formerly IEMA). When referencing legacy IEMA documents, this distinction is not made.

- **Framework Construction Environmental Management Plan (CEMP) (EN010166/APP/6.5); and**
- **Framework Site Waste Management Plan (SWMP) (which is included within the Framework CEMP (EN010166/APP/6.5)).**

Legislation, Policy and Guidance

23.1.7 Legislation, planning policy, and guidance relating to Materials and Waste that are pertinent to the Proposed Development are listed in **Table 23-1**. Further detail regarding these can be found in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics (EN010166/APP/6.4)**.

Table 23-1: Legislation, Planning Policy, and Guidance relating to Materials and Waste

Type	Legislation, Policy and Guidance
Legislation	<ul style="list-style-type: none">• EU Waste Framework Directive 2008 (Ref 23-2);• Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 23-3);• Environmental Protection Act 1990 (as amended) (Ref 23-4);• The Hazardous Waste (England and Wales) Regulations 2005 (as amended) (Ref 23-5);• The Waste (England and Wales) Regulations 2011 (as amended) (Ref 23-6);• The Environmental Permitting (England and Wales) Regulations 2016 (as amended) (Ref 23-7);• Environment Act 2021 (Ref 23-8);• Environment (Wales) Act 2016 (Ref 23-9); and• The Waste Separation Requirements (Wales) Regulations 2023 (Ref 23-10).
National Planning Policy	<ul style="list-style-type: none">• The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 23-11);• The NPS for Natural Gas Electricity Generating Infrastructure (EN-2) (Ref 23-12);• The NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 23-13);• The NPS for Electricity Networks Infrastructure (EN-5) (Ref 23-14);• Planning Policy Wales (PPW) Edition 12 (Ref 23-15);• Technical Advice Note (TAN) 21, Waste (Ref 23-16);• Beyond Recycling: A Strategy to Make the Circular Economy in Wales a Reality (Ref 23-17);

Type	Legislation, Policy and Guidance
	<ul style="list-style-type: none"> • Towards Zero Waste, One Wales: One Planet – The Overarching Waste Strategy Document for Wales (Ref 23-18); • Towards Zero Waste, One Wales: One Planet – The Waste Prevention Programme for Wales (Ref 23-19); • Towards Zero Waste One Wales: One Planet – Collections, Infrastructure and Markets Sector Plan (CIMP) (Ref 23-20); • Future Wales: The National Plan 2040 (Ref 23-21); and • Strategy for Hazardous Waste Management in England (Principle 2 - Infrastructure Provision) (Ref 23-22).
Local Planning Policy	<ul style="list-style-type: none"> • Flintshire County Council (FCC) Local Development Plan (LDP) (2015-2030) (Ref 23-23); • FCC LDP Proposal Maps (Ref 23-24); and • FCC Waste Management Strategy (FWMS) 2009-2025 (Ref 23-25).
National Guidance	<ul style="list-style-type: none"> • IEMA Guidance (Ref 23-1); • Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoW CoP), v2 (2011) (Ref 23-26); • Waste and Resources Action Programme (WRAP) Designing Out Waste: A Design Team Guide for Civil Engineering (Ref 23-27); and • Separate Collection of Waste Materials for Recycling – A Code of Practice for Wales (Ref 23-28). • WRAP Quality Protocol: Aggregates from Inert Waste (Ref 23-29).

23.2 Consultation and Scope of Assessment

Consultation

Scoping Opinion

- 23.2.1 A request for an Environmental Impact Assessment (EIA) Scoping Opinion was sought from the Secretary of State (SoS) through the Planning Inspectorate (PINS) in February 2024 as part of the EIA Scoping Process. The EIA Scoping Opinion was adopted on 20 March 2024 (**Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**).
- 23.2.2 **Appendix 2-B: Scoping Opinion Responses (EN010166/APP/6.4)** provides a summary of how comments raised by stakeholders to date in relation to Materials and Waste have been considered and actioned where appropriate.
- 23.2.3 **Table 23-2** below outlines how and where the EIA Scoping Opinion comments have been addressed within this ES.

Statutory Consultation

- 23.2.4 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information Report (PEIR), issued in October 2024. Responses to this statutory consultation are presented in the **Consultation Report (EN010152/APP/5.1)** and **Table 23-3** below outlines how and where these comments have been addressed within the ES.

Targeted Consultation

- 23.2.5 Following Statutory Consultation changes were made to the heights of the proposed absorber and Heat Recovery Steam Generator (HRSG) stacks and the Applicant undertook further targeted consultation. This consultation included a Supporting Information Report which detailed the environmental considerations associated with these changes. This Targeted Consultation was held between Thursday 8 May to Friday 6 June 2025. Responses to this targeted consultation are presented in the **Consultation Report (EN010152/APP/5.1)** and **Table 23-4** below outlines how and where these comments have been addressed within this chapter.

Additional Relevant Engagement

- 23.2.6 No additional technical engagement has been undertaken for the Materials and Waste assessment.

Table 23-2: Scoping Opinion Responses

Comment ID	Consultee	Comment	Response
13.5.1	PINS	<p><i>"The Scoping Report does not identify any allocated / safeguarded mineral or waste sites present within the site boundary [Order limits], as such, the Inspectorate is content to scope this matter out."</i></p>	<p>This position is acknowledged. At scoping no allocated/safeguarded mineral or waste sites were located within the Order limits. The Order limits have been updated since the scoping process. The Order limits are now within an allocated/safeguarded mineral site at Mostyn Docks (FCC LDP Policy PC11, Ref 23-23). As described in Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5), no works are proposed in the docks which would compromise the essential infrastructure that supports the supply of minerals. There are no other allocated/safeguarded mineral or waste sites present in the Order limits. Consequently, this matter has not been considered further in this assessment.</p>
13.5.2	PINS	<p><i>"The proposed CO₂ connection corridor is located within [a Minerals Safeguarding Area (MSA)]. The Scoping Report states that impacts to MSAs are not proposed to be assessed in the ES as they would be considered separately as a planning consideration. It is stated that this is in accordance with IEMA Guidance. Based on the Proposed Development and noting that potential severance and/or sterilisation of the resource would be assessed as part of the Geology and Ground Conditions ES chapter, the Inspectorate is content to scope this matter out."</i></p>	<p>Potential severance and/or sterilisation of the resource is considered within Chapter 14: Geology and Ground Conditions (EN010166/APP/6.2.14).</p>

Comment ID	Consultee	Comment	Response
13.5.3	PINS	<p><i>“The Scoping Report sets out that products used for the Proposed Development would be developed in a manufacturing environment with its own waste management plans, facilities, and supply chain and as such, are outside of the geographical scope of the study area. On this basis the Inspectorate is content to scope this matter out.”</i></p>	<p>This position is acknowledged. Consequently, this matter has not been considered further in this assessment.</p>
13.5.4	PINS	<p><i>“The Applicant proposes to address other environmental impacts associated with the management of materials and waste to or from the Proposed Development in other relevant environmental aspect chapters of the ES. On this basis the Inspectorate is content to scope this matter out. Cross-references should however be made between aspect chapters where appropriate to ensure a comprehensive assessment.”</i></p>	<p>This position is acknowledged. Cross references are included this chapter to other ES documents as appropriate.</p>
13.5.5	PINS	<p><i>“The Applicant does not deem forecasting the availability of materials and landfill capacity an accurate reflection and states that it could be unreliable, noting the time periods involved. The Inspectorate agrees with this approach and on this basis is content to scope this matter out. Consideration at appropriate intervals regarding the availability of materials and landfill capacity will however need to be considered over the lifetime of the Proposed Development, including decommissioning. It is expected that reference to this will be made in the DEMP, site waste management plan (SWMP), and materials management plan (MMP).”</i></p>	<p>This position is acknowledged. Reference has been made to decommissioning and the Decommissioning Environmental Management Plan (DEMP) that would be produced by the decommissioning contractor within paragraph 23.5.11.</p> <p>The Framework SWMP (CEMP) (EN010166/APP/6.5) and MMP (if required) cover construction only.</p> <p>Commentary on the future availability of materials and landfill capacity is provided in Appendix 23-A: Materials and Waste</p>

