



DCO Submission

Environmental Statement

Chapter 13: Materials and Waste

Document 6.13

On behalf of
Oxfordshire Railfreight Limited

Prepared by BWB Consulting Ltd and WSP
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13.1 INTRODUCTION

13.1.1 This Chapter presents an assessment of the likely significant environmental effects associated with the use of materials and the management of solid waste arising during the construction (including demolition) and operation of the Proposed Development. This assessment follows the guidance laid out in the Institute of Environmental Management and Assessment (IEMA) Guide to Materials and Waste in Environmental Impact Assessment (EIA)¹.

13.1.2 'Materials' for the purposes of this Chapter and assessment include materials required for construction of the Proposed Development, including natural resources and materials such as gravel, sand or aggregates, and includes materials used on the implementation or construction of the development, such as soils (including topsoil). Additionally, this chapter demonstrates how materials and waste have been considered in terms of the design of the Proposed Development and sets out measures for the use of materials and managing waste during construction and operation to meet legislative and policy requirements. It includes an assessment of the potential cumulative effect of the Proposed Development, on the waste environment, alone or in combination with other surrounding significant proposed developments.

13.1.3 The Chapter considers:

- National and local policy requirements in the context of material use and the management of waste;
- The key principles for sustainable waste management, i.e. the waste hierarchy principle and the self-sufficiency principle;
- Identification of the receptors related to materials and waste, including existing waste management facilities and their predicted capacity in the future;
- A description of the baseline material and waste management measures is provided together with a summary of the proposed measures following completion of the Proposed Development; and
- A consideration of the material use and waste arisings during the construction and operational phase and the approach for managing wastes in accordance with the waste hierarchy principle. This also includes waste from the demolition/relocation of buildings and structures.

¹ Institute of Environmental Management and Assessment (IEMA) (2020) 'Guide to Materials and Waste in Environmental Impact Assessment'.

Competency

- 13.1.4 The information presented here has been drafted by Emma Mulligan (Senior Consultant: Responsible Consumption and Production at WSP: MCIWM, BA (Hons)) and Ben Withers (Associate Director: Responsible Consumption and Production at WSP: MCIWM, MSc), qualified technical specialists, working to a model chapter structure, described in the methodological section below.

13.2 ASSESSMENT SCOPE AND METHODOLOGY

- 13.2.1 This section describes the methodology of the assessment of materials and waste in relation to the Proposed Development. It also refers to the sources of data which have been used, as well as setting out the significance criteria to evaluate potential effects related to materials and waste.

Consultation

Scoping Opinion

- 13.2.2 An application for an EIA Scoping Opinion was submitted to the Secretary of State in June 2021. A Scoping Opinion from the Planning Inspectorate, on behalf of the Secretary of State, was returned in July 2021.
- 13.2.3 Table 13.1 summarises the Planning Inspectorate’s comments received in relation to materials and waste, and how these comments have been considered in this chapter.

Table 13.1: Scoping Opinion for Materials and Waste and Actions Taken

ID	Point	PINS Comments	Actions Taken
4.11.1	Use of materials during construction	The Scoping Report proposes that the likely significant environmental effects from the use of materials (e.g. aggregate, concrete, brick and steel) for the construction of the Development will not be addressed in the ES as there is no fixed design to assess against or end-user to define requirements. Despite the indicative nature of the proposal, the Inspectorate considers that an approximate estimate of materials used in the construction of the development, based on worst case	The assessor has taken note of this requirement; where possible, assessments of material types and quantities have been taken using best practice indicators in relation to the “worst case” based on the parameters plan at the time of writing. Where it has not been feasible to quantify waste arisings, a qualitative

ID	Point	PINS Comments	Actions Taken
		parameters, should be included in the ES and the impacts of this matter should be assessed where significant effects are likely to occur.	assessment has been offered.
4.11.2	Use of excavated materials during construction	The Scoping Report seeks to scope out “ <i>excavated material that can be used, in its natural state, for site engineering and restoration purposes</i> ” from the assessment of likely significant environmental effects of construction. At this stage, the volumes of material to be excavated and then used on-site is not yet known. No information has been provided regarding the storage locations for excavated materials and additional details such as dimensions of any stockpiles and the length of time they would be in situ for. Therefore, the Inspectorate is not in a position to agree to scope these matters from the assessment. Accordingly, the ES should include an assessment of these matters or the information referred to demonstrating agreement with the relevant consultation bodies and the absence of a LSE (likely significant effect).	This chapter, along with Chapter 11 – Ground Conditions, will seek to quantify the amounts of waste generated as a result of the Proposed Developments earthworks and assess the related potential significant environmental effects during construction. This includes consideration in both Chapters of the implications on the neighbouring Ardley Landfill waste site.
4.11.3	Types, quantities and removal of on-site waste	It is noted that the types, quantities, and destinations of waste produced as a result of the Proposed Development have not yet been determined. This information should be provided within the ES and the data regarding trip numbers should be included within the Transport Assessment and other relevant chapters such as Air Quality and Noise and Vibration. Appropriate cross-referencing to the Ground Conditions aspect chapter should be included, noting the potential for contaminated land within the vicinity of the Proposed Development.	Noted: An assessment of the current baseline for waste facilities has been undertaken to determine whether there would be sufficient capacity to receive residual waste estimated to be produced by the Proposed Development during the construction and operational phases. Chapter 11-The Ground Conditions chapter has been cross-referenced within this Chapter.
4.11.4	Mitigation	The ES should contain details of any mitigation measures which may be required for the removal of waste off-site, or the use of materials on site, i.e. for noise bunds, landscaping etc. Any areas which will be used to	Noted: Proposed mitigation measures have been provided to reduce the amount of residual waste produced during the construction phase. This

ID	Point	PINS Comments	Actions Taken
		stockpile materials on site should be shown on a plan and details be provided as to the dimensions of stockpiles and how long they would be in situ for.	includes the re-use of excavated materials for various activities and other measures including those contained in the CEMP (ES Appendix 2.3).
14.11.5	Biffa (formerly Severn Trent Green Power) 'In Vessel Composting' (IVC) facility	The Proposed Development includes for the lease to expire and not to be renewed. The ES should consider the direct effects on capacity reduction in the local area.	This ES chapter considers the effects of this capacity potentially disappearing, including a demonstration of stakeholder engagement and local capacity requirements. Please see paragraphs 13.4.22 to 13.4.32 for more information.

Statutory Consultation - Oxfordshire County Council

13.2.4 Table 13.2 summarises the comments received from Oxfordshire County Council (OCC) on the draft Materials and Waste ES Chapter as part of statutory consultation (which ended on 4 November 2025). A follow-up meeting was held on 17 December 2025 to discuss the comments with OCC. The table includes a summary response describing where resulting actions have been taken.

Table 13.2: OCC Statutory Consultation Comments for Materials and Waste

ID	OCC Comments	Actions Taken/Response
8.12.10	This site proposes the removal of Ashgrove Farm, a waste management facility that manages up to 35,000 tonnes of waste per year. The Ashgrove Farm site is listed within Appendix 2 of the Oxfordshire Minerals and Waste Local Plan and in the Authority's Annual Monitoring Reports. Therefore, it is a safeguarded site under Policy W11 of the Oxfordshire Minerals and Waste Local Plan.	This ES chapter considers the effects from the removal of the facility, including local capacity requirements. Please see paragraphs 13.4.22 to 13.4.32 for more information. Ashgrove Farm referred to in this Table 13.2 is also referred to as the Biffa IVC Facility in Table 13.1 above and throughout this ES chapter.
8.12.11	The proposal for the Strategic Rail Freight Interchange is not within an adopted Local Plan or Neighbourhood Plan.	The Applicant engaged with OCC as Waste Planning Authority both before and after the statutory consultation process.
8.12.12	The consultation documents do not propose to deliver equivalent waste management capacity elsewhere.	

ID	OCC Comments	Actions Taken/Response
8.12.13	The consultation documents have not demonstrated that Ashgrove Farm is no longer required.	Please also refer to the Planning Statement (Document 5.4) where local and other planning policy matters are addressed.
8.12.14	A detailed waste needs assessment has not been provided as part of the consultation, and this is required to be able to fully assess the impact of the loss of this site. It is critical that this is undertaken before Submission, so that the full implications of this development can be considered prior to submission.	
8.12.17	At Section 13.4.25 the consultation document states that the Waste Data Interrogator provides details of waste capacity. This is incorrect, the Waste Data Interrogator provides details of waste movements received or removed from sites, not capacity.	<p>In the absence of a better source of publicly available data for capacity of waste facilities, it is common practice to use the Waste Data Interrogator as an indicator of the operational throughput of waste management facilities. The use of the throughput actually provides a more conservative value than capacity as the majority of waste facilities do not operate at their full permitted capacity.</p> <p>Where information on the permitted capacity of waste management facilities is available from the Oxfordshire Minerals and Waste Core Strategy (2017) and the Authorities Monitoring Reports (2020), this has been used instead of data taken from the Waste Data Interrogator.</p>
8.12.18	Without the detailed figures and method of calculation provided to reach the figures in 13.4.25, it is assumed that the figures included are the average waste received into Oxfordshire Sites between 2019 - 2023, and the Waste Data Interrogator has indicated that Oxfordshire's composting and food waste treatment facilities are potentially receiving around 226,298tpa.	<p>Yes this is correct - it takes into account anaerobic digestion and composting sites within Oxfordshire (including the site at Ashgrove Farm).</p> <p>Detailed figures and methods of calculation have been included in this Chapter where required.</p>
8.12.19	With a capacity of 239,000 taken from the AMR, which could be less due to the closure of temporary sites, waste received at these sites is potentially reaching capacity, therefore the loss of Ashgrove farm could significantly impact Oxfordshire's Waste Management Capacity.	See response to 8.12.10.
8.12.20	However, to fully assess and understand the full implications of the impact of the potential loss of this site a full Waste Needs Assessment will need to be	See response to 8.12.10.

ID	OCC Comments	Actions Taken/Response
	prepared. As this has not been provided by the applicant, Oxfordshire County Council will need to undertake this.	
8.12.21	At this stage it has not been proven that the site is no longer required for waste management, nor is the development within a Local Plan or Neighbourhood Plan, nor is it proposed to be provided elsewhere. Therefore, until a full waste needs assessment is undertaken, this proposal is contrary to Policy W11 of the Oxfordshire Minerals and Waste Local Plan.	See response to 8.12.10.
8.12.23	In addition, no assessment of Buckinghamshire's, Milton Keynes or West Northamptonshire's waste needs has been provided to demonstrate that they can manage the additional 35,000 tonnes annually if Ashgrove Farm were to be lost.	<p>In line with the proximity principle, the assessment has demonstrated that the removal of Ashgrove Farm will not have an impact on waste management in Oxfordshire and there is sufficient capacity to manage all organic wastes generated by Oxfordshire within the OCC boundary. Please see paragraphs 13.4.22 to 13.4.32 of this ES Chapter for more information.</p> <p>Therefore, an assessment of whether there is capacity within surrounding counties of Buckinghamshire, Milton Keynes or West Northamptonshire to manage organic waste from Oxfordshire is not required.</p>
8.12.24	<p>It is not considered that the Environmental Statement (ES) and supporting documents provide sufficient detail on the impact of the proposed development on Ardley Landfill, particularly regarding the north-eastern edge of the site, which extends into the landfill area. There is a lack of clarity on the following points:</p> <ul style="list-style-type: none"> • The anticipated quantity of waste to be removed from the restored landfill, including the existing cap, • The material needed for the recapping, • Any alternatives considered for the management of the waste removed from the cells, if the EA do not permit the placement of the waste on the wider site 	<p>Noted - this information was still in preparation at the time of submitting the draft ES chapter (PEIR for consultation) and therefore not able to be included within that draft ES chapter.</p> <p>Further information on these points is covered in this final chapter in paragraphs 13.4.33 to 13.4.35 and paragraphs 13.4.80 to 13.4.82 and paragraphs 13.4.101 to 13.4.105.</p>
8.12.25	This information is essential for a full assessment of the proposal and should be provided before any decision is made	See response to 8.12.24.
8.12.27	We would have expected a greater level of detail regarding the specific types of waste	This ES chapter follows the methodology from the IEMA Materials and Waste EIA

ID	OCC Comments	Actions Taken/Response
	<p>anticipated, the projected quantities for recycling, and the potential impacts on Oxfordshire’s waste management facilities beyond landfill alone. Whilst we recognise that IEMA guidelines require developments to consider impacts on landfill capacity, due to the scale and nature of this development, we would expect that the impact on other waste management capacity should be considered.</p>	<p>guidance which assesses the impact of waste generation on landfill capacity.</p> <p>The OCC comment related to the earlier draft (PEIR) chapter, The impact of waste generation on the capacity of other waste management facilities has been included within this Chapter.</p>
8.12.29	<p>Without the detailed information on potential waste arisings and management routes, we are unable to agree with the assertion in paragraph 13.4.18 that the sensitivity of waste transfer and treatment sites to construction and demolition from the development waste is low, nor with the conclusion in Table 13.23 that the preliminary assessment of construction impacts is slight</p>	<p>See response to 8.12.27.</p>
8.12.30	<p>This proposal has significant potential to impact existing local recycling and recovery capacity and therefore this should be considered and assessed.</p>	<p>See response to 8.12.27.</p>
8.12.31	<p>We request that the applicant provides further clarity on these points to ensure the impacts of the development can be fully considered and the proposal aligns with Oxfordshire’s waste management targets</p>	<p>See response to 8.12.27.</p>
8.12.32	<p>The planning permission for the Biffa Green Power IVC Facility at Ashgrove Farm is permanent, not temporary, and thus forms part of Oxfordshire’s permitted permanent waste management capacity. The assumptions within the consultation documents that it is a temporary facility should be removed and corrected within the Environmental Statement (13.4.19).</p>	<p>The text within paragraph 13.4.23 of this Chapter has been reviewed to ensure it is clear that although the lease expires in 2030, the planning permission for a waste management facility remains in place as a permanent permission.</p>
8.12.33	<p>Paragraph 13.4.22 is incorrect and should be addressed prior to submission. Ashgrove Farm is listed within Appendix 2 of the Oxfordshire Minerals and Waste Local Plan, and it is also listed within the Authority Monitoring Reports. It is a safeguarded site and Policy W11 applies.</p>	<p>Paragraph 13.4.24 of this Chapter has been updated from the draft version (at Stage 2 consultation) to reflect this comment.</p> <p>The site is referred to as Ashgrove Farm, biological treatment, No. 014 in Appendix 2.</p>
8.12.34	<p>The impact of the loss of this site has not been accurately considered in terms of loss of waste management capacity in Oxfordshire.</p>	<p>It has been demonstrated that the removal of Ashgrove Farm will not have an impact on waste management in Oxfordshire by considering the capacity to manage all organic wastes generated</p>

ID	OCC Comments	Actions Taken/Response
		<p>by Oxfordshire within the OCC boundary. Please see paragraphs 13.4.22 to 13.4.32 of this ES chapter for more information.</p> <p>Proposed mitigation for the removal of Ashgrove Farm is therefore not required.</p>
8.12.35	No mitigation has been provided for the proposed removal of Ashgrove Farm.	See response to 8.12.34.