Comment ID	Consultee	Comment	Response
			<p>Baseline Data Report (EN010166/APP/6.4). There is no publicly available information regarding any potential changes to waste management facility capacity that are likely to have occurred by the time of the Proposed Development's construction, operation and decommissioning therefore the availability of materials and landfill capacity be considered by the contractor(s) in their final SWMP and DEMP.</p>
N/A	Natural Resources Wales	<i>"We are content with the proposed scoping of materials and waste aspects."</i>	<p>This position is acknowledged. This chapter has been prepared in accordance with the principles set out in the Appendix 1-A: Scoping Report (EN010166/APP/6.4).</p>

Table 23-3: Statutory Consultee Responses

Consultee	Comment	Response
FCC	<p><i>"It is noted that there is no data available in this table for recycled and secondary aggregates. The following publication may assist.</i></p> <p>https://mineralproducts.org/MPA/media/root/Publications/2022/Contribution of Recycled and Secondary Materials to Total Aggs Supply in GB 2022.pdf</p> <p><i>The ES should demonstrate where waste materials are being reduced, reused and treated/recycled prior to disposal, in line with the waste hierarchy. Options for reuse and treatment of waste should be considered to enable reuse/recovery where possible rather than disposal."</i></p>	<p>Data related to recycled aggregate is included in Table 3 of Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4). The source of data is Minerals and Mineral Products Sales in Great Britain, Mineral Products Association (MPA), Profile of the UK Mineral Products Industry (2023 Edition) (Ref 23-30). This provides more recent data than The Contribution of Recycled and Secondary Materials to Total Aggregates Supply in Great Britain - 2020 Estimates (Ref 23-31) publication. Both publications do not provide recent Wales based data for recycled aggregate, the most recent is 2005 and has not been included since it is more out of date than the Minerals and Mineral Products Sales in Great Britain, MPA, Profile of the UK Mineral Products Industry (2023 Edition).</p> <p>Section 23.5 Development Design and Embedded Mitigation of this chapter and the Framework SWMP within the Framework CEMP (EN010166/APP/6.5) provides information on applying the waste hierarchy during construction Ref 23-32.</p>
FCC	<p><i>"The submitted environmental statement will need to have regard for Planning Policy Wales (PPW) (edition 12, 2024) and any relevant legislation and guidance such as relevant Technical Advice Notes that is in force/adopted in Wales. Also the application should have regard to the</i></p>	<p>Legislation, policy and guidance are outlined in Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics (EN010166/APP/6.4) and Table 23-1 above.</p>

Consultee	Comment	Response
	<i>respective and relevant policies within the Flintshire Local Development Plan (LDP) adopted by the Council on 24 January 2023."</i>	
Natural Resources Wales (NRW)	<i>"No material is to be deposited within 10 m of any watercourse without discussion with NRW. The site is in the immediate vicinity of the Dee Estuary (a SSSI, SAC and SPA), should any contaminated water or materials enter or pollute the watercourse or groundwater, NRW must be notified on 03000 65 3000."</i>	As outlined within the Framework CEMP (EN010166/APP/6.5) , no material is to be deposited within 10 metres of any watercourse without discussion with NRW.
Natural Resources Wales	<i>"According to our records there are three historic landfills within the immediate vicinity of the proposed works (Connah's Quay Power Station, Connah's Quay Power Station No. 1 and Connah's Quay Power Station No. 3). If during construction/excavation works any contaminated material is revealed, the movement of such material either on or off site must be done in consultation with NRW. Any waste excavation material or building waste generated during the development must be disposed of satisfactorily and in accordance with Section 34 of the Environmental Protection Act 1990."</i>	As outlined in the Framework SWMP (Section 23.2 Duty of care) within the Framework CEMP (EN010166/APP/6.5) , all waste movement off-site and would be accordance with the Environmental Protection Act 1990.
Natural Resources Wales	<p>“Materials and Waste Management</p> <p><i>The activity of importing waste into the site for use as, for example, hardcore must be registered with NRW as an exempt/permitted activity under the Environmental Permitting (England and Wales) Regulations 2016. NRW should be contacted to discuss the necessity for an exemption or permit for any waste material imported to, treated on, and exported from the site.</i></p> <p><i>Carriers transporting waste from the site must be registered waste carriers and movement of any Hazardous Waste from the site must be accompanied by Hazardous Waste consignment notes.”</i></p>	<p>It is not currently proposed to import waste for use in construction. If recycled aggregate is brought to site this would not be considered a waste since it would be produced in accordance with the WRAP Quality Protocol: Aggregates from Inert Waste (Ref 23-29).</p> <p>As outlined in the Framework SWMP within the Framework CEMP (EN010166/APP/6.5), details of all appointed waste carriers, brokers and contractors would be included in the SWMP to be developed by the contractor, including copies of appropriate waste carrier licences/registrations.</p>

Table 23-4: Targeted Consultation

Consultee	Summary of Comment	Response
Flint Town Council	<p>The Council expects:</p> <ul style="list-style-type: none">- Transparent, accountable mitigation strategies for all identified environmental risks—including noise and vibration (e.g., from pile driving) in relation to nearby Listed Buildings;- Clear summaries of these assessments for public understanding; <p>Full details of compensation mechanisms available to adversely affected residents and businesses, including:</p> <ul style="list-style-type: none">- How compensation will be calculated,- Who will administer the scheme,- How the public will be made aware of it. <p>Additionally, the Council requests:</p> <ul style="list-style-type: none">- Clarification on how often the project's environmental performance will be reviewed, and how local residents will be kept informed of those findings.	<p>Details of all mitigation and monitoring proposed is included within the Commitments Register (EN010166/APP/6.10).</p>

Scope of the Assessment

23.2.7 The scope of this Materials and Waste assessment is outlined in **Table 23-5**.

23.2.8 For this ES, Materials and Waste comprise:

- The consumption of materials (key construction materials only); and
- The generation and management of waste during construction and operation (decommissioning is scoped out as outlined in paragraph 23.2.15).

23.2.9 Materials are defined in the IEMA Guidance (Ref 23-1) to be:

“physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt, and steel”.

23.2.10 Other material assets considered include built assets such as landfill void capacity and allocated/safeguarded mineral sites (e.g. quarries, wharves, rail depots, concrete plants) and waste sites.

23.2.11 Waste is defined, as per the Waste Framework Directive (2008/98/EC) (Ref 23-2), as:

“any substance or object which the holder discards or intends or is required to discard”.

23.2.12 Impacts upon MSAs are not assessed in this Materials and Waste assessment in accordance with the IEMA Guidance (Ref 23-1). Potential severance and/or sterilisation of resources is assessed as part of **Chapter 14: Geology and Ground Conditions (EN010166/APP/6.2.14)**, as agreed by PINS; this is outlined in **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**.

23.2.13 As indicated within the FCC Proposal Map (Ref 23-24), there are Locations for Waste Management Facilities (Policy EN21) at “Mostyn Docks” and at “Old Power Station site, south of Flintshire Bridge” within the Order limits (Construction and Indicative Enhancement Area (C&IEA) and Accommodation Work Areas). These sites are considered to be suitable in principle for waste management uses. However, as stated in the FCC LDP, *“there is no identified need for further recovery or disposal infrastructure within the County”* and *“no strategic allocations for waste management are identified within the LDP.”* The locations are not considered to be allocated/safeguarded waste sites.

23.2.14 The assessment of Materials and Waste considers the following:

- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal;
- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a licence, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves;

- As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas; and
- Mineral Planning Authorities (MPAs) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

23.2.15 The following matters are not considered in the assessment of Materials and Waste:

- Waste arising from extraction, processing and manufacture of construction components and products. This assumes that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the United Kingdom (UK) or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed as they relate to procurement decisions that cannot be assured. Waste arising from extraction, processing and manufacture of construction components and products are scoped out of the assessment as agreed by PINS, as outlined in **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**;
- Other environmental impacts associated with the management of waste from the Proposed Development on-site (e.g., on water resources, air quality, noise) and off-site transport of materials and waste are not included in this assessment, as they are addressed separately in other relevant chapters of this ES. Cross references to other chapters are included as appropriate within this assessment, and are scoped out of the assessment as agreed by the PINS, as outlined in **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**;
- Indirect environmental impacts at off-site waste management facilities are assumed to be assessed (and where necessary mitigated) under the planning and permitting regime for those sites and thus do not normally require assessment as part of an EIA for a development that uses such facilities waste management as outlined in the IEMA Guidance (Ref 23-1). As noted above, impacts upon MSAs are not assessed in the Materials and Waste assessment in accordance with the IEMA Guidance (Ref 23-1). Potential severance and/or sterilisation of the resource is assessed as part of **Chapter 14 Geology and Ground Conditions (EN010166/APP/6.2.14)** as agreed by the PINS, as outlined in **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**;
- Changes to allocated/safeguarded mineral or waste sites. At scoping no allocated/safeguarded mineral or waste sites were located within the Order limits. The Order limits have been updated since the scoping process. The Order limits are now within an allocated/safeguarded mineral site at 'Mostyn Docks' (FCC LDP Policy PC11, Ref 23-23). As explained in **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5)**, no works are proposed in the docks which would compromise the essential infrastructure that supports the supply of minerals. There are no other allocated/safeguarded mineral or waste sites present in the Order limits;

- Changes in availability of materials in operation are scoped out of the assessment as agreed by PINS (see **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**). Forecast effects are (using professional judgement) considered negligible in relation to the scale and nature of the Proposed Development; and
- Effects associated with decommissioning of the Proposed Development. The Proposed Development has a long design life and as such, it is not considered possible to reliably forecast decommissioning requirements and infrastructure far into the future as agreed by PINS, as outlined in **Appendix 1-B: Scoping Opinion (EN010166/APP/6.4)**. A DEMP is secured by a requirement of the **Draft DCO (EN010166/APP/3.1)** and would be prepared by the decommissioning contractor; this plan would consider potential environmental risks within the Order limits associated with the process of decommissioning and contain guidance on how risks can be removed or mitigated. In the context of Materials and Waste, effects associated with the decommissioning phase would be of a similar magnitude of those experienced during construction.

Table 23-5: Scope of the Material and Waste Assessment

Proposed Development Phase	Potential Effects	Scoped In/Out
Construction, Operation and Decommissioning	Waste arising from extraction, processing and manufacture of construction components and products	Scoped out
	Other environmental impacts associated with the management of waste from the Proposed Development	Scoped out (assessed in other relevant chapters e.g. water resources, air quality, noise or traffic)
	Changes to MSAs	Scoped out (assessed in Chapter 14 Geology and Ground Conditions (EN010166/APP/6.2.14))
	Changes to allocated/safeguarded mineral site	Scoped out
	Changes to allocated/safeguarded waste site	Scoped out
Construction	Changes in demand for materials	Scoped in
	Changes in available landfill void capacity	Scoped in
Operation	Changes in availability of materials	Scoped out

Proposed Development Phase	Potential Effects	Scoped In/Out
	Changes in available landfill void capacity	Scoped in
	Changes in available hazardous waste management facility capacity	Scoped in
Decommissioning	Changes in demand for materials	Scoped out
	Changes in available landfill void capacity	Scoped out

23.3 Assessment Methodology

23.3.1 This section outlines the methodology used for assessing the likely significant effects associated with Materials and Waste. The criteria used for Materials and Waste align with topic specific criteria in the IEMA Guidance (Ref 23-1), rather than the general significance criteria outlined in **Chapter 2: Assessment Methodology (EN010166/APP/6.2.2)**.

23.3.2 The IEMA Guidance (Ref 23-1) outlines two assessment methods for Materials and Waste; these include Method W1 – void capacity and Method W2 – Landfill Diversion. Method W1 has been selected for this assessment because it encompasses a more detailed methodology making it the most appropriate assessment methodology for larger and more complex projects, such as the Proposed Development. A description of each method is provided below:

- W1 – void capacity:
 - The magnitude of impact from waste is assessed by determining the percentage of the remaining landfill void capacity that would be depleted by waste produced during the construction and/or operation phases of the development;
 - A detailed methodology;
 - Robust approach based on industry data;
 - Most likely to be approach for larger and more complex developments; and
 - Recommended for statutory EIAs.
- W2 – landfill diversion:
 - Developments are compared to a good practice landfill diversion rate of 90%;
 - A simpler approach;
 - Less robust than W1;
 - Appropriate for smaller and less complex developments; and
 - Likely to be utilised only for non-statutory EIA.

23.3.3 For this assessment, the sensitive receptors for construction phase impacts are:

- Landfill void capacity in the expansive study area of Wales (non-hazardous landfill void capacity) and Wales and England (hazardous landfill void capacity). As defined in the IEMA Guidance:
"Landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities. This requires the depletion of natural and other resources which, in turn, adversely impacts the environment" (Ref 23-1); and
- Construction material availability in Wales, Great Britain (GB) and the UK. As outlined in the IEMA Guidance:
"Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment" (Ref 23-1).

23.3.4 For this assessment, the sensitive receptors for operational phase waste impacts are:

- Landfill void capacity in the expansive study area of Wales (for non-hazardous landfill void capacity) and combined Wales and England (for hazardous landfill void capacity).

23.3.5 In addition to the above, the IEMA Guidance:

"Does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources" (Ref 23-1).

23.3.6 However, since some of the operational hazardous wastes likely to be generated by the Proposed Development may not be suitable for landfill disposal (e.g. liquid waste), estimated quantities of hazardous operational waste is compared to national hazardous waste management facility capacity (Wales and England).

Methodology for Determining Construction Effects

23.3.7 Materials would be used during the construction of the Proposed Development. The key construction materials expected to be used are steel, aggregates, asphalt, and concrete as outlined in paragraph 23.6.6.

23.3.8 Waste would be generated during the construction of the Proposed Development. Materials

23.3.9 Effects upon materials during the construction of the Proposed Development have been assessed by:

- Establishing the baseline for Wales, GB/UK consumption of key construction materials by weight;
- Assessing the sensitivity of materials as related to the availability and types of materials to be consumed by the Proposed Development in construction;

- Establishing the quantities of key construction materials required for the construction of the Proposed Development; and
- Comparing the total quantities of key construction materials with the most recent national demand (utilising a percentage approach).

Waste

23.3.10 Effects upon waste during the construction of the Proposed Development have been assessed by:

- Establishing the baseline landfill void capacity in the expansive study areas;
- Assessing the sensitivity of landfill void capacity;
- Establishing the quantities of construction, demolition, and excavation waste to be generated during the construction of the Proposed Development; and
- Comparing the total waste arising from the construction of the Proposed Development against the landfill void capacity (using a percentage approach); this assumes a worst-case that waste goes to landfill.

Methodology for Determining Operational Effects

23.3.11 Effects upon materials during the operation of the Proposed Development have been assessed by:

- Establishing the baseline landfill void capacity in the expansive study areas;
- Assessing the sensitivity of landfill void capacity;
- Establishing the quantities of operational waste to be generated during the operation of the Proposed Development;
- Comparing the total waste arising from the operation of the Proposed Development against the landfill void capacity (utilising a percentage approach); and
- Comparing operational hazardous waste arisings from the operation of the Proposed Development against national hazardous waste management facility waste inputs (Wales and England) (utilising a percentage approach).

Impact Assessment Methodology

Sensitivity

Materials

23.3.12 The sensitivity of materials relates to the availability and type of construction material to be consumed by the Proposed Development. The IEMA Guidance (Ref 23-1) criteria, summarised in **Table 23-6**, has been used to evaluate the sensitivity of materials.

Table 23-6: Criteria for Materials Receptor Sensitivity (Ref 23-1)

Sensitivity	Criteria for Materials Receptor Sensitivity
Negligible	<p>The key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock.</p> <p><i>And/or</i></p> <p>are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials*.</p>
Low	<p>The key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock.</p> <p><i>And/or</i></p> <p>are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials.</p>
Medium	<p>The key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock.</p> <p><i>And/or</i></p> <p>are available comprising some sustainable features and benefits compared to industry-standard materials.</p>
High	<p>The key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock.</p> <p><i>And/or</i></p> <p>Comprise little or no sustainable features and benefits compared to industry-standard materials.</p>
Very High	<p>The key materials required for the construction of the Proposed Development are forecast to be insufficient in terms of production, supply and/or stock.</p> <p><i>And/or</i></p> <p>Comprise no sustainable features and benefits compared to industry-standard materials.</p>

*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, 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

23.3.13 The sensitivity of waste relates to availability of landfill void capacity in the absence of the Proposed Development. As outlined in the IEMA Guidance:

“Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste” (Ref 23-1).