Additional Stakeholder Engagement

13.2.5 Statistics related to waste facilities were obtained from the Environment Agency (EA) to provide a basis for consultation with the regulatory stakeholders.

13.2.6 Extensive engagement has also been held with the EA regarding waste permitting issues associated with the relationship of the Proposed Development with, and potential impacts on, the Ardley Landfill (including following comments received from the EA during statutory consultation). This centered on the proposal for reprofiling relocated waste material within the site, with agreement reached regarding the proposed approach and mechanisms for appropriate mitigation (also referred to with regard to Ground Conditions (Chapter 11), and Odour (Chapter 4) chapters of this ES).² Table 13.3 below provides a summary of comments received from the EA and a response describing where resulting actions have been taken.

Table 13.3: EA Comments on the relationship with Ardley Landfill

ID	EA Comments	Actions Taken/Response
EA26	<p>There is an absence of detail regarding how the development will interact with the Environment Agency regulated Ardley Landfill site, which it cuts across. A permit variation under the Environmental Permitting Regulations will be required separate to the DCO.</p>	<p>Noted - this information was still in preparation at the time of submitting the draft ES chapter (PEIR for consultation) and therefore not able to be included within the draft ES chapter.</p> <p>Further information on these points is covered in this final chapter in paragraphs 13.4.33 to 13.4.35 and paragraphs 13.4.80 to 13.4.82 and paragraphs 13.4.101 to 13.4.105, along with other additional documents and risk assessments submitted in support of the DCO application.</p>

² The separate Consultation Report (Document 5.1) also provides details of the engagement with the Environment Agency and other consultees.

EA27	We are aware of proposals to divide cell B (scenario 2), but no details have been provided. There is no design of permit boundary or understanding of how the two permits interact is provided.	Noted - this information was still in preparation at the time of submitting the draft ES chapter (PEIR for consultation) and therefore not able to be included within the draft ES chapter. Further information on these points is covered in this final chapter in paragraphs 13.4.33 to 13.4.35 and paragraphs 13.4.80 to 13.4.82 and paragraphs 13.4.101 to 13.4.105, along with other additional documents and risk assessments submitted in support of the DCO application.
EA28	Lack of clarity regarding the fate of the Biffa Green Power IVC facility	It has been demonstrated that the removal of Ashgrove Farm will not have an impact on waste management in Oxfordshire and there is sufficient capacity to manage all organic wastes generated by Oxfordshire within the OCC boundary. Please see paragraphs 13.4.22 to 13.4.32 of this ES Chapter for more information.

13.2.7 Preliminary conversations with facilities Ardley Energy Recovery facility (“Viridor ERF”) have been undertaken to inquire about the exact types of waste materials they accept and their capacity to receive waste arising from the Proposed Development, both during the construction and operational phases.

Study Area

13.2.8 The spatial scope of material and waste assessments is often not easily defined as issues associated with material use and waste management can be geographically far-reaching and extend well beyond the application boundary. The Study Area for the assessment of materials and waste principally comprises the Application Site.

13.2.9 For the construction phase of the Proposed Development, this chapter provides an assessment of the demolition waste from existing on-site structures, as well as construction waste associated with earthworks, and the construction of on-site structures and Highway Works. Therefore, the assessment comprises of the Application Site and expands beyond the boundary of the Main Site.

13.2.10 For the operational phase, an assessment of waste generated by warehousing units and the terminal which would be located within the Main Site only has been undertaken.

13.2.11 In addition, the relevant local waste infrastructure (i.e. waste management facilities up to 30km from the Application Site) and regional mineral resource planning areas are referred to within the assessment as the ‘Expansive Materials and Waste Study Area’. This area is defined by the availability of landfill sites and other waste management facilities relative to the proximity of the Application Site. The radius used has to be realistic around the practicalities of construction and operation. If this process identifies a supply problem in relation to landfill capacity or other waste management facility capacity, the Proposed Development looks at a wider catchment.

Establishing the Baseline

13.2.12 This chapter considers the material use required during construction, and waste arisings generated during construction and operation of the Proposed Development but excludes wastewater which is covered in Chapter 9: Water Environment (including Flood-Risk, Drainage and Water Quality). The estimates of material and waste types / quantities are based on information available at the time of writing which includes preliminary construction information and high-level assumptions for occupancy. The management measures set out in this chapter are in accordance with legislative obligations, planning policy and best practice guidance.

13.2.13 The assessment of waste from demolition and construction activities includes all structures on the Application Site. The assessment of effects on roads and junctions has considered Highways England’s Design Manual for Roads and Bridges (DMRB) LA 110 Material Assets and Waste guidance³. DMRB LA 110 requires that the following information on material assets and waste is identified:

- Types and quantities of materials required to construct the Proposed Development;
- Information on availability of key construction materials required for the Proposed Development;
- Information on materials that contain secondary aggregate or recycled content;
- Information on any known sustainability credentials of materials to be consumed;
- The type and volume of materials that will be recovered from off-site sources for use on the Proposed Development;

³ Highways England (2019) ‘LA 110 Material Assets and Waste’ Available from: <https://www.standardsforhighways.co.uk/dmrbs/search/6a19a7d4-2596-490d-b17b-4c9e570339e9>

- The proposed 'cut and fill' earthworks balance;
- Details of onsite storage and stockpiling arrangements, and any supporting logistical details;
- Types and quantity of material use associated with operation of the existing road/site; and
- Types and quantities of waste associated with operation of the existing road/site.

13.2.14 An assessment of material resources required during the operational phase has been scoped out⁴ as it is anticipated that only a minimal quantity would be required.

13.2.15 The assessment of the baseline is proportionate to the receptors within the Study Area. This is measured by information about these sites within the OCC Minerals and Waste Core Strategy 2017, as well as waste received by each receptor based on EA data.

Identifying the Receptors

13.2.16 According to IEMA Guidance¹, *“For waste, the sensitive receptor is landfill capacity. 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”*. Materials, however, are sensitive receptors in their own right: *“consuming materials impacts upon their immediate and (in the case of primary materials) long-term availability; this results in the depletion of natural resources and adversely impacts the environment”*.

13.2.17 Receptors have been identified by means of a desk study of Ordnance Survey (OS) map data, publicly available data, the EIA Scoping Report (June 2021), the Proposed Development's designs (including the proposed cut and fill balance) and the use of waste management experience and judgement.

Sources of Waste

13.2.18 The Proposed Development would generate the following types of waste during construction, which are considered in the assessment:

- Demolition wastes;

⁴ Agreed at Scoping Stage.

- Excavation wastes; and
- Construction wastes.

13.2.19 During the operational phase, waste related to logistics and distribution operations, including waste associated with the rail terminal, is expected to be generated. The assessment of this potential waste output has been undertaken using typical weekly waste arisings from British Standard BS 5906:2005⁵.

Assessing the Sensitivity of a Receptor

13.2.20 The significance of waste arisings is largely based on the nature of the waste, the location and capacity of local and regional waste management facilities and the sustainability of the disposal or processing method.

13.2.21 Overall, the purpose of a materials and waste assessment is to characterise material use and waste types and arisings and identify the significance of change associated with a Proposed Development in comparison to the current and likely future situation without the Proposed Development.

13.2.22 This chapter utilises the standard EIA approach of assessing significance as a function of the magnitude of impact (and proximity) and sensitivity of receptors.

13.2.23 The sensitivity of materials can be determined by identifying where one or more of the criteria displayed in Table 13.4 are met.

Table 13.4: Assessment Criteria for the Sensitivity of Material Receptors

MATERIALS	
Negligible	Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials.
Low	Are forecast (through trend 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.
Medium	Are forecast (through trend 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

⁵ British Standards Institute (2005) 'BS5906:2005 Waste management in buildings – Code of Practice'. Available from: <https://www.rbkc.gov.uk/pdf/BS5906-2005.pdf>

MATERIALS	
High	Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or Comprise little or no sustainable features and benefits compared to industry-standard materials.
Very High	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.

13.2.24 The sensitivity of landfill void capacity can be determined using the criteria within Table 13.5 and Table 13.6.

Table 13.5: Inert and Non-hazardous Landfill Void Capacity Sensitivity

WASTE	
Across construction and/or operation phases, the baseline/future baseline (i.e. without development of regional (or where justified, national) 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	... 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

Table 13.6: Hazardous Landfill Void Capacity Sensitivity

HAZARDOUS WASTE	
Across construction and/or operation phases, the baseline/future baseline (i.e. without development of regional (or where justified, national) 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	... 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.

13.2.25 The quantity of waste has been assessed by interrogating the designs for the Proposed Development, and by using professional judgement. An evaluation has been carried out to determine whether it is likely to be hazardous.

Assessing the Magnitude of Impacts

13.2.26 The IEMA Guide to Materials and Waste divides the assessment of the magnitude of impacts into the sensitivity of materials as a receptor and the sensitivity of landfill void capacity.

13.2.27 The magnitude of impact from materials can be determined using the criteria in Table 13.7.

Table 13.7: Assessment Criteria for the Magnitude of Impacts from Materials

MATERIALS	
The assessment is made by determining whether, through a development, the consumption of:	
No change	...no material is required.
Negligible	...no individual material type is equal to or greater than 1% by volume of the regional baseline availability.
Minor	...one or more materials is between 1-5% by volume of the regional 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.
Moderate	...one or more materials is between 6-10% by volume of the regional baseline availability; and/or one allocated mineral site is substantially sterilised by the development rendering it inaccessible for future use.
Major	...one or more materials is >10% by volume of the regional baseline availability; and/or more than one allocated mineral site is substantially sterilised by the development rendering it inaccessible for future use.

13.2.28 The magnitude of impact from inert and non-hazardous waste can be determined using criteria within Table 13.8.

Table 13.8: Assessment Criteria for the Magnitude of Impacts from Inert and Non-hazardous Waste

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

13.2.29 The magnitude of impact from hazardous waste can be determined using criteria within Table 13.9.

Table 13.9: Assessment Criteria for the Magnitude of Impacts from Inert and Hazardous Waste

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

Assessing the Significance of Impacts

13.2.30 The significance of impact can be determined using the sensitivity of receptor and the magnitude of impact to identify thresholds as shown in Table 13.10.

Table 13.10: Thresholds of Impacts

SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT					
		No change	Negligible	Minor	Moderate	Major
Very High		Neutral	Slight	Moderate or large	Large or very large	Very large
High		Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
Medium		Neutral	Neutral or slight	Slight	Moderate	Moderate or large
Low		Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
Negligible		Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

13.2.31 In line with the guidance presented in the IEMA EIA Materials and Waste guidance, impacts which reach a threshold of moderate or above are considered significant. Where a range of significance levels are presented, the final assessment for each effect is based upon expert judgement.

13.2.32 A description of the significance levels, assigned taking account of proposed mitigation, is as follows:

- *Very Large*: These beneficial or adverse effects are considered to be of such magnitude that they would cause irreversible impacts and are likely to be material in the decision-making process.

- *Large*: These beneficial or adverse effects are considered to be very important considerations (but still reversible) and are likely to be material in the decision-making process.
- *Moderate*: These beneficial or adverse effects are noticeable and may be important. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- *Slight*: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the Proposed Development.
- *Neutral*: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Assessing Cumulative Effects

13.2.33 The Study Area for the consideration of cumulative effects has been developed considering the predicted extent of impacts associated with materials and waste regarding the Proposed Development.

13.2.34 Where sufficient information exists, the Study Area includes all known proposed developments in the surrounding area that could potentially result in cumulative effects. The cumulative effects assessment has been undertaken by a review of sites which have been consented but are yet to be constructed. The expansive study area to cover relevant local waste infrastructure (i.e. waste management facilities up to 30km from the Application Site) and regional mineral resource planning areas considered in the cumulative effects assessment remains the same as when assessing effects of the Proposed Development alone.

Identifying Potential Mitigation Measures

13.2.35 The Proposed Development includes certain embedded design and mitigation measures of relevance to the ES – this is in part set out in ES Chapter 2 (Description of Development and Alternatives). Embedded mitigation includes the CEMP (ES Appendix 2.3) which is of direct relevance to consideration of a number of issues and potential impacts associated with both waste and materials during the construction phase. The CEMP (ES Appendix 2.3) refers to there being a Site Waste Management Plan, and a Materials Management Plan, both of which will be required to be prepared post-consent, and which will help minimise the effects of the Proposed Development.

- 13.2.36 A further embedded design and mitigation feature is achieving a site wide earthworks 'balance', with cut and fill across the development to remove the need for material to be moved on- or off-site as part of the construction process.
- 13.2.37 Consideration of the need for Additional Mitigation is set out in section 13.6 of this ES Chapter. Mitigation measures have been identified using engineering judgement based on IEMA Guidance, best practice and experience from previous projects.
- 13.2.38 In addition, as set out below, a number of regulatory or legislative requirements directly shape and inform the likely scale and nature of the impacts from the Proposed Development with regard to the approach taken to waste management during both construction and operational phases. For example, requirements to separate different types of waste for recycling and application of the 'waste hierarchy'.

Limitations and Assumptions

- 13.2.39 The impacts associated with the by-products and associated wastes from the extraction of raw materials and the manufacture of products outside of the Study Area are excluded from the scope. These stages of a product's or a material's life cycle will have been subjected to a separate environmental assessment and are therefore outside the scope of this assessment.
- 13.2.40 The effects associated with the transportation of materials (Greenhouse gas (GHG) emissions, air quality, noise, etc.) are not covered within this methodology and are addressed in the ES chapters relevant to these environmental topics.
- 13.2.41 The assessment of waste during the operational phase relates to the production of waste from structures within the Main Site only. It excludes waste associated with Highway Works as minimal waste is expected to be generated once the Highway is operational.
- 13.2.42 Mitigation measures to reduce the impacts of material assets and waste from the Proposed Development follow the principles of sustainable resource and waste management in accordance with the waste hierarchy as described in DMRB LA 110 (which includes Image 11-4: Waste hierarchy).

13.2.43 The potential for excavated land to be contaminated has been assessed in ES Chapter 11 (Ground Conditions) and is therefore not assessed within this Chapter.

13.2.44 Impacts associated with the excavation of landfill waste from Ardley Landfill, for example odour and contamination risk, have been assessed within the relevant chapters and are not covered within this assessment.

13.3 POLICY CONTEXT

13.3.1 As a producer of waste, the Proposed Development must consider a range of waste legislation. This section details relevant legislation, policy and guidance at the national, regional and local levels.

National Legislation and Policy

National Policy Statement for National Networks 2024 ('NPS')

13.3.2 The National Policy Statement (NPS) for National Networks⁶, produced by the Department for Transport, is the primary source of national policy for Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. It includes the Government's policies relating to the management of waste when delivering an NSIP. Waste management is a crucial aspect of this policy, reflecting the need for sustainable development and environmental protection in infrastructure projects. Paragraph 5.71 states that waste should be managed in accordance with the Waste Hierarchy and consideration should be given to circular economy principles wherever practicable.