23.3.14 The sensitivity of landfill void capacity has been assessed based on a review of historic landfill void capacity trends, where available, and information from relevant policy documents.

23.3.15 The criteria described within **Table 23-7** and **Table 23-8** has been used to evaluate the sensitivity of landfill void capacity.

Table 23-7: Inert and Non-hazardous Landfill Void Capacity Sensitivity (Ref 23-1)

Sensitivity	Criteria for Inert and Non-Hazardous Landfill Void Capacity Sensitivity
Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of Wales inert and non-hazardous landfill void capacity is expected to...	
Negligible	Remain unchanged or is expected to increase through a committed change in capacity.
Low	Reduce minimally by <1% as a result of wastes forecast.
Medium	Reduce noticeably by 1-5% as a result of wastes forecast.
High	Reduce considerably: by 6-10% as a result of wastes forecast.
Very High	<ul style="list-style-type: none"> Reduce very considerably (by >10%); End during construction or operation; Already be known to be unavailable; or Require new capacity or infrastructure to be put in place to meet forecast demand.

Table 23-8: Hazardous Landfill Void Capacity Sensitivity (Ref 23-1)

Sensitivity	Criteria for Hazardous Landfill Void Capacity Sensitivity
Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of Wales and England hazardous landfill void capacity is expected to...	
Negligible	Remain unchanged or is expected to increase through a committed change in capacity.
Low	Reduce minimally by <0.1% as a result of wastes forecast.
Medium	Reduce noticeably by 0.1-0.5% as a result of wastes forecast.
High	Reduce considerably by 0.5-1% as a result of wastes forecast.
Very High	<ul style="list-style-type: none"> Reduce very considerably (by >1%); End during construction or operation; Already be known to be unavailable; or Require new capacity or infrastructure to be put in place to meet forecast demand.

Magnitude

23.3.16 The magnitude of impact describes the degree of variation from the baseline conditions as a result of the Proposed Development.

Materials

23.3.17 The methodology for assessing the magnitude of impact from materials comprises a percentage-based approach; this determines the influence of construction materials use on the baseline national demand from the construction of the Proposed Development. The IEMA Guidance (Ref 23-1) criteria has been used to assess the magnitude of impact for materials and is set out within **Table 23-9**.

Table 23-9: Criteria for Materials Magnitude of Impacts (Ref 23-1)

Magnitude	Criteria for Materials Magnitude of Impacts
No Change	Consumption of no materials is required.
Negligible	Consumption of no individual material type is >1% by volume of the baseline availability*.
Minor	Consumption of one or more materials is between 1-5% by volume of the baseline availability*.
Moderate	Consumption of one or more materials is between 6-10% by volume of the baseline availability*.
Major	Consumption of one or more materials is >10% by volume of the baseline availability*.

*a National Wales baseline is used for concrete, aggregates and asphalt and a UK baseline is used for steel in accordance with the IEMA Guidance. Steel requirement for Wales is not available.

Waste

23.3.18 The IEMA Guidance (Ref 23-1) methodology for assessing the magnitude of impact for waste comprises a percentage-based approach; this determines the influence of waste generation from the construction of the Proposed Development on the baseline landfill void capacity. The criteria which has been used to assess the magnitude of impact for waste are provided within **Table 23-10**.

Table 23-10: Waste Magnitude of Impacts (Ref 23-1)

Magnitude	Criteria for inert and non-hazardous waste magnitude of impacts	Criteria for hazardous waste magnitude of impacts
No Change	Zero waste generation and disposal from the Proposed Development.	Zero waste generation and disposal from the Proposed Development.
Negligible	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by <1%.	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by <0.1%.
Minor	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by 1-5%.	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by <0.1-0.5%.
Moderate	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by 6-10%.	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by <0.5-1%.
Major	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by >10%.	Waste generated by the Proposed Development will reduce expansive study area landfill void capacity baseline* by >1%.

*Forecast as the worst-case scenario, during a defined construction and/or operational phase.

Potential Effects

23.3.19 **Table 23-11** describes the IEMA Guidance effect thresholds which has been used in determining the effects. **Table 23-12** identifies which effects are considered to be significant.

Table 23-11: Effect Thresholds (Ref 23-1)

Sensitivity of Receptor	Magnitude of Impact				
	Major	Moderate	Minor	Negligible	No Change
Very High	Very large	Large or very large	Moderate or Large	Slight	Neutral
High	Large or very large	Moderate or Large	Slight or Moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or Slight	Neutral
Low	Slight or moderate	Slight	Neutral or Slight	Neutral or Slight	Neutral
Negligible	Slight	Neutral or Slight	Neutral or Slight	Neutral	Neutral

Table 23-12: Significance of Effect (Ref 23-1)

Effects	Materials	Waste
Neutral	Not significant	Not significant
Slight		
Moderate	Significant	Significant
Large		
Very Large		

Rochdale Envelope

23.3.20 The setting of design parameters using the 'Rochdale Envelope' approach is described in **Chapter 2: Assessment Methodology (EN010166/APP/6.2.2)**. The maximum parameters for the principal components of the Proposed Development are set out in the **Design Principles Document (EN010166/APP/7.8)** and are illustrated on the **Works Plans (EN010166/APP/2.4)** and the **Parameter Plans (EN010166/APP/2.5)**. These parameters, together with assumptions regarding the future plans for the existing Connah's Quay Power Station set out in **Chapter 2: Assessment Methodology (EN010166/APP/6.2.2)** have been used to inform the representative worst-case scenario that has been assessed in this chapter, in order to provide a robust assessment of the impacts and likely significance of environmental effects of the Proposed Development at its current stage of design.

23.3.21 A focused use of the Rochdale Envelope has been adopted for the following aspects:

- A scenario where the Proposed Development is constructed over 3.5 years (excluding commissioning) during a Simultaneous Construction (i.e., both Train 1 and Train 2 constructed simultaneously) is assumed rather than a Phased Approach (i.e., Train 1 is constructed in full, then Train 2 is constructed in full, in sequence) (see **Chapter 2: Assessment Methodology (EN010166/APP/6.2.2)** and **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5)** for a detailed breakdown of each construction scenario). This is deemed to be a worst-case as a Phased Approach, with construction material use and construction waste generated over a longer period, would have a lower magnitude of impact;
- It is assumed that all excavated materials would be generated in one calendar year (for the Simultaneous Construction scenarios) because the majority of excavated material is anticipated to be generated at the start of construction;
- There are three cases for excavated material (outlined below). Case 3 has been used in the assessment (since this is considered to be a reasonable worst-case scenario, as it is assumed that a large majority of the excavated material would be pulverised fuel ash, which is non-hazardous):
 - Case 1 - all excavated material is non-hazardous (this is not considered to be a realistic scenario for the Proposed Development since the Main Development Area is located within the curtilage of the existing Connah's Quay Power Station. Given the nature of the former site operations, it is possible that subsurface contamination may be present);
 - Case 2 - all excavated material is hazardous (this is not considered to be a realistic scenario for the Proposed Development since areas to be excavated consist of pulverised fuel ash which is anticipated to be non-hazardous); and
 - Case 3 - 20% of excavated material is hazardous (considered to be a realistic scenario for the Proposed Development).
- For this assessment, it is assumed that all construction waste would be sent to landfill (excluding liquid waste, which cannot be disposed of to landfill). This ensures that a robust, worst-case assessment of the waste impacts of the Proposed Development is provided; however, a large proportion of waste would be reused, recycled, or recovered with over 90% diversion from landfill achievable. A good practice landfill diversion target of 90% has been achieved and exceeded by major UK developments as outlined in the IEMA Guidance (Ref 23-1) and in 2020, the UK achieved a recovery rate of 92.6% (Ref 23-33); and
- A worst-case assumption that all operational waste (excluding liquid waste which cannot be disposed of to landfill) would be sent to landfill has been made to inform this assessment, ensuring that a robust assessment is provided.

Assessment Assumptions and Limitations

Assumptions

23.3.22 Since the Proposed Development would be constructed over several years, total construction materials and construction waste quantities have been divided equally across the number of years of construction (as a worst-case, a 3.5 year construction period is assumed for the Simultaneous Construction scenario). A Phased Approach, with construction material use and construction waste generated over a longer period, would have a lower magnitude of impact.

23.3.23 Required material quantities were provided by a Bill of Materials (BoM) document; this covered material requirements for a single train construction. For the assumed simultaneous construction scenario (i.e., Trains 1 and 2 constructed at the same time), total construction material requirements were calculated by doubling the figures provided within the BoM document. This is considered to be a worst-case scenario for material consumption. Total construction materials have been divided equally by the assumed number of construction years (3.5 years, excluding commissioning where limited construction materials would be used).

23.3.24 It is assumed that key construction materials (aggregates, asphalt, and concrete) would be sourced locally (e.g. within Wales and North West England), taking into account the proximity principle. Other materials may be sourced (e.g. steel) from the rest of the UK or imported into the UK.

23.3.25 Data on the bulk density of materials has been used to convert quantities between volume (m^3) and weight (tonnes) where required.

Limitations

23.3.26 The assessment is based on information available at the time of writing.

23.3.27 It is not possible to reliably forecast the future availability of construction materials; therefore, UK/GB and Wales and North West England data has been used to establish a quantitative baseline of the consumption of key construction materials which is used as a proxy for availability.

23.3.28 It is not possible to reliably forecast any potential changes to landfill void capacity by the time of the Proposed Development's construction and operation. Therefore, landfill void capacity is assumed to remain the same as the current baseline.

23.4 Baseline Conditions and Study Area

23.4.1 This section describes the baseline environmental characteristics for the Construction and Operation Area and surrounding areas with specific reference to Materials and Waste.

Study Area

23.4.2 The study areas for the assessment of impacts related to Materials and Waste have been defined in line with the IEMA Guidance (Ref 23-1). Two study areas are defined in the following sections:

- *A Proposed Development study area:* within which waste associated with the Proposed Development is generated and construction materials are used; and
- *An expansive study area:* within which landfills and other waste facilities that manage waste generated by the Proposed Development are likely to be located and construction materials are available.

23.4.3 Together, the Proposed Development study area and expansive study area are referred to in this chapter as 'the study areas'.

Proposed Development Study Area

23.4.4 The Proposed Development study area for construction and operational waste generation, and for use of construction materials (key construction materials only), comprises the Order limits (i.e. the footprint of the proposed works, together with any temporary land requirements during construction) as shown on **Figure 3-1: Order Limits (EN010166/APP/6.3)**. This includes temporary offices, compounds, laydown, and storage areas as shown on **Figure 5-3: Construction Areas (EN010166/APP/6.3)**.

Expansive Study Area

23.4.5 The expansive study area for non-hazardous and inert waste management comprises the whole of Wales, within which waste management infrastructure (specifically landfill void capacity) is located. The expansive study area for non-hazardous and inert waste management is defined based on professional judgement and informed by consideration of the proximity principle (waste should generally be managed as near as practicable to its place of production) and value for money.

23.4.6 The expansive study area for hazardous waste management is combined for Wales and England. This study area is defined based on professional judgement and informed by consideration of the proximity principle and value for money. Applicability of the proximity principle across Wales and England is broken down below:

- The proximity principle "*must be applied in Wales when decisions are taken on the siting of appropriate waste facilities*", as outlined in the Towards Zero Waste, One Wales: One Planet – The Overarching Waste Strategy Document for Wales (Ref 23-18); and
- The proximity principle for hazardous waste in England is outlined in Principle 2 - Infrastructure Provision in the Strategy for Hazardous Waste Management in England (Ref 23-22), "*We look to the market for the development of hazardous waste infrastructure, which implements the hierarchy for the management of hazardous waste and meets the needs of the UK to ensure that the country as a whole is self-sufficient in hazardous waste disposal, facilities are put in place for hazardous waste recovery in England, and the proximity principle is met*".

23.4.7 The expansive study areas for the availability of concrete, aggregates and asphalt is Wales, whereas a UK baseline has been used for steel (steel requirement for Wales is not available).

Existing Baseline

23.4.8 Baseline information for Materials and Waste has been reviewed and consists of:

- The national and regional availability (consumption/sales) of key construction materials (see Table 1 and Table 2 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**):
 - UK steel availability, 15 million tonnes per year;
 - Wales aggregate availability, 12.7 million tonnes per year (crushed rock), 1.9 million tonnes per year (sand and gravel);
 - Wales asphalt availability, 1.1 million tonnes per year; and
- Wales concrete availability, 0.5 million m³ (or 1.2 million tonnes per year).
- The potential recycled content of the main construction materials, as outlined within WRAP's Designing Out Waste Tool for Civil Engineering (Ref 23-27) (See Table 3 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**).
- The non-hazardous and inert landfill void capacity for Wales (8.3 million m³ and 1.8 million m³ respectively) (see Table 4 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**).
- The hazardous landfill void capacity in Wales (14,000 m³) and hazardous landfill void capacity in England (9.9 million m³) (see **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**).
- The national hazardous waste management facility inputs for both Wales and England (297,520 tonnes per year for hazardous waste incineration facilities accepting hazardous waste, and 704,594 tonnes per year for hazardous liquid waste treatment facilities) (see Table 6 and Table 7 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)** respectively).
- The national non-hazardous construction and demolition waste recovery rate (92.6% in 2020) (Ref 23-33).
- Historic and permitted landfills, as outlined by Natural Resources Wales' (NRW) Permitted Waste Sites Data Map (Ref 23-33), three historic and zero permitted landfill sites are located within the Order limits (see Table 8 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**).
- The standard, good, and best practice recovery rates by material, provided by WRAP (Ref 23-29) (see Table 9 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**).

23.4.9 For further information on the existing baseline for the Materials and Waste assessment refer to **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**.

Future Baseline

23.4.10 There is no publicly available information on any potential changes to national material availability by the time of the construction of the Proposed Development. Construction material demand, such as ready-mix concrete, is closely aligned to both the quantity of construction taking place and the general economy. It is deemed inappropriate to forecast future demand as the demand is unlikely to be linear and it is not possible to set a future baseline for material resources. As such, future consumption is assumed to remain the same as the current baseline, as outlined above and in Table 1 and Table 2 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**.

23.4.11 Considering the decline of landfill void capacity, forecasting into the future would lead to the inevitable conclusion that there would be no void space remaining. However, this is not a credible scenario as if there is still a need for landfill, then the Waste Planning Authority will need to consent new landfill void capacity to replace that which has been used up. Therefore, landfill void capacity is assumed to remain the same as the current baseline as outlined above and in Table 4 of **Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**. However, although the current baseline is used in the assessment, a 'very high' sensitivity is applied to landfill void capacity recognising the potential for landfill void capacity to decline in future.

23.5 Development Design and Embedded Mitigation

23.5.1 The Proposed Development has been designed, as far as possible, to avoid and/or minimise the impacts and effects on Materials and Waste. This has been achieved through the process of design development, and by embedding mitigation measures into the design of the Proposed Development.

Design

23.5.2 The following embedded mitigation measures have been incorporated into the Proposed Development's design principles:

- Design for reuse and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects (e.g. reuse of excavated soil for landscaping);
- Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content;
- Design for off-site construction: maximising the use of prefabricated structure and components, encouraging a process of assembly rather than construction where practicable;
- Design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how de-constructability and de-mountability of elements can be maximised at end of first life; and

- Design for waste and material asset efficient procurement.

Construction

23.5.3 The Proposed Development would aim to prioritise waste prevention, followed by preparing for reuse, recycling and other recovery and lastly disposal to landfill as per the waste hierarchy illustrated in **Plate 23-1**.