13.3.3 Waste Management Principles: The NPS emphasises the importance of minimising waste and promoting sustainable waste management practices during the construction and operation of national networks. It highlights the need for developers to adopt waste hierarchy principles, prioritising waste prevention, reuse, and recycling over disposal (Paragraph 5.72 and 5.73). Consideration must be given to managing generated waste in accordance with

⁶ Department of Transport (2024) 'National Policy Statement for National Networks'. Available from: <https://assets.publishing.service.gov.uk/media/65e76aabce8540001c12c41c/national-networks-national-policy-statement-print.pdf>

regulatory waste regimes including the Environmental Permitting requirements (Paragraph 5.74).

- 13.3.4 Construction and Demolition Waste: The NPS recognises the significant amounts of waste generated during construction and demolition activities and requirements for material. It calls for the implementation of modern methods of construction and other sustainable design practices including using sustainable timber and low carbon concrete to reduce material consumption and construction waste (Paragraph 5.75).
- 13.3.5 Available Waste Infrastructure: The NPS policy requires developers to consider available waste infrastructure in order to ensure that infrastructure projects contribute positively to local waste management goals and do not overwhelm existing systems (Paragraph 5.76).
- 13.3.6 Consideration has been given to the requirements and principles outlined above in the design of the Proposed Development. For the construction phase, this has influenced and informed relevant parts of the submitted CEMP which in turn sets the context for future phase specific CEMPs (P-CEMP), Site Waste Management Plans and Materials Management Plans.

Environment Act 2021

- 13.3.7 Part 3 Section 57 of the Environment Act⁷ (2021), sets out a number of provisions related to industrial/commercial waste including the following:
- “Recyclable relevant waste must be collected separately from other relevant waste”; and
 - *Recyclable relevant waste in each recyclable waste stream must be collected separately” unless “it is not technically or economically practicable to collect recyclable relevant waste in those recyclable waste streams separately, or collecting recyclable relevant waste in those recyclable waste streams separately has no significant environmental benefit”.*
- 13.3.8 Recyclable relevant waste is defined in the Act as any of the following materials: glass; metal; plastic; paper/card; and food waste. This is relevant to the Proposed Development as there is a requirement to separate recycling from other waste during the construction and operational phase. This, and

⁷ HM Government (2021) ‘Environment Act 2021’ Available from: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

other similar legislative or regulatory elements of the context for the Proposed Development referred to below, therefore forms part of the assessment of likely effects in terms of waste generation as it diverts waste from landfill and impacts on existing or future capacity of landfills and other waste management facilities.

The Waste (Circular Economy) (Amendment) Regulations 2020

13.3.9 The Waste (Circular Economy) (Amendment) Regulations 2020⁸ implements the European Union Circular Economy Package into UK law.

13.3.10 The regulations introduce stricter requirements for the management of hazardous waste (restricts mixing of hazardous waste), new requirements for separately collected waste deemed for reuse or recycling to prevent it being incinerated or landfilled, and enhanced producer responsibility obligations for packaging, batteries, waste electronic equipment and end-of-life vehicles. The requirements imposed by these regulations will be adhered to when managing waste arising from the Proposed Development.

The Separation of Waste (England) Regulations 2025

13.3.11 The Separation of Waste (England) Regulations 2025⁹ introduces new legal requirements for all businesses to have separate collections of:

- Residual (non-recyclable) waste;
- Food waste (mixed with garden waste if appropriate);
- Paper and card; and
- All other dry recyclable materials (plastic, metal and glass).
- From March 2027, businesses will also be required to have a separate collection of plastic film.

13.3.12 This is relevant to the Proposed Development as there is a requirement to separate out waste into the above waste streams during the construction and operational phase, and as above, it is directly relevant to the assessment of

⁸ HM Government (2020) 'The Waste (Circular Economy) (Amendment) Regulations 2020'.

⁹ HM Government (2025) 'The Separation of Waste (England) Regulations 2025'.

potential effects on waste generation, levels of recycling (and avoiding landfill) and the capacity of landfill and other waste management facilities.

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

13.3.13 The Environmental Permitting Regulations¹⁰ provide a framework for the authorisation of waste activities and aim to ensure that their discharges do not harm human health or the environment. Environmental permits must be granted by the Environment Agency (EA). This is relevant to the Proposed Development to the extent that there are interactions and impacts on the existing Ardley Landfill where some works to create the new rail sidings, and site access, are located. In addition, waste generated by the Proposed Development is required to be disposed of at a waste management facility suitably permitted under these Regulations.

13.3.14 The Regulations combine the requirements for an integrated waste management approach and for hazardous waste management. This provides a framework for regulation that enables the EA to assess permitting and compliance.

The Waste (England and Wales) Regulations 2011 (and amendments)

13.3.15 The Waste Regulations implement revisions to the Waste Framework Directive in England and Wales. They apply the waste hierarchy which details methods to reduce waste generation and the amount of waste sent to landfill. The stages of the waste hierarchy and examples of each stage, which were provided by the Department of Environment, Food and Rural Affairs¹¹, are given in **Table 13.11**. The management of waste arising from the Proposed Development during the construction and operational phase will apply the waste hierarchy.

Table 13.11: Stages of the Waste Hierarchy

Stages	Examples
Prevention	Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous materials.
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.
Recycling	Turning waste into a new substance or product. Includes

¹⁰ HM Government (2016) 'The Environmental Permitting (England and Wales) Regulations 2016'.

¹¹ Department for Environment, Food and Rural Affairs (2011) 'Guidance on applying the Waste Hierarchy' Available from:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf

	composting if it meets quality protocols.
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling.
Disposal	Landfill and incineration without energy Recovery.

The Hazardous Waste (England and Wales) Regulations 2005

13.3.16 The Hazardous Waste Regulations¹² set out the regime for the control and tracking of hazardous waste in England and Wales. These regulations introduced a process of registration of hazardous waste producers and a system for recording the movement of waste. The requirements imposed by these regulations will be adhered to when managing hazardous waste arising from the Proposed Development.

Waste Management Plan for England 2021

13.3.17 The Waste Management Plan for England¹³ provided an analysis of the waste management situation in England and evaluated how it would support implementation of the objectives and provisions of the European Union’s revised Waste Framework Directive.

13.3.18 In relation to the management of waste during construction and demolition, this plan stated that: *“we are continuing to comfortably exceed the target to recover 70% of non-hazardous construction and demolition waste by 2020. The annual recovery rate for construction and demolition in England has remained at around 92% since 2010. In 2016, the recovery rate was 92.1%”* (p.17).

13.3.19 The waste management principles of the waste hierarchy are now fully incorporated in the Waste Management Plan for England as objectives to be delivered through waste local plans. These principles are outlined in **Table 13.12** and will be adhered to when managing waste arising from the Proposed Development during the construction and operational phase.

¹² HM Government (2005) ‘The Hazardous Waste (England and Wales) Regulations 2005’ Available from: <https://www.legislation.gov.uk/uksi/2005/894/made>

¹³ Department for Environment, Food and Rural Affairs (2021) ‘Waste Management Plan for England’ Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/955897/waste-management-plan-for-england-2021.pdf

Table 13.12: Waste Management Principles

Principle	Description
Waste Hierarchy	A theoretical framework used as a guide to the waste management options that should be considered when assessing the BPEO
Waste as a Resource	Certain wastes can be directly used or separated / processed for use as a replacement for raw materials, saving resources and potentially reducing energy use or other impacts associated with virgin resource extraction and transport.
Proximity Principle	Certain wastes can be directly used or separated / processed for use as a replacement for raw materials, saving resources and potentially reducing energy use or other impacts associated with virgin resource extraction and transport.
Regional Self-sufficiency	Where practical, waste should be treated or disposed of within the region in which it is produced.
Best Practicable Environmental Option (BPEO)	Defined by the Royal Commission on Environmental Pollution (1988) as the outcome of a systematic and consultative decision making procedure which emphasises the protection and conservation of the environment across land, air and water". The BPEO procedure establishes, for a given set of objectives, the option that provides the most benefits, as a whole, at acceptable cost, in both the short term and the long term. SA is designed to ensure compliance with SEA and as such includes for requirements on environmental decision making such as an opportunity for the public to express their opinion on draft plans (community involvement), take into account significant environmental effects including those on human health, material assets and climatic factors and a full assessment of alternative options and reasons why alternatives have been assessed and why others have not.

National Planning Policy for Waste 2014

13.3.20 The National Planning Policy for Waste¹⁴ provides “a framework in which communities and businesses are engaged with and take more responsibility for their own waste, including by enabling waste to be disposed of...in line with the proximity principle” (pg. 3).

13.3.21 It also aims to ensure that: “the design and layout of new residential and commercial development and other infrastructure (such as safe and reliable transport links) complements sustainable waste management, including the provision of appropriate storage and segregation facilities to facilitate high quality collections of waste” (pg. 3). The design of the Proposed Development will include appropriate waste storage facilities which also facilitate recycling.

¹⁴ Department for Communities and Local Government (2014) ‘National Planning Policy for Waste’. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/364759/141015_National_Planning_Policy_for_Waste.pdf

'Our Waste, Our Resources: A Strategy for England', 2018

- 13.3.22 'Our Waste, Our Resources: A Strategy for England'¹⁵ builds on the previous national waste strategies of 2000 and 2007 and contains actions and commitments which set a clear direction towards a zero-waste economy.

National Planning Policy Framework, 2024

- 13.3.23 The National Planning Policy Framework¹⁶ (NPPF) sets out the Government's planning policies for England. The NPPF must be taken into account in preparing development plans and is a material consideration in planning decisions, and although is not the main source of national planning policy for NSIPs, is material in this case too. The policy sets out objectives for sustainable development which includes protecting and enhancing our natural, built and historic environment through minimising waste and pollution.
- 13.3.24 In relation to the sustainable use of materials, paragraph 223 states that developments must: "so far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously".

Regional and Local Policies

Oxfordshire County Council Minerals and Waste Core Strategy 2017

- 13.3.25 Paragraph 3.4 of the OCC Minerals and Waste Core Strategy¹⁷ states the aim to: "Facilitate the efficient use of Oxfordshire's mineral resources by encouraging the maximum practical recovery of aggregate from secondary and recycled materials for use in place of primary aggregates".
- 13.3.26 OCC are aiming to achieve a rate of 70% for recycled and secondary aggregate waste by 2031, which includes waste from construction, demolition and excavation works. How the Proposed Development aims to meet or exceed this recycling rate when managing waste arising from the construction

¹⁵ HM Government (2018) 'Our Waste, Our Resources: a Strategy for England' Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765914/resources-waste-strategy-dec-2018.pdf

¹⁶ Ministry of Housing, Communities & Local Government (2024) 'National Planning Policy Framework'. Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹⁷ Oxfordshire County Council (2017) 'Minerals and Waste Core Strategy'. Available from: <https://www2.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/planning/mineralsandwaste/September2017/AdoptedMineralsWasteCoreStrategySept2017.pdf>

phase is considered in the Assessment of Likely Effects in Section 13.5 of this Chapter and will be secured within the submitted CEMP and Site Waste Management Plans to be prepared post-consent.

13.3.27 **Policy M8: ‘Safeguarding Mineral Resources’** sets out the locations of Mineral Safeguarding Areas within the region and requires that development which prevents or otherwise hinders the future working of the mineral is not permitted unless it can be shown that:

- *The site has been allocated for development in an adopted local plan or neighbourhood plan; or*
- *The need for the development outweighs the economic and sustainability considerations relating to the mineral resource; or*
- *The mineral will be extracted prior to the development taking place.*

13.3.28 The impact of the Proposed Development on Mineral Safeguarding Areas has been assessed further within Chapter 11: Ground Conditions¹⁸.

13.3.29 In relation to waste planning, this document states that: *“the underlying philosophy is to seek to reduce waste generation and to see waste as a resource, through maximizing reuse, recycling and composting and recovery of value from residual waste”* (p. 34).

13.3.30 OCC plan to provide waste management facilities in strategic locations so: *“facilities will be located and managed to minimise the use of unsuitable roads, particularly through settlements, and other harmful impacts of waste management development on Oxfordshire’s communities and natural and historic environment”* (p. 34). OCC wish *“to provide for waste to be managed as close as possible to where it arises...”* so as to:

- *“Minimise the distance waste needs to be transported by road;*
- *Reduce adverse impacts of waste transportation on local communities and the environment; and*
- *Enable communities to take responsibility for their own waste”* (p. 35).

13.3.31 **Policy W2: ‘Oxfordshire waste management targets’** sets out OCC’s waste management targets for commercial / industrial, as well as construction, demolition and excavation (CDE) waste to be met by the years 2021, 2026 and 2031. According to this policy, *“Oxfordshire’s non-hazardous waste that is sent*

¹⁸ Minerals Assessment at ES Appendix 11.3, Document 6.11C.

to landfill to reduce to no more than 5% of arisings by 2026” (p. 84). How waste management for the Proposed Development would aim to match or exceed these targets for both the construction and operational phases is considered in the Assessment of Likely Effects in Section 13.5 of this Chapter and will be secured within the submitted CEMP and Site Waste Management Plans to be prepared post-consent.

13.3.32 It is estimated that approximately 1.033 million tonnes of non-hazardous CDE waste are created within Oxfordshire each year and it is expected that *“existing waste management facilities will provide much of the waste management capacity required”* (pg. 74). The available capacity expected across Oxfordshire for specific years up to 2031 are shown in **Table 13.13**. These figures are taken from Table 6 of the OCC Minerals and Waste Core Strategy 2017 (p. 74).

Table 13.13: Capacity Available to Manage Waste at Existing Facilities 2016 – 2031 (tonnes per annum)

Type of waste management	2016	2021	2026	2031
Non-hazardous waste recycling	598,900	429,900	429,900	317,800
Composting / food waste treatment	219,600	219,600	214,600	214,600
Non-hazardous residual waste treatment	300,000	300,000	300,000	300,000

13.3.33 At the time the Minerals and Waste Core Strategy 2017 was made, projections of capacity for the management of non-hazardous waste recycling predicted that Oxfordshire would not have enough capacity by 2021. However, the strategy planned to provide additional waste facilities to meet their needs, as set out in **Policy W3: ‘Provision for waste management capacity and facilities required’**.

13.3.34 In relation to inert waste, *“in 2013 there were ten licensed inert waste ‘disposal’ facilities operating in Oxfordshire with a collective void space of some 4.2 million cubic metres”* (p. 86). Shellingford Quarry, which has permission to operate until 2028, and Shipton-on-Cherwell Quarry, which has permission to operate until 2025, provide most of the capacity to manage inert waste in Oxfordshire. These facilities are expected to provide sufficient capacity to manage inert waste until at least 2025 and OCC plan to provide additional facilities to meet future demand beyond this point.