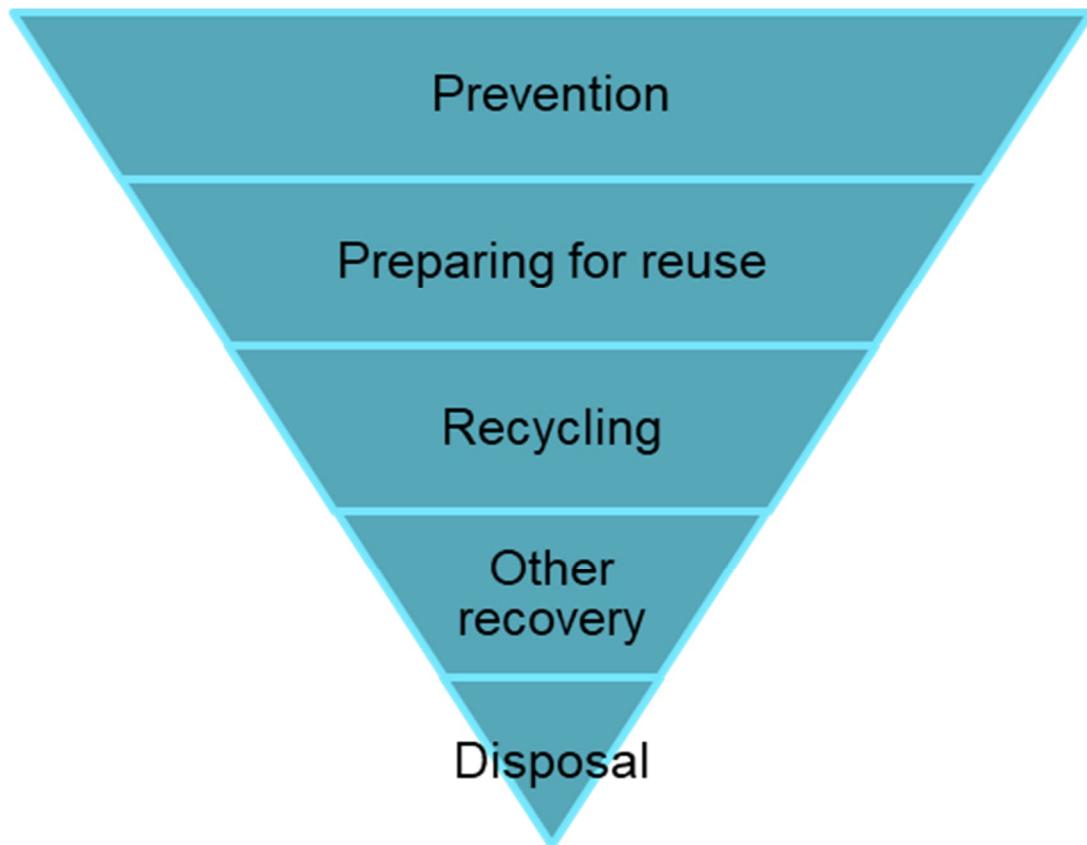


Plate 23-1: The Waste Hierarchy, from Defra's Guidance on Applying the Waste Hierarchy, recreated by AECOM (Ref 23-32)

23.5.4 The following standard construction practices are relevant to this assessment:

- agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- implementation of a 'just-in-time' (JIT) material delivery system where possible to avoid materials being stockpiled, which can increase the risk of damage and subsequent disposal as waste;
- attention to material quantity requirements to avoid over-ordering and the generation of waste materials due to surplus;
- reuse of materials on-site wherever feasible, e.g. reuse of excavated soil for landscaping, recycling of demolition materials into aggregates;
- off-site prefabrication, where practical, including the use of prefabricated structural elements;
- segregation of waste at source, where practical, to facilitate a high proportion and high-quality recycling; and

- off-site reuse, recycling and recovery of materials and waste where reuse on-site is not practical, e.g. through use of an off-site waste segregation or treatment facility or for direct reuse or reprocessing off-site.

23.5.5 As noted within **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5)**, a **Framework CEMP (EN010166/APP/6.5)** has been prepared to set out the key measures to be employed during the Proposed Development's construction phase to control and minimise the impacts on the environment. The **Framework CEMP (EN010166/APP/6.5)** includes an **Framework SWMP** which sets out how waste would be managed during construction, and opportunities to prevent material waste and reuse materials and recycle waste would be explored in accordance with the waste hierarchy.

23.5.6 A final CEMP and detailed SWMP would be prepared by the construction contractor in accordance with the **Framework CEMP (EN010166/APP/6.5)** prior to construction (see paragraph 5.1.1 of **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5)**). The production of a final CEMP in general accordance with the **Framework CEMP (EN010166/APP/6.5)** is secured by a requirement of the **Draft DCO (EN010166/APP/3.1)**.

23.5.7 To manage and monitor waste generated within the Order limits during the construction of the Proposed Development, the **Framework SWMP** within the **Framework CEMP (EN010166/APP/6.5)** provides the foundations for waste streams to be estimated and monitored. The **Framework SWMP (EN010166/APP/6.5)** requires that the construction contractor segregates waste streams on-site, prior to them being taken to a waste facility for recycling or disposal. All waste removal from the Order limits would be undertaken by fully licensed waste carriers and taken to permitted waste facilities.

Operation

23.5.8 The Proposed Development would require an environmental permit and would be required to comply with any granted permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (Ref 23-7). The permit would include procedures for the management of Materials and Waste in accordance with relevant national legislation.

23.5.9 The Proposed Development would be operated in line with appropriate standards, whilst the operator would implement and maintain an Environmental Management System (EMS) which would be certified to International Standards Organisation 14001. The EMS would outline requirements and procedures required to ensure that the Proposed Development is operating to the appropriate standard.

23.5.10 Availability of materials and landfill capacity would be considered over the lifetime of the Proposed Development, including operation.

Decommissioning

23.5.11 A DEMP would be prepared prior to decommissioning commencing by the decommissioning contractor, which would consider potential environmental

risks associated with the decommissioning of the Proposed Development and would contain guidance on how risks can be removed or mitigated. The submission, approval, and implementation of a DEMP prior to demolition is secured by requirement of the **Draft DCO (EN010166/APP/3.1)**.

23.5.12 Availability of materials and landfill capacity would be considered over the lifetime of the Proposed Development, including decommissioning.

23.6 Assessment of Likely Impacts and Effects

23.6.1 Taking into account the embedded mitigation measures (Section 23.5 above) the potential impacts and effects of the Proposed Development have been assessed using the methodology described within Section 23.3 of this chapter.

Material Receptor Sensitivity

23.6.2 Material receptor sensitivity is determined as 'low' in accordance with **Table 23-6**. This is because, on balance, the key construction materials required for the Proposed Development's construction are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock (see paragraph 23.3.12 and **Table 23-6**).

23.6.3 Key materials required for construction and operation are likely to be available comprising a high proportion of sustainable features and benefits (e.g. recycled content) as demonstrated by the potential recycled content for the main construction materials outlined in Table 3 of **Appendix 23-A: Material and Waste Baseline (EN010166/APP/6.4)**.

Waste Receptor Sensitivity

23.6.4 Waste receptor sensitivity is determined as 'very high' (see paragraphs 23.3.13-23.3.14, **Table 23-7** and **Table 23-8**). Since there is no publicly available information on any potential changes to landfill void capacity at the time of the Proposed Development's construction and operation, a worst-case scenario is considered. Landfill capacity is assumed to remain the same for the baseline, however a very considerable reduction in capacity cannot be excluded (>10% for non-hazardous and inert landfill and >1% for hazardous landfill) for the purpose of selecting sensitivity.

Construction Phase

23.6.5 **Table 23-13** summarises the types of materials that would be used and the types of waste that would be generated during the Proposed Development construction phase. Material and waste quantities are provided in paragraph 23.6.6 and **Table 23-14** respectively.

Table 23-13: Construction Material Use and Waste Types Arising from the Construction of the Proposed Development

Construction Activity	Materials Used	Waste Types Generated
Site preparation/ earthworks	<ul style="list-style-type: none"> fill material for construction purposes; and primary/secondary/recycled aggregates for ground stabilisation. 	<ul style="list-style-type: none"> surplus excavated materials; surplus topsoil and subsoil; unsuitable and contaminated soils and excavated materials; vegetation from site clearance; and clearance of other materials.
Demolition	<ul style="list-style-type: none"> materials are not required for demolition works. 	<ul style="list-style-type: none"> waste arisings from the required demolition of existing Gas Treatment Plant (GTP), existing GTP Above Ground Installation (AGI) and existing stores building.
Site Construction (commissioning is included in the operational assessment)	<ul style="list-style-type: none"> aggregates; asphalt and bituminous materials; in-situ cast concrete; precast concrete products (structural components, curbs, drainage pipes, chambers and channels); structural steel; cabling; pipework; and topsoil and subsoil for landscaping and restoration. 	<ul style="list-style-type: none"> excess, offcuts and broken/damaged construction materials; packaging from materials delivered to site; construction worker wastes from offices and welfare areas/canteens; waste oils from construction plant; and paints and coatings.

Construction Materials

23.6.6 The estimated main construction material types and quantities to be used for Proposed Development's construction are:

- Aggregates – 391,600 tonnes per year (2.7% of Wales aggregate consumption/sales);

- Concrete – 460,957 tonnes per year (38.4% of Wales concrete consumption/sales);
- Steel – 30,286 tonnes per year (0.2% of UK steel availability); and
- Asphalt – 743 tonnes per year (0.07% of Wales asphalt availability).

23.6.7 For steel and asphalt, sensitivity of the receptor is classified as 'low' (as outlined in paragraph 23.6.2 and **Table 23-6**) and the magnitude of impact is considered to be 'negligible' (0.2% for steel and 0.07% for asphalt, as outlined in **Table 23-9**). This, therefore, results in a **slight adverse** effect (as outlined in **Table 23-11**) for these materials, which is **not significant** (as outlined in **Table 23-12**).

23.6.8 For aggregates, sensitivity of the receptor is classified as 'low' (as outlined in paragraph 23.6.2 and **Table 23-6**) and the magnitude of impact is considered to be 'minor' (2.7% for aggregates, as outlined in **Table 23-9**). This, therefore, results in a **slight adverse** effect (as outlined in **Table 23-11**) for this materials, which is **not significant** (as outlined in **Table 23-12**).

23.6.9 For concrete, sensitivity of the receptor is classified as 'low' (as outlined in paragraph 23.6.2 and **Table 23-6**) and the magnitude of impact is considered to be 'major' (38.4% for concrete, as outlined in **Table 23-9**). This, therefore, results in a **slight or moderate adverse** effect (as outlined in **Table 23-11**), which is **significant** when moderate is selected as a worst-case (as outlined in **Table 23-12**).

23.6.10 Due to the proximity of the Proposed Development close to the Welsh-English border, it is anticipated that concrete may be sourced from North West England. Therefore, when this context is considered (i.e., a combined Wales and North West England baseline (4.6 million tonnes) as outlined in **Table 2 of Appendix 23-A: Materials and Waste Baseline Data Report (EN010166/APP/6.4)**), this material requirement is 10.1% of the baseline.

23.6.11 In addition, batch concrete facilities would be used onsite which may ease demand on local sources.

23.6.12 When considering this, the impact magnitude is reduced but is still classified a 'major' and the effect remains **slight or moderate adverse**. Using professional judgement, an effect classification of slight has been selected on the basis the material requirement is just above the 10% threshold. Therefore, when considering the combined Wales and North West England baseline, the resultant effect would be **not significant**.

23.6.13 A technical study to assess the risk of flooding at the Main Development Area. It is currently anticipated that some targeted ground raising may be required to increase ground levels above the existing average ground height to 7.4 m Above Ordnance Datum (AOD) in order to protect critical operational infrastructure from flood events and considering the effects of climate change.

23.6.14 The estimated volume of material required to undertake any targeted land raising to mitigate flood risk is anticipated to be minimal and would not result in a change in significant effect in terms of aggregate quantities (e.g. more than 10% of Wales aggregate consumption/sales).

Waste

Demolition

23.6.15 The Main Development Area would require site clearance and remedial works prior to the construction of the Proposed Development.

23.6.16 As outlined in **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5)**, the demolition of the GTP, existing GTP AGI, and existing stores building, would take place in the early stages of the Proposed Development's construction.

23.6.17 The estimated quantities of demolition waste are approximately 2,050 m³ of hardstanding waste and 17,050 m³ of building/ancillary equipment waste (19,100 m³ total) (**Table 23-14**). Key calculative assumptions comprise the following:

- Estimated hard standing is based on an assumed depth of 350 millimeters (mm) (200 mm of concrete/asphalt on a base of 150 mm of aggregate);
- Waste from buildings/ancillary equipment is based on an estimate of 0.47 tonnes per m³ of building/ancillary equipment volume (height x width x depth);
- Buildings and ancillary equipment height is assumed to be 6.1 m, except for stacks and a tank located in the GTP; and
- Based on information provided regarding the previous operational use of existing assets within the Main Development Area (i.e., the above noted GTP, AGI, existing stores, and the materials used in the prior construction of each asset), it is assumed that the majority of demolition waste would be non-hazardous and would be either recycled on-site (e.g. crushing of hard standing) or recycled off-site, with recovery rates over 90% achievable.

Excavated Material

23.6.18 The Main Development Area is located within the curtilage of the existing Connah's Quay Power Station. Given the nature of the former site operations, it is possible that subsurface contamination may be present. However, it is currently anticipated that the majority of excavated materials would be non-hazardous since the areas to be excavated consist of pulverised fuel ash which is anticipated to be non-hazardous. It is assumed that non-hazardous excavated material would be reused on-site for land raising.

23.6.19 The detailed design of the Proposed Development will be progressed to optimise the requirements for cut and fill, and where possible, this would be minimised to reduce the import and export of materials and waste, although the design may generate excavated material that would require off-site treatment or disposal. Where possible surplus excavated material would be reused or recovered on-site, in accordance with the CL:AIRE DoW CoP (Ref 23-26) and a MMP, waste exemption or environmental permit.

23.6.20 It is currently estimated that 87,100 m³ of material would be excavated with 20% of material (17,420 m³) currently being assumed (in a worst-case) to be

hazardous waste with the remaining 80% being non-hazardous and assumed to be reused on-site for land raising (**Table 23-14**).

Construction Waste

23.6.21 The estimated main types and quantities of waste to be generated during construction of the Proposed Development are:

- 8,500 m³ of non-hazardous inert material (e.g. concrete, asphalt and aggregates), source separated recyclables (paper & card, plastic, metals and wood) and mixed construction waste;
- 50 m³ of hazardous construction waste (e.g. surplus paint/coatings, batteries and oil filters); and
- 500 m³ of non-hazardous municipal waste, source-separated recyclables (e.g. paper, card, plastics) and mixed municipal waste e.g. construction worker waste (**Table 23-14**).

23.6.22 Sewage from the site offices/compounds would drain to a septic tank and be collected by a suitable specialist waste contractor and/or portable toilet facilities on-site (portaloos, etc.) would be emptied by the facility provider as per their service agreement.

Construction, demolition and excavation waste summary

23.6.23 Construction, demolition (of existing structures) and excavation waste is summarised in **Table 23-14**.

Table 23-14: Construction, Demolition and Excavation Waste Summary

Construction Activity and Waste Type	Waste (m ³)
Demolition – hazardous waste	Minimal, it is assumed that the majority of demolition waste would be non-hazardous.
Demolition – non-hazardous waste	19,100
Excavation – hazardous waste	17,420
Excavation – non-hazardous waste	It is assumed that non-hazardous excavated material would be reused on-site for land raising and would not be sent to landfill.
Construction - hazardous waste	50
Construction – non - hazardous waste	9,000
Total hazardous waste	17,470
Total non-hazardous waste	28,100

Hazardous Waste

23.6.24 In a worst-case scenario where all hazardous waste ($17,470 \text{ m}^3$) is sent to landfill within one calendar year this would be 0.18% of the hazardous waste landfill void capacity in Wales and England (9.9 million m^3). The magnitude of this impact is 'minor'.

23.6.25 For hazardous waste, the sensitivity of receptor is classified as 'very high' (as outlined in paragraph 23.6.4 and **Table 23-8**) and the magnitude of impact is 'minor', resulting in a **moderate or large adverse** effect (as outlined in **Table 23-11**) which is **significant** (as outlined in **Table 23-12**).