13.3.35 To protect the waste facilities within Oxfordshire, the OCC Minerals and Waste Core Strategy safeguards waste management sites under **Policy W11: ‘Safeguarding waste management sites’**. According to this policy *“Proposals for development that would directly or indirectly prevent or prejudice the use of a site safeguarded for waste management will not be permitted unless:*

- *the development is in accordance with a site allocation for development in an adopted local plan or neighbourhood plan; or*
- *equivalent waste management capacity can be appropriately and sustainably provided elsewhere; or*
- *it can be demonstrated that the site is no longer required for waste management.”*

Cherwell District Council Local Plan 2011 - 2031

13.3.36 According to **Policy BSC 9: Public Services and Utilities** of the Cherwell District Council Local Plan 2011 – 2031¹⁹, *“Waste management and disposal is the responsibility of Oxfordshire County Council and the District Council will continue to consider the emerging Minerals and Waste Development Framework in the preparation of the Local Plan”* (p. 72).

13.3.37 **Policy ESD 3: Sustainable Construction** sets out the following policies which are of relevance to the management of waste during the construction of the Proposed Development:

- *“All new non-residential development will be expected to meet at least BREEAM ‘Very Good’ with immediate effect, subject to review over the plan period to ensure the target remains relevant. The demonstration of the achievement of this standard should be set out in the Energy Statement; and*
- *All development proposals will be encouraged to reflect high quality design and high environmental standards, demonstrating sustainable construction methods including but not limited to:*

¹⁹ Cherwell District Council (2015) ‘The Cherwell Local Plan 2011 – 2031’ Available from: <https://www.cherwell.gov.uk/downloads/download/45/adopted-cherwell-local-plan-2011-2031-part-1-incorporating-policy-bicester-13-re-adopted-on-19-december-2016>

- *Minimising both energy demands and energy loss;*
- *Maximising passive solar lighting and natural ventilation;*
- *Maximising resource efficiency;*
- *Incorporating the use of recycled and energy efficient materials;*
- *Incorporating the use of locally sourced building materials;*
- *Reducing waste and pollution and making adequate provision for the recycling of waste;*
- *Making use of sustainable drainage methods;*
- *Reducing the impact on the external environment and maximising opportunities for cooling and shading (by the provision of open space and water, planting, and green roofs, for example); and*
- *Making use of the embodied energy within buildings wherever possible and re-using materials where proposals involve demolition or redevelopment”.*

Cherwell District Council Local Plan Review 2042 – Proposed Submission Document

13.3.38 Cherwell District Council are in the process of preparing a new Local Plan 2042²⁰. The new Local Plan is currently at the proposed submission stage and has been submitted to the Secretary of State to consider prior to examination and adoption. The plan is at an advanced stage of preparation and so is considered to have sufficient weight to be material to this Chapter.

13.3.39 According to draft Policy CSD1: Mitigating and Adapting to Climate Change, “All development proposals will be required to ... Minimise waste and make adequate provision for the reuse and recycling of waste.” (p. 29).

13.3.40 Draft Policy CSD21: Waste Collection and Recycling is of most relevance to the operational phase of the Proposed Development:

“Development will be expected to incorporate suitable facilities to allow occupiers to separate and store waste for recycling and recovery unless existing provision is adequate. Such facilities should be well designed having regard to published guidance including (but not limited to) ADEPT Making Space for Waste Designing, Waste Management in New Developments: A Practical Guide for Developers and Local Authorities (2010).

²⁰ Cherwell District Council (2024) ‘Cherwell Local Plan Review 2042 – Proposed Submission Version Document (Regulation 19)’ Available from: <https://www.cherwell.gov.uk/local-plan-review-2042-submission>

The Council will support residential, commercial and mixed-use development proposals that:

- i. Provide suitable internal storage space within their premises to enable the occupiers to separate, store and recycle their waste;*
- ii. Provide suitable, secure, external or communal storage facilities on site that allow for the separate storage and collection of waste, reusable items, recyclable materials and compostable waste;*
- iii. Include on-site waste management, which minimises the need for waste transfer, where it is feasible to do so;*
- iv. Allow for convenient and safe access to manage waste, including for older persons or persons with disabilities;*
- v. Allow for convenient and safe access for waste collection services;*
- vi. Demonstrate that bin storage, whilst being designed to meet practical needs, is integrated into the built form and does not detract from the overall design of the scheme or the surrounding area;*
- vii. Demonstrate that external bin storage is designed as an integral part of the overall design or are positioned to minimise the adverse visual impact;*
- viii. Enable waste from mixed-use schemes to be segregated in separate secured areas;*
- ix. Provide innovative solutions to reduce waste at source, and*
- x. All major development must be accompanied by a Waste Management Plan which demonstrates how the criteria set out above will be achieved.”*

Summary of Regulation, Policy and Guidance

13.3.41 The key requirements that arise from the regulation, policy and guidance are as follows:

- Waste must be stored in such a way as to prevent it from causing damage to the environment or posing a risk to human health;

- The waste hierarchy must be applied in both the construction and operation of new developments, and waste reduction and re-use should be prioritised;
- Duty of Care obligations for businesses to dispose of all their recyclable materials and commercial waste must be implemented;
- The impact of new development on waste management facilities should not prejudice the implementation of the waste hierarchy and/or efficient operation of such facilities;
- At least 70% (by weight) of waste from construction and demolition should be either reused or recycled; and
- To achieve a BREEAM “Very Good” rating, the Proposed Development should aim for the BREEAM target of diverting 70% (by volume) and 80% (by weight) of non-hazardous construction waste from landfill, and 80% (by volume) and 90% (by weight) of demolition waste.

13.3.42 As referred to earlier in this Chapter, the context provided by regulation, policy and guidance is directly relevant to key elements of the assessment of likely effects on materials and waste because compliance with these requirements – particularly with regard to the proportion of waste to be reused or recycled (diverted from landfill) – has a direct influence on the likely scale of impact of the Proposed Development, even without consideration of any mitigation (embedded or additional).

13.4 BASELINE CONDITIONS

Existing Baseline

- 13.4.1 At present the Main Site mainly comprises agricultural fields with an associated farm and buildings. Other uses on the Main Site include a local highway (unnamed) road which runs in an east-west direction through part of the Main Site, and a composting green waste facility operated by Biffa located towards the south-east of the Main Site (the Biffa facility is also known as Ashgrove Farm).
- 13.4.2 The Biffa IVC facility is an operational commercial food and garden waste composting facility. This facility comprises a weighbridge, reception building, composting tunnels, office and welfare facility, bio filter and maturation pad. It receives up to 35,000 tonnes of organic waste per year which is turned into bagged compost product.

- 13.4.3 The Main Site is currently a source of agricultural and green waste and small quantities of commercial waste from JW Pickford & Son farm. The exact quantities of waste currently generated from the Main Site are unknown but any waste from the agricultural activities is considered to be negligible.
- 13.4.4 The east of the Main Site is bounded by the B430 with Ardley Fields Household Waste & Recycling Centre, Ardley Landfill Site and Viridor ERF beyond on the eastern side of the B430. To the south of these waste facilities (also east of the B430) is an active Dewars Farm minerals quarry (limestone and clay) operated by Smiths Bletchington. Agricultural fields lie to the south and south-west. Chilgrove Drive bounds the west of the Main Site with the site of Heyford Park beyond.
- 13.4.5 The north-eastern edge of the Application Site extends into the Ardley Landfill Site. Part of the landfill south of the Chiltern Main Line is within the Order Limits, associated with the proposed rail connections to serve the proposed Rail Terminal, and works to provide the new primary vehicular access to the Main Site.

Ground Conditions

- 13.4.6 A geological baseline and assessment is presented in **Chapter 11** of this ES (Ground Conditions). This includes information and appraisal of areas of historical landfill present where the north-eastern edge of the Application Site extends into the Ardley Landfill Site (described as infilled ground - Ardley Landfill) and immediately to the north-west, north the Main Site. ES Appendix 11.6 contains the '*Ardley Landfill Ground Investigation and Geo-Environmental Assessment*' (Document 6.11F).

Mineral Resources

- 13.4.7 No area of the Main Site is located within a Coal Authority reporting area. Ground conditions comprise topsoil over weathered deposits of the White Limestone formation with solid bedrock from approximately 1m. Superficial deposits of alluvium were identified in the vicinity of streams and comprised a mixture of clays, sands, and gravels.
- 13.4.8 The impact of the Proposed Development on Mineral Safeguarding Areas has been assessed further within Chapter 11: Ground Conditions²¹.

²¹ Minerals Assessment at ES Appendix 11.3, Document 6.11C.

13.4.9 A number of quarries have been identified in the Expansive Materials and Waste Study Area which provide mineral sources. These are summarised in Table 13.14. There is no publicly available data on the capacity of the quarries that serve this area.

Table 13.14: Regional quarries identified within a 30 km radius of the Main Site

Quarry Name	Operator	Address	Distance from Site
Smith Ardley	Smiths Blechington	B430, Bicester OX25 4AE	200 m east
Wroxton Quarry	Peter Bennie LTD	Stratford Road, A422, Wroxton Heath, Banbury OX15 6EZ	19 km north-west
Rollright Quarry	Smiths Blechington	Unnamed Road, Chipping Norton OX7 5QD	25 km west
Passenham Quarry	GRS Group	Buckingham Rd, Deanshanger, Milton Keynes MK19 6JT	25 km north-west
Burford Quarry	Smiths Blechington	Burford Rd, Carterton OX18 3WN	29 m south-west

13.4.10 According to OCC’s most recent Local Aggregate Assessment²², total permitted reserves of sharp sand and gravel in Oxfordshire at the end of 2023 were 7.693 megatonnes (mt), which equated to a supply for 7.8 years based on OCC’s predicted demand of 0.986 mt per year. Total permitted reserves for soft sand in Oxfordshire at the end of 2023 were 3.288mt, which equated to a supply for 14.0 years based on OCC’s predicted demand of 0.235 mt per year. Total permitted reserves for crushed rock in Oxfordshire at the end of 2023 were 4.744mt, which equated to a supply for 4.9 years based on OCC’s predicted demand of 0.964 mt per year.

13.4.11 Information within the Local Aggregate Assessment confirms that Oxfordshire has a large existing supply of sharp sand and gravel, soft sand and crushed rock. However, the assessment states the need to identify sites to ensure sufficient supply of the following amounts up to the end of the local plan period (2031):

- Sand and Gravel - 2.649 mt;

²² Oxfordshire County Council (2024) ‘Oxfordshire Local Aggregate Assessment (Calendar year 2023)’ Available from: <https://www.oxfordshire.gov.uk/sites/default/files/file/planning-minerals-and-waste/FinalLocalAggregateAssessmentfor2023.pdf>

- Soft Sand - 0 mt; and
- Crushed rock - 0 mt.

Existing Facilities for the Deposition of Waste

13.4.12 The capacity and annual waste data received from active landfill sites within the Expansive Materials and Waste Study Area has been summarised in **Table 13.15**. The site name, address and types of materials accepted are also given. This data has been collated from the Environment Agency’s ‘2024 Remaining Landfill Capacity’²³ and ‘2024 Waste Data Interrogator’²⁴. The majority of the waste facilities within this table are located in Oxfordshire. However, the nearest waste facilities to the Main Site in Aylesbury Vale, Buckinghamshire, have also been added:

Table 13.15: Key Details of Waste Facilities within the Expansive Materials and Waste Study Area

Facility Name	Address	Location from the Site	Local Authority	Site Type	Total tonnes Received 2024	Remaining Capacity (m ³) as of end 2024
Oxfordshire						
Finmere Quarry Landfill EPR/ TP3436YQ	Banbury Road, Finmere MK18 4AJ	11 km north-east	Cherwell	Non Hazardous LF	126,748	12,000
Shipton Quarry	Shipton On Cherwell, Oxfordshire, OX5 3EL	11.5 km south-east	Cherwell	Inert Landfill and Physical Treatment	145,696	815,616
Woodeaton Quarry	Woodeaton Quarry, Woodeaton, Oxfordshire, OX3 9TJ	13.5 km south	South Oxfordshire	Inert Landfill	59,787	57,383
Restoration Landform	Blenheim Palace, Woodstock, Oxon, OX20 1PP	14 km south-west	West Oxfordshire	Inert Landfill	0	35,472

²³ Environment Agency (2025) ‘Remaining Landfill Capacity’ Available from: <https://www.data.gov.uk/dataset/237825cb-dc10-4c53-8446-1bcd35614c12/remaining-landfill-capacity1>

²⁴ Environment Agency (2025) ‘2024 Waste Data Interrogator’ Available from: <https://www.data.gov.uk/dataset/81f9d676-e77c-4d68-ab0c-b67e0b0b353e/2024-waste-data-interrogator>

Facility Name	Address	Location from the Site	Local Authority	Site Type	Total tonnes Received 2024	Remaining Capacity (m ³) as of end 2024
Dix Pit Landfill Site	Linch Hill, Stanton Harcourt, OX29 5BJ	25 km south-west	West Oxfordshire	Non-Hazardous Landfill	157,331	101,445
Upwood Quarry	Besselsleigh, Abingdon, Oxfordshire, OX13 5DW	29 km south-west	Vale of White Horse	Inert Landfill	14,254	210,746
Sutton Courtenay Landfill EPR/BV7001 IK	Appleford Sidings, Sutton Courtenay, Abingdon OX14 4PW	30 km south	Vale of White Horse	Non-Hazardous Landfill	365,472	1,155,866
Sutton Courtenay Landfill - Phase 3 - EPR/TP3330 AT	Sutton Courtenay Office, Appleford Sidings, Sutton Courtenay, Abingdon, Oxon OX14 4PW	30 km south	Vale of White Horse	Non-Hazardous Landfill	24,927	410,062
Buckinghamshire						
Calvert Landfill Site - Pit 6 - EPR/BP3637 AF	Brackley Lane, Calvert, Buckingham, MK18 2HF	15 km east	Aylesbury Vale	Non Hazardous Landfill	152,040	4,574,688
Calvert Landfill (Pits 4&5) - EPR/BS8605 IQ	Brackley Lane, Calvert, Buckingham MK18 2HF	15 km east	Aylesbury Vale	Non Haz (SNRHW) Landfill	99,451	1,873,391

13.4.13 By assessing the cumulative landfill void capacity set-out in Table 13.15 above, the calculation in Table 13.16 below determines that the regional landfill void capacity forecasted for 2029 is 5.35 million tonnes – this is based on a projection of the quantity of material received in 2024 over a 5 year period against the 2024 capacity. At this same rate of receiving material (1.15 million

tonnes per year), based on the assessment criteria presented Table 13.5 in the methodology section, the sensitivity is assessed as Very High.

Table 13.16: Regional non-hazardous / inert landfill capacity and received waste

Total Capacity of 10 sites 2024	= 9.25 million (M) m ³
• At 1.2 tonnes per m ³	= 11.1 M tonnes
• Total material received 2023	= 1.15 M tonnes
• 2023 sensitivity	= 1.15/11.1 x 100% = 10.4 % (very high)
Projection of 5 years based on 1.15 M tonnes per year	
• 5 year tonnage	= 5.75 M tonnes
• 2029 Total Capacity	= 5.35 M tonnes
• 2029 Sensitivity	= 1.15/5.35 x 100% = 21.5% (very high)

13.4.14 Based on the EA Waste Data Interrogator 2024, there are a limited number of hazardous waste landfill sites nationally. The management and disposal of hazardous waste is a specialist process and usually involves some interim treatment processes prior to disposal at landfill.

13.4.15 Three hazardous waste landfill sites were identified to include in a regional study (Midlands and South West of England). This data has been collated from the Environment Agency’s ‘2024 Remaining Landfill Capacity’ and ‘2024 Waste Data Interrogator’. The key information for each is shown in Table 13.17.

Table 13.17: Hazardous Landfill Sites Considered for a Regional Assessment

Facility Name	Address	Location from the Site	Local Authority	Total tonnes Received 2024	Remaining Capacity (m ³) as of end 2024
Parkgate Farm Hazardous Waste Landfill	Purton, SN5 4HG	58km south-west	Wiltshire	11,849	208,494
Wingmoor Farm	Stoke Orchard Road, Cheltenham, GL52 4DG	60km west	Tewkesbury, Gloucestershire	19,611	103,825
East Northants Resource Management Facility	Stamford Road, Kingscliffe, Peterborough PE8 6XX	86 km north-east	East Northamptonshire, Northamptonshire	220,245	1,783,450

13.4.16 The nearest hazardous landfill site is Parkgate Farm Hazardous Waste Landfill, which is approximately 58 km south-west of the Main Site in Wiltshire.

As of the end of 2024, this facility had a capacity of 208,494 m³ and received 11,849 tonnes of waste in 2024. Two other hazardous waste landfill sites are available from 60 to 90 km away from the Main Site: Wingmoor Farm and East Northants Resource Management Facility. Table 13.18 below calculates the void capacity for Hazardous waste sites for 2024 and forecasted for 2029 both at a Regional and National level. In the Regional context, the sensitivity of waste receptors is considered Very High. In the National context, the sensitivity of waste receptors is considered Very High.

Table 13.18: Regional and National Hazardous Waste Landfill capacity and received waste

	Regional	National
Capacity in 2024 (volume)	2.1 M m ³	9.17 M m ³
Capacity in 2024 (tonnage) At 1.2 tonnes per m ³	2.5 M tonnes	11 M tonnes
Material received 2024	0.25 M tonnes	0.8 M tonnes
2024 sensitivity	0.25 M / 2.5 M x 100 % = 10% (Very High)	0.8 M / 11 M x 100 % = 7.3% (Very High)
Projection of material received in 5 year period	1.25 M tonnes	4 M tonnes
2029 capacity based on 5 year prediction	0.85 M tonnes	7 M tonnes
2029 sensitivity	0.25 M / 0.85 M x 100 % = 29% (Very High)	0.8 M / 7 M x 100 % = 11.4 % (Very High)

13.4.17 Asbestos is considered a hazardous waste. Asbestos waste is, however, accepted at non-hazardous landfill sites with SNRHW (Stable Non-Reactive Hazardous Waste) Cells.

Waste Material and Management Facilities

13.4.18 A review of waste management facilities located in Cherwell, West Oxfordshire and Vale of Waste Horse was conducted using the EA Waste Data Interrogator 2024. In the absence of a better source of publicly available data for capacity of waste facilities, the tonnes received by waste facilities (data taken from the Waste Data Interrogator) has been used as an indicator of the operational throughput of waste management facilities. The use of throughput in the assessment may provide a more conservative value than capacity, but this is considered appropriate and robust as the majority of waste facilities often do not operate at their full permitted capacity due to operational constraints.

13.4.19 The sites presented in Table 13.19 accepted Construction & Demolition waste at quantities of over 1,000 tonnes in that year.

Table 13.19: Facilities within the Expansive Materials and Waste Study Area which accepted over 1,000 tonnes of Construction and Demolition waste in 2024

Site Name	Facility Type	Facility District	Tonnes Received
Cresswell Field, Worton Farm (OX29 4EB)	Physical Treatment	Cherwell	48,680
Ferris Hill Farm (OX15 5JY)	Non-Hazardous Waste Transfer / Treatment	Cherwell	16,450
Hanson Aggregates Cassington Quarry	Deposit of Waste to Land	Cherwell	114,291
L C Hughes Partnership	Metal Recycling	Cherwell	5,043
M & M Waste Recycling Transfer Station (OX29 4EB)	Non-Hazardous Waste Transfer / Treatment	Cherwell	43,507
Newlands Farm (OX15 4HE)	Non-Hazardous Waste Transfer	Cherwell	4,512
Shipton Quarry (OX5 3EL)	Physical Treatment	Cherwell	37,254
Wroxton Fields Quarry	Physical Treatment	Cherwell	2,040
Aggregates Recycling Facility (OX29 4EG)	Physical Treatment	West Oxfordshire	25,236
B & E Waste Transfer Station (OX29 0XQ)	Non-Hazardous Waste Transfer	West Oxfordshire	8,672
Cuckwood Farm (OX29 8AD)	Physical Treatment	West Oxfordshire	2,040
Dix Pit (OX29 5BB)	Inert Waste Transfer / Treatment	West Oxfordshire	13,020
Gill Mill Quarry Recycling Facility (OX29 7PP)	Deposit of Waste to Land	West Oxfordshire	18,348
Gill Mill Quarry Recycling Facility (OX29 7PP)	Physical Treatment	West Oxfordshire	10,172
Hickman Landscapes (OX18 4BZ)	Non-Hazardous Waste Transfer / Treatment	West Oxfordshire	1,833
Mick's Skips Waste Transfer Facility (OX29 7PL)	Non-Hazardous Waste Transfer	West Oxfordshire	2,965
Rollright Halt	Metal Recycling	West Oxfordshire	1,643
Appleford Recycling Facility (OX14 4PP)	Physical Treatment	Vale of White Horse	2,766
CAMAS Land (OX14 4AB)	Deposit of Waste to Land	Vale of White Horse	22,857
Chilton Transfer Station	Non-Hazardous Waste Transfer	Vale of White Horse	41,295
Hatford Quarry (SN7 8JQ)	Physical Treatment	Vale of White Horse	6,030
Shellingford Quarry	Physical Treatment	Vale of White Horse	59,718
Stonepit Barn (OX13 5HB)	Inert Waste Transfer / Treatment	Vale of White Horse	53,444

Swannybrook Farm (OX13 5NE)	Physical Treatment	Vale of White Horse	20,290
The Former Coal Yard (OX14 3NG)	Non-Hazardous Waste Transfer / Treatment	Vale of White Horse	10,020
Wantage Transfer and Recycling Facility (OX12 9FA)	Non-Hazardous Waste Transfer	Vale of White Horse	17,147

13.4.20 As can be seen in Table 13.19 above, there were 26 waste transfer or treatment sites which accepted more than 1,000 tonnes of construction and demolition waste in 2024. A total of 584,230 tonnes per annum (tpa) of construction and demolition waste was received by the facilities in 2024. The sensitivity of this receptor is considered to be Low.

13.4.21 The sites presented in Table 13.20 accepted Non-Hazardous waste at quantities of over 1,000 tonnes in that year.

Table 13.20: Facilities within the Expansive Materials and Waste Study Area which accepted over 1,000 tonnes of Non-Hazardous waste in 2024

Site Name	Facility Type	Facility District	Tonnes Received
Ardley Energy Recovery Facility	Municipal Waste Incinerator	Cherwell	334,321
Ardley Fields Farm	Non-Hazardous Waste Transfer	Cherwell	3,741
Ardley Green Compost Centre	Composting	Cherwell	34,317
Cassington AD Facility	Anaerobic Digestion	Cherwell	38,898
Banbury Transfer Station	Non-Hazardous Waste Transfer / Treatment	Cherwell	54,095
Dewars Farm Quarry	Physical Treatment	Cherwell	10,066
Finmere Quarry MRF	Material Recycling Facility & Physio-Chemical Treatment	Cherwell	81,430
M & M Waste Recycling Transfer Station	Non-Hazardous Waste Transfer / Treatment	Cherwell	19,527
Newlands Farm	Non-Hazardous Waste Transfer & Metal Recycling	Cherwell	9,864
Dix Pit Transfer Station	Non-Hazardous Waste Transfer	West Oxfordshire	21,077
Mick's Skips Waste Transfer Facility	Non-Hazardous Waste Transfer	West Oxfordshire	7,718
Showell Composting Facility	Composting	West Oxfordshire	25,148
West Oxfordshire Waste Transfer Station	Material Recycling Facility	West Oxfordshire	12,181
Chilton Transfer Station	Non-Hazardous Waste Transfer	Vale of White Horse	7,442

Hinton Compost Site	Composting	Vale of White Horse	4,351
Sutton Courtenay Composting Facility	Composting	Vale of White Horse	49,439
Sutton Courtenay Materials Recycling Facility	Material Recycling Facility	Vale of White Horse	69,195
Wantage Transfer and Recycling Facility	Non-Hazardous Waste Transfer	Vale of White Horse	8,053

13.4.22 As can be seen in Table 13.20 above, there were 18 waste transfer or treatment sites which accepted more than 1,000 tonnes of non-hazardous waste in 2024. A total of 790,863 tpa of non-hazardous waste was received by the facilities in 2024. The sensitivity of this receptor is considered to be Low.

Biffa IVC facility

13.4.23 The Biffa IVC facility, also referred to above, is an operational commercial food and garden waste composting facility located on the Main Site. The existing facility manages up to 35,000 tonnes of waste annually, with an average annual capacity over the last 5 years of 28,449 tpa.

13.4.24 The current lease for the facility will expire before the development is due to commence (2030) in that part of the site, although the planning permission would remain extant, absent the DCO. If OxSRFI is approved, the Applicant would exercise their agreement to acquire the land but would allow Biffa to operate the site until their lease ends in 2030. Therefore, DCO consent would represent the loss of this local organic waste capacity, unless Biffa is able to locate to an alternative site.

13.4.25 The waste management sites that are safeguarded by the Local Plan are listed in Appendix 2 of the Local Plan. It was proposed for a Site Allocations Document to be developed which would confirm whether or not safeguarding will apply to each site for the duration of the plan, however the development of this document ceased following the announcement that a new Mineral and Waste Local Plan was being developed. The Biffa IVC facility is listed within Appendix 2 of the Local Plan, referred to as Ashgrove Farm, biological treatment, reference number 014.

13.4.26 Policy W11 of the Oxfordshire Minerals and Waste Local Plan states that development that would prevent or prejudice the use of a safeguarded site will not be permitted unless, among other things, an equivalent waste management capacity can be appropriately and sustainably provided

elsewhere, or it can be demonstrated that the site is no longer required for waste management.

13.4.27 The following paragraphs aim to demonstrate why the site is no longer required for waste management. The Oxfordshire Minerals and Waste Local Plan has the following forecast capacity requirement for composting and food waste (based on forecast waste arisings):

Table 13.21: Projected capacity requirements for composting and food waste treatment

	MSW	C&I	CDE (non-inert)	Total
2021	109,700	28,200	10,300	148,200
2026	126,000	28,700	10,300	165,000
2031	131,600	29,100	10,300	171,000

13.4.28 According to the Waste Local Plan, existing waste management facilities (for composting and food waste treatment) will provide available capacity for: 219,600 tpa by 2021, 214,600 tpa by 2026 and 214,600 tpa by 2031. Therefore, there is a predicted surplus of capacity of 71,400 tpa in 2021, 49,600 tpa in 2026 and 43,600 tpa in 2031.

13.4.29 The most recent Authority Monitoring Report (AMR) 2020 (prepared by OCC in May 2023)²⁵ identifies that the actual tonnage of waste requiring composting/food treatment in 2020 was 188,178 tpa, approximately 40,000 tpa higher than the forecast capacity requirement for the closest target year 2021. However, the 2020 tonnage was still significantly below the available capacity for composting/food treatment facilities which is listed as 239,600 tpa for 2020 in the AMR (still a surplus capacity of 51,422 tpa).

13.4.30 The 2020 AMR provides a list of the composting/food treatment facilities within Oxfordshire and their permitted capacity within Appendix 3 of that report. The list has been copied in Table 13.22 below.

Table 13.22: Available capacity for composting and food waste treatment facilities in Oxfordshire (Appendix 3 of 2020 AMR)

Site	Operator	District	Grid Ref	End Date	Capacity (tpa)
Worton Farm	ST Green Power	Cherwell	SP 471 113	Permanent	48,500

²⁵ OCC (2023) 'Oxfordshire Minerals and Waste Authority Monitoring Report 2020 (1st January 2020 – 31st December 2020)' Available from: <https://www.oxfordshire.gov.uk/sites/default/files/file/planning-minerals-and-waste/MineralsandWasteAMR2020.pdf>

Ashgrove Farm	ST Green Power (now known to be Biffa)	Cherwell	SP 534 256	Permanent	35,000
Battle Farm/Wallingford Composting	ST Green Power	South Oxfordshire	SU 622 906	Permanent	45,000
Sutton Courtenay Landfill	FCC	Vale of White Horse	SU 515 930	2030	40,000
Glebe Farm	ST Green Power	Vale of White Horse	SU 366 972	2024	5,000
Church Lane	National Trust	Vale of White Horse	SU 234 938	Permanent	100
Showell Farm	ST Green Power	West Oxfordshire	SP 356 296	2040	21,000
Battle Farm/Wallingford AD	ST Green Power	South Oxfordshire	SU 622 905	Permanent	45,000
				Total	239,600

13.4.31 According to Table 13.22, the Biffa IVC facility (also known as Ashgrove Farm) has a maximum operational capacity of 35,000 tpa so if the site was closed and not relocated, it would leave a total capacity of 204,600 tpa which is sufficient to cover the projected capacity requirement of 171,000 tpa in 2031 (surplus of 33,600 tpa).

13.4.32 Considering the overcapacity for the management of organic waste within Oxfordshire, the proposed closure of the Biffa IVC facility is considered to be Negligible and should not impact upon the Oxfordshire Minerals and Waste Plan ability to deliver sufficient capacity for composing and food waste.

Ardley Landfill

13.4.33 Ardley Landfill was a major waste disposal site that operated for 35 years prior to closing in April 2014. It was operated by Viridor Waste Management Ltd but ownership has since been transferred to Valencia Waste Management Ltd.

13.4.34 Ardley Landfill was permitted under permit number EPR/BV73461M to deposit up to 440,000 tonnes of non-hazardous and inert waste per year, and a small amount (less than 10,000 tonnes per year) of asbestos/construction materials containing asbestos into a designated hazardous landfill cell. The landfill received over 6 million tonnes of waste before it closed.

13.4.35 The north-eastern edge of the Application Site extends into the Ardley Landfill Site and the proposed design would result in the construction of the railway and site access intersecting with the landfill cells A and B. The Application Site does not extend into the designated hazardous landfill cell at Ardley Landfill. Where the rail alignment and site access cuts through the existing area of Ardley Landfill, remodeling of the landfill will be required so that the final developed area of the Application Site does not fall within the landfill permit boundary. Further information on the landfill remodeling has been included in Section 13.5.