23.6.26 In practice, a proportion of hazardous waste generated by excavation from the Proposed Development could be non-hazardous and/or likely to be sent to a waste management facility rather than disposed of to landfill, further reducing the overall quantities of waste for disposal (e.g. <0.1% of hazardous waste landfill void capacity in Wales and England). If 50% of hazardous waste could be recovered via off-site treatment at a waste management facility, this would reduce the magnitude of the impact to 'negligible' (0.09% of the hazardous waste landfill void capacity), resulting effect to **minor adverse (not significant)** however, the worst-case (with no recovery) outlined above is used in the assessment.

Non-hazardous Waste

23.6.27 In a worst-case scenario where all non-hazardous waste ($28,100 \text{ m}^3$) is sent to landfill within one calendar year this would be 0.3% of the total inert and non-hazardous waste landfill void capacity in Wales (10.1 million m^3). The threshold for a significant effect (based on a 'very high' sensitivity) is 1% of the inert and non-hazardous waste landfill void capacity in Wales.

23.6.28 For non-hazardous waste, the sensitivity of receptor is classified as 'very high' (as outlined in paragraph 23.6.4 and **Table 23-7**) and the magnitude of impact is considered to be 'negligible' (0.3% of the total inert and non-hazardous waste landfill void capacity in Wales as outlined in **Table 23-10**), resulting in a **slight adverse** effect (as outlined in **Table 23-11**) which is **not significant** (as outlined in **Table 23-12**).

23.6.29 In practice, a large proportion of non-hazardous waste from the Proposed Development is likely to be recovered rather than disposed of to landfill, further reducing the overall quantities of waste for disposal. As set out in Table 9 of **Appendix 23-A: Materials and Waste Baseline Report (EN010166/APP/6.4)**, good and best practice waste recovery (landfill diversion) for the Proposed Development is likely to be above 90% for the majority of construction wastes (excluding excavated material).

Operation Phase

23.6.30 Operational waste from the Proposed Development would comprise waste from site offices and waste from the CCGT and CCP. The estimated main types and quantities of waste to be generated during the Proposed Development's operation are:

- 3,741 tonnes ($2,961 \text{ m}^3$) of amine reclamer sludge per year;
- Reflux purge (reflux drain drum, liquid) quantity per year to be confirmed and subject to front end engineering design (FEED) detailed design; and

- Acid wash purge (acid drain drum, liquid) quantity per year to be confirmed and subject to FEED detailed design.

23.6.31 All operational wastes (listed above) are assumed to be hazardous and may not be suitable for landfill disposal. It is assumed as a worst-case that these wastes would be transferred off-site by tanker to suitable waste management facilities rather than being managed on-site in a wastewater treatment plant.

23.6.32 Since some of the operational hazardous waste likely to be generated by the Proposed Development would not be suitable for landfill disposal (e.g. liquid), hazardous operational waste has been considered in the context of national hazardous waste management facility capacity (Wales and England).

23.6.33 Liquid hazardous waste from the operation of the Proposed Development may be managed by high-temperature incineration or by physio-chemical treatment. Alternatively, in the longer term, some form of waste treatment may be developed near to the Proposed Development to manage waste generated in the CCP and other carbon capture facilities in the area, should other developments seek to undertake carbon capture. However, in the absence of such facilities, this assessment conservatively does not consider the potential for such waste treatment facilities to be developed.

23.6.34 If amine reclamer sludge from the CCP is disposed of by high-temperature incineration, the wastes from the Proposed Development (3,741 tonnes) would be equivalent to 1.3% of 2023 hazardous waste incineration waste inputs (297,520 tonnes at the Wales and England level).

23.6.35 If amine reclamer sludge from the CCP is managed by hazardous liquid waste facilities, the wastes from the Proposed Development would be equivalent to 0.5% of 2023 hazardous liquid waste treatment inputs (704,594 tonnes at the Wales and England level).

23.6.36 Since the IEMA Guidance focuses on assessing the impacts on landfill void capacity only, there is no assessment criteria for comparing waste against baseline waste management facility capacity and significance is not provided. However, in the event that waste is sent to a hazardous waste management facility, the annual quantity is likely to be small in the context of national capacity.

23.6.37 Non-hazardous commercial wastes from office and maintenance activities would be generated in smaller quantities e.g. few hundred tonnes of waste per year. In the event that non-hazardous and inert wastes from the Proposed Development are disposed of to landfill, the annual quantity is likely to result in a reduction of <1% (e.g. less than 83,000 m³ and 18,000 m³) of Wales non-hazardous and inert waste landfill void capacity. The sensitivity of receptor is classified as 'very high' (as outlined in paragraph 23.6.4 and **Table 23-7**) and the magnitude of impact is considered to be 'negligible' (<1% of Wales non-hazardous and inert waste landfill void capacity) as outlined in **Table 23-10**), resulting in a **slight adverse** effect (as outlined in **Table 23-11**) which is **not significant** (as outlined in **Table 23-12**).

23.6.38 Hazardous commercial wastes from office and maintenance activities would be generated in very smaller quantities e.g. < one tonne of waste per year. In the event that hazardous wastes from the Proposed Development are disposed of to

landfill, the annual quantity is likely to result in a reduction of <0.1% (e.g. less than 9,926 m³) of Wales and England hazardous and inert waste landfill void capacity. The sensitivity of receptor is classified as 'very high' (as outlined in paragraph 23.6.4 and **Table 23-7** and the magnitude of impact is considered to be 'negligible' (<1% of Wales non-hazardous and inert waste landfill void capacity) as outlined in **Table 23-10**, resulting in a **slight adverse** effect (as outlined in **Table 23-11**) which is **not significant** (as outlined in **Table 23-12**).

23.7 Additional Mitigation and Enhancement Measures

- 23.7.1 A potential significant effect has been identified in relation to hazardous waste from excavation of material requiring disposal during construction of the Proposed Development. No additional mitigation is proposed at this time. Waste management routes would be confirmed by the construction contractor.
- 23.7.2 No other significant effects have been identified; therefore, additional mitigation or monitoring is not proposed.
- 23.7.3 No enhancement measures related to Materials and Waste are proposed at this stage.

23.8 Summary of Residual Effects

- 23.8.1 **Table 23-15** summarises the residual effects of the Proposed Development in relation to Materials and Waste.
- 23.8.2 In summary, there are significant residual effect associated with concrete availability in Wales and hazardous waste from excavation of material requiring disposal. There are no other significant residual effects associated with construction or operation of the Proposed Development and an assessment of the decommissioning is scoped out of the assessment on the basis the effects would be of a similar magnitude to those identified for construction.

Table 23-15: Summary of Residual Effects (Construction)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation/Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect
Changes in material availability – concrete	Low	Major	Based on the impact level, the classification could be either slight or moderate adverse. Using professional judgement, an effect classification of slight has been selected on the basis the material requirement is just above the 10% threshold. (not significant)	N/A	Major	Based on the impact level, the classification could be either slight or moderate adverse. Using professional judgement, an effect classification of slight has been selected on the basis the material requirement is just above the 10% threshold. (not significant)
Changes in material availability – aggregates, steel, and asphalt	Low	Negligible	Slight adverse (not significant)	N/A	Negligible	Slight adverse (not significant)
Changes in available non-hazardous and inert	Very High	Negligible	Slight adverse (not significant)	N/A	Negligible	Slight adverse (not significant)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation/Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect
waste landfill void capacity						
Changes in available hazardous landfill void capacity – excavated material	Very High	Minor	Moderate or Large adverse (significant)	No additional mitigation measures are proposed at this time.	Minor	Moderate or Large adverse (significant)

Table 23-16: Summary of Residual Effects (Operation)

Receptor	Sensitivity (value)	Description of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation/Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect
Changes in available non-hazardous and inert waste landfill void capacity	Very High	Negligible	Slight adverse (not significant)	N/A	Negligible	Slight adverse (not significant)
Changes in available hazardous waste landfill void capacity	Very High	Negligible	Slight adverse (not significant)	N/A	Negligible	Slight adverse (not significant)

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