Future Baseline

13.4.36 The latest available information on material assets and waste infrastructure capacity has been used to inform the future baseline. Where information on likely trends is available, this is utilised to define the potential future baseline.

13.4.37 From 2025 until 2035, commercial construction activity and demand for aggregates is projected to grow by 1.6% on average each year. For context, the compound annual growth rate for commercial construction activity and aggregate demand between 2014 and 2021 was also 1.6%. It is possible that construction activity and aggregate demand may increase above a 1.6% growth each year given the Government's plans for infrastructure investment to reach £650bn over the 10-years to 2030/3126.

13.4.38 Annual aggregates demand is projected to increase from 253 million tonnes in 2021 to 323 million tonnes by 2035, a level not seen since the late 1980s²⁴.

13.4.39 The Department for Business Energy and Industrial Strategy published a research report called 'Future capacities and capabilities of the UK steel industry'²⁷. It estimated that UK demand for finished steel (across all industries) would grow to 11 million tonnes by 2030. However, demand fell during the first coronavirus lockdowns of 2020/2021. Demand and consumption of steel in the UK will depend on the strength of the construction industry, including spending on nationally important infrastructure projects and manufacturing.

²⁶ Mineral Products Association (MPA) (2022) 'Aggregates demand and supply in Great Britain: Scenarios for 2035'.

²⁷ Department for Business, Energy and Industrial Strategy (2017) 'Future capacities and capabilities of the UK steel industry', BEIS Research Paper Number 26.

- 13.4.40 In the UK, as with aggregates and steel, the future demand for timber will be directly linked to investment in house building, infrastructure projects and the strength of the UK building industry as a whole.
- 13.4.41 The Proposed Development will consume large quantities of key materials such as aggregates, concrete, asphalt and mortar, increasing the demand on the existing UK supply chain. The sensitivity of the receptor can be identified as Medium.
- 13.4.42 It is anticipated that different types of waste infrastructure capacity will continue to be available during the construction and operation of the project. Landfill will experience some use of available capacity as void space is taken. Government policy measures are also likely to divert waste from landfill. It is likely that a future baseline of waste infrastructure capacity in absence of the Proposed Development would see the Biffa IVC facility retained and operational.
- 13.4.43 Permitted capacity data published by the Environment Agency has been used to estimate the projected landfill capacity for the Expansive Materials and Waste Study Area for the future baseline. This relates to the total capacity of inert, non-hazardous and hazardous waste landfill that will be available within all of the regional areas in the Extended Study Area through which route the Proposed Development will pass.

13.5 ASSESSMENT OF LIKELY EFFECTS

- 13.5.1 This section of the Chapter considers the likely effects of the Proposed Development including embedded mitigation and design measures.

Construction Phase

- 13.5.2 The Proposed Development will result in the production of waste arising from Construction, Demolition and Excavation (CD&E) activities. The Proposed Development will generate quantities of CD&E waste potentially increasing the demand on the existing waste infrastructure.

Embedded mitigation

- 13.5.3 There is significant synergy between materials re-use and the avoidance of the generation of waste, and therefore there is a substantial overlap between the embedded mitigation measures for materials and waste.

13.5.4 The importance of careful management of materials to promote re-use and waste reduction has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes and provide the basis for mitigating environmental effects associated with materials and waste.

13.5.5 The principal embedded mitigation measure relating to this topic is the implementation of measures identified in the CEMP which is submitted as part of the DCO application (ES Appendix 2.3, Document 6.2C). The detail of measures and their implementation will be expanded through phase-specific P-CEMPs relating to the detailed design phase (i.e., before the start of construction) and implemented during the construction phase. The CEMP includes the following:

- details of the approach to environmental management throughout the construction phase, with the primary aim of mitigating any adverse impacts from construction activity on the identified sensitive receptors;
- methods for the prevention and control of any potential short-term construction phase impacts (e.g., construction dust, and the risk of accidental spillages contaminating materials) and also other permanent impacts (e.g., disturbance to vegetation, archaeology and heritage);
- good materials management methods, such as location of temporary haul routes and re-use of temporary works materials from haul routes, plant and piling mats etc; and
- risk/impact-specific method statements and strategic details of how relevant environmental impacts would be addressed throughout the construction of the Proposed Development.

13.5.6 Although not required by the regulations, the CEMP (ES Appendix 2.3) requires a Site Waste Management Plan (SWMP) to be produced during the detailed design phase post-consent (i.e., before the start of construction) and regularly updated during the construction of the Proposed Development. The SWMP will identify:

- the types and likely quantities of construction, demolition and excavation (CD&E) wastes that may be generated as a result of the proposed development;
- relevant reuse, recycling and landfill diversion targets applicable to the proposed development; and

- a review of the waste management measures and procedures to be implemented on site during construction in line with relevant legislation, guidance and best practice. These measures would set out how the CD&E wastes would be reduced, reused, managed and disposed of.

13.5.7 The P-CEMPs would also contain a Materials Management Plan (MMP). An MMP would:

- demonstrate the quantity of material to be reused on site;
- identify the origin of the material to be used on site, and/or identify the receiver site for surplus material; and
- demonstrate that the material is suitable for reuse and there would be no risk to either human health or the environment by reusing the material either on site or on the receiver site.

13.5.8 Implementation of a SWMP and MMP would ensure that material reuse is maximised by minimising waste at source (reducing the requirement for new construction materials) and during construction. For example, this could include screening, crushing, and recycling of demolition materials onsite, or the use of in-situ recycling of tar bound bituminous materials. Further, an MMP allows for any imported material to come from donor sites as waste material or material for reuse.

Setting Targets to Divert Waste from Landfill

13.5.9 Targets for diverting demolition materials from landfill and construction waste from landfill targets will be included in the SWMP. These targets will be in line with the good practice targets set in the Building Research Establishment Environmental Assessment Methodology BREEAM New Construction Manual (BRE Global Ltd, 2018). The targets are anticipated to exceed the target set by the Waste (England and Wales) Regulations 2011 (as amended), which requires that a minimum of 70% of construction and demolition waste should be prepared for reuse, recycling or other material recovery. The Proposed Development intends to target 90% diversion from landfill for the construction phase.

13.5.10 Where applicable, further targets would be set during the detailed design stage to reduce, reuse or recycle key waste materials on and off site. The targets will be incorporated into the contract specifications with contractors post consent.

Minimisation

13.5.11 The design of the new buildings and structures will take into account the relevant best practice guidance. This could include industry body 'The Waste and Resources Action Programme' (WRAP) which ensures design reduces the amount of waste produced by:

- *“Designing for reuse and recovery”;*
- *“Designing for off site construction”;*
- *“Designing for materials optimisation”;*
- *“Designing for waste efficient procurement”;* and
- *“Designing for deconstruction and flexibility”*

13.5.12 The majority of opportunities to minimise the amount of waste generated by a development occur during the design stage. The following design measures will be considered where practicable:

- Using pre-fabricated materials for on-site assembly;
- Buildings/structures designed to standard dimensions of blocks or frames to avoid off-cuts; and
- Internal materials and fittings would be pre-cut to reduce the need for site cutting.

13.5.13 The design of the Proposed Development aims to retain spoil on site, where practicable. The CEMP (ES Appendix 2.3) assumes a Materials Management Plan (MMP) would be prepared to document the management of excavated material on the site and provide the evidence needed to avoid this material being deemed to be a waste.

13.5.14 Decisions taken to minimise waste through the design process will be documented in the SWMP following consent, as part of implementing the approach defined by the CEMP (ES Appendix 2.3).

13.5.15 Waste would also be minimised by improving wastage rates when ordering materials. Waste allowances are generally included within material orders to take into account design waste and construction process waste. These waste allowances are often generic and not project specific and, therefore, run the risk of being inaccurate. This can lead to a surplus of materials, which typically ends up being discarded (i.e., waste). A system will be put in place to enable the accurate estimates of material requirements (and waste allowances) at the detailed design stage.

13.5.16 On appointment of the construction team, the buyer would discuss the purchasing requirements with the site manager to identify priorities and review the quotations received. Materials would be checked against the material specifications as part of the quality control system. Where possible, hazardous materials would be substituted for less hazardous alternatives.

13.5.17 Waste minimisation measures would be implemented by the principal contractor and site manager during construction in order to achieve the waste allowance targets. The following measures will be considered within the SWMP to be prepared during the detailed design stage:

- A logistics system which allows 'just-in-time' deliveries to minimise the length of time materials are stored on site and co-ordinate with other trades;
- Providing suitable and secure storage for materials where 'just-in-time' deliveries cannot be set up;
- Mechanical systems and machinery would be considered for moving materials to reduce the risk of damage; and
- Programming and monitoring construction activities to avoid overlap of incompatible trades working in the same area and to reduce the potential for waste to be generated from replacing damaged work.

13.5.18 The target for construction waste resource efficiency for new buildings is ≤ 11.1 tonnes of waste generated per 100 m² (gross internal floor area) and is in line with BREEAM New Construction Manual (BRE Global Ltd, 2018).

Preparing for Reuse of site won materials

13.5.19 The approach to earthworks will enable materials excavated onsite to be re-used at areas of the site where materials are required, as far as practicable. The approach to earthworks will be influenced by the construction phasing and there may be limitations on how materials can be re-used between the different phases.

13.5.20 The Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste Code of Practice (Contaminated Land: Applications in Real Environments, 2011)²⁸ will be applied to optimise the amount of excavated materials that can be re-used and recycled across the Proposed Development.

²⁸ Contaminated Land: Applications in Real Environments (2011) The Definition of Waste: Development Industry Code of Practice

The requirement to comply with the CL:AIRE Definition of Waste Code of Practice is set out in the CEMP.

- 13.5.21 A pre-demolition audit will be undertaken prior to demolition works for all buildings and structures to be demolished to identify the type, location and condition of hazardous materials. A similar record of all salvageable and recyclable materials will also be prepared.
- 13.5.22 Prior to demolition, any hazardous waste will be removed from the buildings and the fittings etc. would be stripped out and sorted for salvage/recycling. All movements of waste from the site will be recorded using the SWMP.
- 13.5.23 Materials from the demolition of buildings and structures on site will be stockpiled to allow pre-treatment for reuse on or off- site, or they will be removed off-site for recycling or disposal.

Recycling

- 13.5.24 Wastes generated during the construction process will be segregated into waste types to facilitate off-site recycling (for example, metals, wood, plastic). The layout of the construction site will be designed to allow sufficient space for separate containers of key waste materials to be stored. These containers will be clearly labelled and construction staff will be given training on waste segregation.
- 13.5.25 Concrete from the redundant areas of hardstanding, including the redundant strip of road will be excavated to an agreed depth and crushed on site for re-use in the construction process.
- 13.5.26 It is expected that green waste generated during site preparation works will be composted on-site or sent offsite for composting. Opportunities will be investigated to retain woody material on site for landscaping and ecological planting.
- 13.5.27 The principal contractor will consider the use of recycled materials where possible, subject to cost and availability (for example, recycled aggregate and secondary aggregates for use in concrete, or granular fill).

Disposal

- 13.5.28 Any waste that cannot be reused, recycled or recovered will be collected by the licensed waste management contractor and disposed of at a permitted site

suitable for the type of waste. Burning of surplus material or material arising from the site construction will not be permitted, this will set out within the CEMP and SWMP.

Storage of Waste

- 13.5.29 Waste storage areas will be provided at the construction site. Each skip/container will be clearly marked to indicate the intended contents and will be suitable for the storage of the specified contents. All skips/containers will be covered to prevent the escape of waste by wind blow or vandalism. If liquid waste is being stored, an appropriate bund and drip pans will be in place.
- 13.5.30 Storage areas will be located away from potential contaminant pathways such as drains, and excavations and trenches. Any hazardous waste will be stored safely in a designated area away from non-hazardous and inert wastes and labelled accordingly.

Mineral Assets

- 13.5.31 The depletion of finite material resources will occur through extraction of primary aggregates (e.g. sands and gravels). Structures, drainage and signage products will be procured with consideration of the environmental impacts associated with their manufacture, as well as other considerations such as structural design, carbon footprint (PAS 2050), energy consumption, long-life performance, visual impacts, durability and cost. The procurement of sustainable materials will be secured through the CEMP.
- 13.5.32 With the growing demand for construction products and the ever-increasing pressure to reduce the environmental impacts of depleting natural resources, there is a significant percentage of construction materials that are produced from recycled material including the use of site-won recycled materials.
- 13.5.33 Site levels and grading of the Proposed Development will be designed to achieve a cut and fill balance in order to help minimise excavation quantities. The approach to earthworks will enable materials excavated onsite to be re-used at areas of the site where materials are required, as far as practicable.

13.5.34 The Environment Agency Quality protocols (Environment Agency, 2020d)²⁹ will be used to identify when a waste-derived material can be regarded as a non-waste product and no longer subject to waste controls. The Quality protocols could potentially be applied to optimise the amount of demolition materials that can be re-used across the Proposed Development, and the requirement to comply with these protocols will be set out in the CEMP.

Ardley Landfill

13.5.35 Landfill waste excavated from where the rail alignment and site access intersects with Ardley Landfill will be re-deposited atop the existing Ardley Landfill within Cells A and B in accordance with an environmental permit variation. For further information about the approach to the permit variation, please refer to the DCO Explanatory Memorandum.

13.5.36 The current cap on Cells A and B is not compliant with the Landfill Directive (1999/31/EC). The reprofiling and capping of the landfill will ensure that the cap on Cells A and B is in compliance, creating health and safety and environmental benefits. Reprofiling Cells A and B and improvements to gas and leachate infrastructure in the reprofiled areas will also improve the collection and management of gas and leachate which will have environmental benefits.

13.5.37 Specific mitigation to be implemented to reduce potential impacts arising from odour, noise and contamination related to the excavation of landfill waste from Ardley Landfill will be addressed in the Chapters from relevant topics and is not included within this Chapter.

Demolition Waste

13.5.38 Demolition works would be required as part of the Main Site preparation works including demolition of the IVC facility and parts (but not all) of the existing Farm Campus buildings at Ashgrove Farm. Demolition of the buildings on the Main Site will produce a variety of waste materials including concrete, masonry, aggregates, ferrous and non-ferrous material, timber, glass, plasterboard and slate. A relatively small quantity of material is expected to be generated from these demolition works.

²⁹ Environment Agency (2020d) Quality protocols: converting waste into non-waste products, available at: <https://www.gov.uk/government/collections/quality-protocols-end-of-waste-frameworks-for-waste-derived-products>

13.5.39 Based on the footprint area of the buildings to be demolished and using the assumption that the quantity of demolition wastes resulting from industrial structures is estimated to be 2 tonnes/m² of the total demolished area³⁰, the total demolition waste from buildings within the Main Site is calculated at 12,806 tonnes (as shown in **Table 13.23**).

Table 13.23: Building demolition waste

Building	Area (m ²)	Demolition waste (tonnes)
Ardley IVC buildings	2,750	5,500
Ashgrove Farm buildings	3,653	7,306
Total	6,403	12,806

13.5.40 Parts of existing roads and hardstanding will be demolished generating additional material. Material generated is anticipated to include crushed concrete, aggregate road base and road planings.

13.5.41 The quantity of waste expected to be generated as a result of the demolition of hardstanding has been calculated based on the area and the assumption that the hardstanding is 0.5m thick. An average density of 2 tonnes/m³ has also been applied. The results are shown in **Table 13.24**.

Table 13.24: Demolition waste from roads and hardstanding

Location	Area of hardstanding (m ²)	Demolition waste (tonnes)
Ardley IVC	4,512.5	9,025
Ashgrove Farm	2,843	5,686
Total	7,355.5	14,711

13.5.42 A small quantity of further demolition waste will be generated through the clearance of existing infrastructure, including services, and drains which will need to be removed prior to construction. These are likely to consist of hard and inert materials, soils, rock and stones, wood (including vegetation), brick, concrete, and miscellaneous metals.

13.5.43 It is expected that green waste generated during site preparation works will be composted on-site or sent offsite for composting. Opportunities will be investigated to retain woody material on site for landscaping and ecological planting.

³⁰ El-Hagggar, S. E., Chapter 8 – Sustainability of Construction and Demolition Waste Management, 2007, p261-292

- 13.5.44 A high proportion of this demolition and site clearance material is expected to be suitable for reuse and recycling on site. This includes: reinforcement and structural steel work; masonry and brickwork; reinforced concrete and concrete; aggregate sub-base; and bituminous pavement material. Where necessary these materials would be suitably processed to meet specification requirements.
- 13.5.45 The volumes of non-hazardous waste from demolition works are considered to be relatively low in comparison to the regional landfill capacity (equivalent to 0.5% of the forecasted capacity). Therefore, with a Very High sensitivity of receptor and Negligible magnitude of impact, this results in a Slight significance of effect which is Not Significant.
- 13.5.46 It is expected that a high proportion of the material generated will be recyclable and not go to landfill. Waste facilities (non-landfill) in the surrounding area (Cherwell, West Oxfordshire and Vale of White Horse) received a total throughput of 584,230 tonnes of construction and demolition waste in 2024. The volumes of non-hazardous waste from demolition works are considered to be relatively low in comparison to this throughput (equivalent to 4.7% of the throughput).
- 13.5.47 It is likely that the demolition will generate some asbestos hazardous waste. Asbestos will need to be surveyed prior to the commencement of demolition works so that all asbestos material can be separated and managed appropriately. The quantities are expected to be very low in comparison to the national hazardous landfill capacity. Therefore, with a Very High Sensitivity of receptor and a Negligible magnitude of impact, this results in a Slight significance of effect which is Not Significant.

Earthworks

- 13.5.48 Some material, such as excavated soils, will originate on the Main Site. The Proposed Development will seek to utilise as much soil and other materials sourced from within the Main Site as possible as part of achieving a cut and fill balance. This will depend on the scheduling and timing of the construction of each scheme and the nature of the materials available and whether legacy contamination is found.
- 13.5.49 How a cut and fill balance for the Main Site of the Proposed Development could be achieved is shown in Table 13.25 below, based on information contained within the CEMP (ES Appendix 2.3):

Table 13.25: Cut and fill balance for the Proposed Development

Location	Area (m ²)	Cut (m ³)	Fill (m ³)	Net balance (m ³)
Inside Plot Development				
Zone A1 a	175,800	120,100	71,200	48,900 (Surplus)
Zone A1b	178,600	130,500	123,100	7,400 (Surplus)
Zone A2	134,600	179,100	60,100	119,000 (Surplus)
Zone A3	533,500	443,300	1,133,200	689,900 (Import)
Zone A4	234,500	858,100	26,200	831,900 (Surplus)
Zone B	53,300	353,300	0	353,300 (Surplus)
Zone C	62,700	610,600	0	610,600 (Surplus)
Total	1,373,000	2,695,000	1,413,800	1,281,200 (Surplus)
Outside Plot Development				
Total	-	1,292,600	2,546,100	1,253,500 (Import)
<i>Overall Total</i>		<i>3,987,600</i>	<i>3,959,900</i>	<i>27,700 (Surplus)</i>

- 13.5.50 A small amount of earthworks is also expected to be required for the off-site highways works, with a net import of 91,000 m³ of material required for the highways works.
- 13.5.51 Topsoil is treated as a bulk earthworks material in this assessment. The approximate volume of topsoil within the site is 717,000m³ based on an average thickness of 0.3m. The volume of material within the perimeter bunds exceeds 2,000,000m³ which is sufficient to accommodate excess topsoil.
- 13.5.52 An allowance of 93,000m³ has been made for stockpiling of topsoil to be used within plot landscaping.
- 13.5.53 Within areas of fill, the existing topsoil will require stripping and replacing with engineered material. This is not allowed for within the overall volume assessment above. The area of built development within areas of fill is 601,000m² and based on 0.3m topsoil thickness a volume of 180,000m³ of additional earthworks is to be allowed for.
- 13.5.54 As referred to above, a commitment has been made to achieve a cut and fill balance within the Order Limits with an exception of the excavation material arising from the boundary of the Ardley Landfill. The Main Site and off-site highways works will in combination work to create a cut and fill balance. The volumes of non-hazardous and inert material generated by the excavation works for disposal off-site are considered to be very low in comparison to the regional landfill capacity providing that the cut and fill balance is met and the

majority of the earthworks material is reused and recycled on-site. Therefore, with a Very High sensitivity of receptor and Negligible magnitude of impact, this results in a Slight significance of effect which is Not Significant.

- 13.5.55 The quantities of hazardous waste expected to be generated as part of the earthwork activities are expected to be very low (if any) in comparison to the national hazardous landfill capacity. Therefore, with a High sensitivity of receptor and Negligible magnitude of impact, this results in a Slight significance of effect which is Not Significant.

Ardley Landfill

- 13.5.56 The north-eastern edge of the Application Site extends into the Ardley Landfill Site and the proposed design would result in the construction of the railway and site access intersecting with the landfill cells A and B. It is proposed that landfill waste will be excavated from the impacted area and placed atop the existing Ardley Landfill within Cells A and B. This will include removing the existing mineral cap, placing the existing waste and capping it with a new mineral cap that conforms to Waste Framework Directive standards.
- 13.5.57 In order to facilitate the proposed engineering works to the landfill, a permit variation will be required to be submitted to, and approved by, the EA. The permit variation will allow for a partial surrender of the existing permit, which will take into account the works that are proposed to be carried out as part of the Proposed Development. Initial discussions on the permit variation application have been held with the EA but no formal application has been prepared at this stage.
- 13.5.58 An assessment of effects related to the excavation and deposition of the landfill material, for example odour and contamination risks, has been addressed within the Chapters for the relevant topics and are not included within this Chapter. The Technical Note at Appendix 13.1 sets out more detail regarding the proposed works in the landfill area.
- 13.5.59 The cut and fill balance for the section of the Ardley Landfill site which falls within the Application Site boundary is shown in Table 13.26 below.

Table 13.26: Cut and fill balance for the section of Ardley Landfill site within the Application Site boundary

Location	Cut (m ³)	Fill (m ³)	Net balance (m ³)
Landfill	275,000	275,000	0 (Balanced)

13.5.60 The proposed methodology and scope for these works are set out in more detail in ES Appendix 13.1. The approach taken is considered robust in terms of the calculated volumes of excavated landfill waste which will be placed within (on top of) the existing Ardley Landfill cells A and B. There is sufficient volume and area within the defined parameters for those works for be implemented as proposed, and the assumptions made are considered sufficiently robust to remove any likelihood or likely risk that any excavated landfill waste would be required to be removed from site.

Construction Waste

13.5.61 In terms of waste, potential environmental impacts are primarily related to the production, movement, transport, processing and disposal of waste from the construction of the Proposed Development. Most of the material resources required for construction of the Proposed Development, such as metals, aggregate, pavement, concrete and soils, will originate offsite purchased as construction products.

13.5.62 Waste produced from the construction of buildings within the Proposed Development is shown in Table 13.27. This figure has been calculated using Smart Waste BRE Benchmark Data³¹; industrial buildings produce an average quantity of 12.6 tonnes of construction waste per 100 m².

Table 13.27: Waste produced during the construction of buildings within the Proposed Development

Building Type	Area (m ²)	BRE Benchmark Type	Construction Waste (tonnes)
Main site	603,850	Industrial Buildings	76,085
Rail terminal	2,500	Industrial Buildings	315
<i>Total</i>	<i>606,350</i>	-	<i>76,400</i>

13.5.63 Waste produced from the construction of roads and paved areas within the Main Site (including hardstanding for the Rail Terminal) has been calculated based on a wastage rate of 3% of the total material used³² and is shown in Table 13.28. An average density of 1.5 tonnes/m³ has been assumed.

³¹ Smart Waste BRE Benchmark Data (2012).

³² Based on industry standard quantity surveying estimates

Table 13.28: Waste produced from the construction of hardstanding within the Proposed Development

Area of proposed hardstanding (m²)	Volume of material (m³) (assuming a depth of 0.5m)	Construction waste (tonnes)
802,500	401,250	18,056.25

- 13.5.64 Potential impacts could include the temporary use of waste management facilities capacity (during treatment) and a permanent decrease in landfill capacity (disposal). Landfill is a finite resource and the ongoing disposal of waste puts pressure on the existing facilities or requires new sites to be developed. Similarly, waste management and waste treatment facilities have limits on processing capacity, therefore there is the potential for the Proposed Development to utilise a proportion of the remaining available capacity temporarily for the duration of construction.
- 13.5.65 Assuming a worst case scenario where all waste is sent to landfill, the total quantity of construction waste calculated in Tables 13.25 and 13.26 (94,456.25 tonnes) is 1.8% of the total non-hazardous landfill capacity. This waste is unlikely to be generated in one year; instead it will be generated over the whole construction period which is likely to span several years. Therefore, with a Very High sensitivity of receptor and Negligible magnitude of impact, this results in a Slight effect which is Not Significant.
- 13.5.66 It is expected that a high proportion of the material generated will be recyclable and not go to landfill. Waste facilities (non-landfill) in the surrounding area (Cherwell, West Oxfordshire and Vale of White Horse) received a total throughput of 584,230 tonnes of construction and demolition waste in 2024. The volumes of non-hazardous waste from demolition works are considered to be relatively low in comparison to this throughput (equivalent to 16% of the throughput) noting that the waste is unlikely to be generated in one year; instead it will be generated over the whole construction period which is likely to span several years.
- 13.5.67 The quantities of hazardous waste expected to be generated as part of the construction activities are expected to be very low (if any) in comparison to the national hazardous landfill capacity. Therefore, with a High sensitivity of receptor and Negligible magnitude of impact, this results in a Slight significance of effect which is Not Significant

Construction Material

13.5.68 Material assets used during construction of the Proposed Development will include primary raw materials, such as aggregates and minerals, steel, timber, masonry and glass, and manufactured construction products which include recycled and secondary aggregates. The term 'aggregate' is an umbrella descriptor for bulk raw materials used in large development and infrastructure construction projects. These materials can be further defined as primary, secondary or recycled aggregate as follows:

- Primary aggregate - is the term used for aggregate produced from naturally occurring mineral deposits which are used for the first time;
- Secondary aggregates - are derived from a very wide range of aggregates and minerals that may be used as aggregates; and
- Recycled aggregates - can be sourced from a variety of materials arising from construction and demolition (concrete, bricks, and tiles), highway maintenance (asphalt planings), excavation and utility operations.

13.5.69 The quantities of materials expected (estimated) to be required for the construction of the Proposed Development is shown in Table 13.29. At this stage of the design, the estimated quantities can only be calculated as a high-level approximation based on the following assumptions:

- 603,850 m² GIA of Industrial (Warehouse) type building with material splits of 45% concrete, 33% steel, 8% timber, 8% masonry, 4% glass, 3% insulation and 3% other. Building material intensity of 1.75 t/m².
- 2,500 m² GIA of ancillary Commercial (Office) type building (Rail terminal) with material splits of 55% concrete, 23% steel, 8% timber, 8% masonry, 7% glass, 3% insulation and 3% other. Building material intensity of 1.75 t/m².
- 196,500 m² area of road construction assuming an average of 0.5m engineering thickness broken down into 0.1m of asphalt, 0.2m of concrete sub-base and 0.2m of aggregate sub-base.
- Construction of 11 new bridges/culverts with the assumption that all bridges/culverts are an average size of 35m Length x 20m Width x 10m Depth.
- 5,850m of railway tracks assumed to be 1.5m width where a single track and 3m width where a double track (ratio of 50:50 along the

- length). Comprised of steel (0.1m thickness), concrete sleepers (0.1m thickness), and 4,000 m³/km of aggregate ballast and sub-grade.
- 135,100 m² of landfill area requiring capping material assumed to be of a geosynthetic clay cover material.

Table 13.29: Estimated quantities of material required for the construction of the Proposed Development

Material Type	Volume of material (m ³)	Density (t/m ³)	Construction material (tonnes)
Buildings			
Concrete	199,249	2.4	477,251
Steel	43,889	7.85	344,143
Timber	132,698	0.6	79,490
Masonry	39,809.5	2	79,490
Glass	17,034	2.5	42,473
Insulation	663,500	0.04	26,497
Other (Miscellaneous)	26,540	-	26,497
Roads			
Asphalt	19,650	2.2	43,230
Concrete	39,300	2.4	94,320
Aggregate	39,300	2.5	98,250
Other Infrastructure			
Steel	78,316	7.85	614,783
Concrete	78,316	2.4	187,959
Aggregate	23,400	2.5	58,500
Landfill capping material	-	5,015 g/m ²	678

13.5.70 Although the source of materials cannot be defined at this stage, a significant quantity of minerals and materials are expected to be sourced locally where practicable by the Contractor and the percentage of recycled materials is expected to be maximised wherever possible, as required by the CEMP and SWMP for site-won recycled materials. As confirmed by Chapter 11 of this ES, the site contains limestone resources, some of which will be exploited as part of the process of preparing the Main Site for development and in delivering the proposed cut and fill earthworks across the scheme. Site won mineral resources and spoil will be used on-site and will help reduce the reliance on similar products from other sources, including off-site quarries.

13.5.71 However, a review of the available quarries has been undertaken and five quarries have been identified in close proximity to the Main Site (as shown in Table 13.12). All five are within the Expansive Materials and Waste Study

Area). Mineral capacity data is not readily available as it is commercially sensitive information to operators and therefore not forthcoming. It is considered that given the number of quarries in close proximity to the Main Site that there is a substantial quantity of quarried material available to this Site.

- 13.5.72 Given the Application Site's proximity to identified reserves of construction materials and expected construction material types and volumes, the magnitude of impacts for materials is expected to be minor at this stage. Therefore, with a Medium sensitivity of receptor and Minor magnitude of impact, this results in a Slight significance of effect which is Not Significant.

Storage of Materials and Waste

- 13.5.73 Measures to control the management and temporary storage of materials and waste during construction are detailed within the CEMP submitted as part of the application (appended to Chapter 2 of this ES) and in future detailed phase specific CEMPs (P-CEMPs) to be required by the DCO. Details are therefore not covered or defined in this assessment.
- 13.5.74 Waste will be separated at source where practical, with storage areas laid out to facilitate the segregation of waste material to encourage reuse and recycling; for example, by using colour coded skips. Signage will be used to clearly identify the material to be stored in each area and the site set up will be continuously reviewed and modified where necessary to maximise the opportunity for reuse and recycling.
- 13.5.75 Temporary storage areas will be provided with the capacity to store excavated material required for reuse onsite. Best practice guidance recommends that topsoil should not be stored at heights greater than 3m³³.

Transportation of waste

³³ Defra, 2009. Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available online at: [Construction Code of Practice for the Sustainable Use of Soils on Construction Sites \(publishing.service.gov.uk\)](http://publishing.service.gov.uk)

13.5.76 The movement of waste will be undertaken by road. The extent of the impacts will be proportional to the waste generated and any reduction in waste will reduce the impacts on the road network. During construction works the reuse of material onsite will reduce waste movements. The impact on air quality, noise, and traffic is assessed elsewhere in the ES. Any betterment in the reduction of waste generated will automatically reduce the potential transportation impact.

Construction Waste Impacts

13.5.77 The potential waste types that could arise during the construction phase are summarised in **Table 13.30**.

Table 13.30: Types of waste arisings generated by construction of the Proposed Development

Phase	Potential Waste Generation	Classification of Waste	Potential Impacts / Management
Demolition	Building materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc. Made ground, soil and sub-soils Asphalt and bituminous products.	Inert; and/or, Non-hazardous; and/or, Hazardous. Non-hazardous, and Hazardous if it contains sufficiently high levels of	The reduction in national landfill capacity.
	Existing infrastructure such as farmhouse and road demolition including supports, rails, voids.	heavy metals or if asphalt contains coal tar.	Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert / non-hazardous or hazardous landfill site.
Excavation	Made ground, soil and sub-soils.	Inert; and/or, Non-hazardous; and/or, potentially Hazardous if it contains sufficiently high levels of heavy metals.	The reduction in regional inert, non-hazardous and hazardous landfill capacity.
Site preparation and earthwork	Vegetation strip and tree removal. Existing highways infrastructure such as kerbs, lighting, highways signs, safety barriers, etc.	Inert; and/or, Non-hazardous.	Re-use onsite. Recycling offsite in local projects. Local recycling facilities. Disposal at an inert / non-hazardous or hazardous landfill site.
	Landfill waste excavated from Ardley Landfill.	Inert; and/or, Non-hazardous; and/or, potentially Hazardous if it contains sufficiently high	Re-used onsite to reprofile Cells A and B.

Phase	Potential Waste Generation	Classification of Waste	Potential Impacts / Management
		levels of heavy metals.	
Construction	Construction materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc.	Inert; and/or, Non-hazardous; and/or, Hazardous.	The reduction in regional inert, non-hazardous and hazardous landfill capacity.
	Made ground, soil and sub-soils.	Non-hazardous, and Hazardous if it contains sufficiently high levels of heavy metals.	The reduction in national landfill capacity.
	Waste products arising from the presence of construction staff onsite e.g. effluent from portable toilets, food waste and packaging, as well as waste from surplus materials and spillages.	Inert; Non-hazardous and potentially Hazardous.	The reduction in regional non-hazardous and hazardous landfill capacity.
	Surface planings.		Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert or non-hazardous site.
Site won material (hazardous).		Any hazardous material will be taken to a permitted waste management facility.	

13.5.78 An assessment of construction impacts in terms of waste is presented in Table 13.31.

Table 13.31: Assessment of the likely construction impacts

Project Activity	Activities with Potential impacts on material resource / waste	Sensitivity of Receptor	Description Magnitude	Significance
Demolition	Disposal of demolition waste	Very High	Negligible	Slight
Demolition	Disposal of asbestos from demolition works	Very High	Negligible	Slight
Site preparation earthworks	Excavation and filling using site won materials, disposal of unsuitable material	Very High	Negligible	Slight
Construction	Construction waste	Very High	Negligible	Slight

Project Activity	Activities with Potential impacts on material resource / waste	Sensitivity of Receptor	Description Magnitude	Significance
Construction	Use of quarried aggregate for construction (Concrete, sub base, road surfacing)	Medium	Minor	Slight

Operational Phase

Embedded mitigation

- 13.5.79 Operational waste will be managed through embedded mitigation measures that prioritise waste prevention, segregation, and resource efficiency.
- 13.5.80 The Proposed Development will implement a clearly defined waste hierarchy approach, supported by well-designed internal storage areas that enable the separation of recyclables, and residual waste at source. Operational procedures will include staff training, visible signage, and colour-coded containers to minimise contamination and maximise recycling performance. Waste and recycling storage will be enclosed, ventilated, and sized to meet forecast arisings, with regular collections scheduled to prevent overflow, odour, or pest issues.
- 13.5.81 Monitoring of waste volumes and recycling rates will be undertaken by site staff to identify improvement opportunities and ensure the site maintains full compliance with regulatory obligations and recycling targets.

Operational Waste

- 13.5.82 An assessment of the likely waste impact during the operation of the Proposed Development is based on the typical weekly waste arisings quantities from BS5906:200534. This British Standard has typical quantities for a wide range of building types and this proposed use best fits with the industrial weekly arising of five Litres (L) per m² of floorspace. Based on the assumed floor total area of 603,850 m² for the Main Site, this equates to approximately 3,019.25 m³ of waste generated per week, or an annual waste arising of 157,001 m³ / 32,970 tonnes per annum of waste generated (using the WRAP conversion of 0.21 tonnes per m³ for municipal waste). Generated wastes are likely to

³⁴ British Standards Institute (2005) 'Waste Management in Buildings – Code of Practice' Available from: <https://shop.bsigroup.com/products/waste-management-in-buildings-code-of-practice/standard>

comprise residual waste (non-recyclable) and recyclable wastes including food waste, paper and cardboard, plastic, glass and metals.

- 13.5.83 On the assumption that the recycling rates would be 65% as required by regulations³⁵, the annual amount of operational waste produced by the Proposed Development would amount to 0.2% of the annual non-hazardous landfill capacity for the Study Area. The magnitude of the operational waste is assessed as Negligible. Therefore, with a Very High sensitivity of receptor and **Negligible magnitude of impact**, this results in a Slight significance of effect which is **Not Significant**.
- 13.5.84 It is expected that a high proportion of the waste material generated during the operational phase will be recyclable and not go to landfill (target recycling rate of 65%). Waste facilities (non-landfill) in the surrounding area (Cherwell, West Oxfordshire and Vale of White Horse) received a total throughput of 790,863 tonnes of non-hazardous waste in 2024. The volumes of non-hazardous waste from demolition works are considered to be relatively low in comparison to this throughput (equivalent to 4% of the throughput).
- 13.5.85 Beyond negligible levels of waste generated from the Terminal office buildings, the Rail Terminal is not expected to generate waste through its operation or maintenance. The replacement of rails on sidings will occur at a frequency greater than 30 years and it is assumed that rails are recycled and ballast is cleaned and reused.
- 13.5.86 The decommissioning of the new structures/buildings has not been assessed as the structures are all permanent structures. As a commercial site, a more feasible longer-term outcome would be for some parts of the site (e.g. specific buildings) to be redeveloped. If, at some point in the future parts of the site are redeveloped, this will be subject to a new application for which a separate waste strategy would be required.
- 13.5.87 An assessment of operational impacts in terms of waste is presented in Table 13.32.

Table 13.32: Assessment of the operational impacts

Project Activity	Activities with Potential	Sensitivity of Receptor	Description of Magnitude	Significance
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³⁵ Waste Management Plan for England, January 2021. Department for Environmental Food and Rural Affairs, Available from: www.gov.uk/government/publications/see-p33 - Business Waste

	impacts on material resource / waste			
Operations of logistics park	No manufacturing or processing is expected. There is potential for repackaging to occur.	Very high	Negligible	Slight

13.6 ADDITIONAL MITIGATION AND RESIDUAL EFFECTS

13.6.1 Given the scope of the proposed embedded measured described and considered above, there are no appropriate or relevant additional mitigation measures proposed for Materials and Waste.

Residual Environmental Effects

13.6.2 As there are no additional mitigation measures proposed, the residual effects remain the same as set out in Table 13.31 and Table 13.32.

13.7 CUMULATIVE AND IN-COMBINATION EFFECTS

13.7.1 There is the potential for additional impacts with regards to material use and waste disposal when the Proposed Development is considered alongside other committed developments within the local vicinity.

13.7.2 A list of schemes considered within this cumulative assessment is presented in Chapter 1 of this ES and not repeated here in full. However, consideration has been given to a number of major allocated and consented sites, including:

- Heyford Park allocated site with consented sites/phases within it – residential led development within and around former RAF Heyford Airfield.
- Bicester expansion/eco-town – residential led development, allocated for 6,000 homes total, local centre hubs, 4 primary and 1 secondary school and other community facilities, and 10ha (min.) employment.

- Great Wolf leisure resort near Chesterton - New leisure resort incorporating waterpark, family entertainment centre, hotel, conferencing facilities and restaurants with associated access, parking and landscaping.
- Employment sites at Junction 9 of the M40.

13.7.3 In addition, as explained in Chapter 1 of the ES, consideration has been given to the potential for other major developments to be approved in due course. These include:

- Heyford Park - Redevelopment to deliver a new settlement of approx. 9,000 dwellings, new commercial, business and employment uses (approx. 60k sqm), four primary schools, one secondary school, three wind turbines, and a range of other community facilities.
- Distribution development proposals (by Albion Land and Tritax) in the vicinity of the A43 - Total 580,000 sqm (GIA) of logistics floorspace.
- Puy du Fou - Tourism development which consists of mix of show theatres (7 indoor and 7 outdoor), x3 hotels (total 350 rooms for 1,400 guests), a conference centre (1,000 capacity) and other ancillary facilities including retail and food.

13.7.4 The Proposed Development alongside other proposed and committed developments will have an increased drawdown on the regional landfill capacity. However, it can also be assumed that planned major developments (i.e. Local Plan allocations) have been taken into account in the planning and monitoring of waste capacity by OCC as Waste Planning Authority. Other major development proposals coming forward outside of the local plan process will be required to consider their potential impacts on waste facilities.

13.7.5 It can be assumed that all consented schemes within the study area will also be required to meet the requirements of relevant legislation and local policies. This will include adherence to the Waste Hierarchy and a target of at least 70% recovery of wastes generated (as per the Waste Framework Directive) with a view to achieve 2035 targets. This will minimise the likely effects of the sites individually and cumulatively.

13.7.6 Additional developments in relative close proximity to others can be considered to have a positive cumulative effect. For example, where construction on development sites takes place at the same time there is sometimes potential for opportunities to use nearby sites as donor or receiver sites for any surplus excavated material (if generated), helping reduce pressure on other sites and minimise travel.

13.7.7 In considering the potential for likely cumulative effects, the following issues and potential 'pathways' have been considered:

- **Combined demand for construction materials** - where the construction of the identified cumulative developments overlap with the Proposed Development, combined material demand could put increased pressure on construction material availability. However, market flexibility allows for material reallocation across suppliers and contractors typically use diverse procurement routes.
- **Pressure on regional landfill capacity and other local waste management capacity** - combined construction, demolition and excavation waste and operational waste could temporarily increase throughput at regional landfill and other local waste management sites. However, the majority of the identified cumulative developments will be within the scope of planned development anticipated by the OCC within their local plan and therefore factored into waste planning capacity forecasts for the area. In addition, as referred to above, the cumulative developments will be required to carry out their own capacity assessments within an EIA to assess and minimise the impact on materials and waste to mitigate any significant effects.
- **Cumulative hazardous waste generation** - combined hazardous waste from the construction and operational phase could temporarily increase throughput at national hazardous landfill and other hazardous waste management sites. However, the volume of hazardous waste expected to be generated by the Proposed Development and identified cumulative developments is likely to be of an in-significant quantity to create a cumulative effect.

13.7.8 For the reasons referred to above, no significant cumulative effects are considered likely with regard to materials and waste.

13.8 SUMMARY AND CONCLUSIONS

- 13.8.1 The Proposed Development is a nationally significant infrastructure project on a significant site. a large volume of material is required to be moved to create plateau for the proposed warehousing units and suitable levels for the connections to surrounding road and rail infrastructure. The design of the earthworks will be optimised to achieve a 'cut and fill' balance to maximise the quantity of material reused onsite and minimise the material disposed off-site (or transported on).
- 13.8.2 A Construction Environmental Management Plan (CEMP) (ES Appendix 2.3) and future phase specific P-CEMPs will include specific measures and requirements to be taken to manage and dispose of the varied waste that is anticipated to occur during the construction phase. A Materials Management Plan (MMP) will also ensure that any adverse effects associated with material assets are responsibly managed. This will minimise material classified as waste and outline an approach which will maximise the potential to recover material and ultimately prevent the material from being disposed of in landfill.
- 13.8.3 It is inevitable that there will be a requirement to import construction materials particularly where large quantities of engineering graded material are required and for the production of concrete. Reuse of site-won mineral resources, and use of recycling other material will minimise the volume of material imported, but the Main Site is also well served with a number of quarries in the near vicinity. The importation of material is not expected to have a significant impact on the supply of aggregates with the impact assessed as **slight adverse**, and is not significant.
- 13.8.4 The Proposed Development will also have in place a SWMP secured as part of the CEMP (ES Appendix 2.3). This will be a key document with which to measure and report on construction operations as they occur. It will also include specific instruction on steps to be taken to manage and dispose of the varied waste that is anticipated to occur during operations in line with the Waste Hierarchy. Waste generated by the Proposed Development which cannot be reused or composted onsite will have to be taken off-site. The Main Site benefits from a range of waste facilities in close proximity.
- 13.8.5 With adherence to a SWMP, the associated reuse of material the quantity of waste would not have a significant impact on the capacity of the landfill sites in the region with the impact assessed as **slight adverse**, and is not significant.
- 13.8.6 During the operational phase, the Proposed Development is expected to generate quantities of residual waste (non-recyclable) and recyclable wastes

including food waste, paper and cardboard, plastic, glass and metals. Aside from the terminal office, negligible waste is expected to be generated from the maintenance of the rail terminal. Assuming a 65% recycling rate (from regulations), the Proposed Development would generate operational waste amounting to only 0.62% of the non-hazardous landfill capacity. This represents a **Negligible** magnitude of impact. Combined with a Very High receptor sensitivity, the overall effect is assessed as **Slight** and therefore not significant.

- 13.8.7 The Proposed Development, when considered alongside other committed schemes in the area, could contribute to increased demand for construction materials and greater pressure on regional landfill and waste management capacity. However, all developments are expected to comply with legislation and local policy requirements, including applying the Waste Hierarchy and achieving at least 70% waste recovery, which helps to limit these effects to below significant levels.