11. Ground Conditions and Contaminated Land

Executive Summary

This chapter evaluates existing baseline conditions across the study area(s) and assesses potential significant effects for ground conditions and contaminated land, waste generation and materials use as a result of the proposed development. The contaminated land assessment is informed primarily by a Phase 1 Land Quality Assessment (LQA) report prepared by Sweco in 2023 which incorporates a review of third-party regulatory data, Ministry of Defence (MOD) site records, and previous LQA reports prepared by third parties. The information within the Sweco Phase 1 LQA report is relied upon in the presentation of baseline conditions herein and Jacobs has not replicated assessment of baseline conditions.

The study areas comprise land associated with the historically operational Royal Air Force (RAF) Brawdy, now referred to as Cawdor Barracks. The Sweco Phase 1 LQA report concluded that significant sources of contamination are unlikely to be present based on historical evidence and previous phases of targeted ground investigation, however localised sources of contamination have been identified in soil and groundwater. Contaminants of concern include metals, hydrocarbons, inorganic and organic compounds, polychlorinated biphenyls (PCBs), explosive residues, per- and polyfluoroalkyl substances (PFAS) and asbestos containing material (ACM).

Based on the current understanding, with appropriate design interventions and further ground investigation and risk assessment in accordance with Land Contamination Risk Management (LCRM) to render the site suitable for use, the proposed development is not expected to result in significant effects during construction and operation. This assumes mitigation will be implemented prior to and during construction through LCRM, a robust Construction Environmental Management Plan (CEMP) and via operational environmental management systems during operation.

The materials and waste assessment in this chapter has been undertaken in accordance with the 2020 Institute of Environmental Management and Assessment (IEMA) guidance on key terms, concepts, and considerations for assessing the environmental impacts and effects of materials and waste as part of the Environmental Impact Assessment (EIA) process.

The assessment of the impact of waste and resources on the proposed development considers the sensitivity of receptors and the magnitude of impact to calculate the overall effect. The sensitivity assessment for waste considers landfill void capacity, and based on current predictions, this would result in a very high sensitivity factor. However, the magnitude of impact is negligible; therefore, the overall impact is not significant for waste.

Based on a negligible sensitivity for all key construction materials and the highest key construction material magnitude being minor, the calculated effect is considered neutral or slight; therefore, the overall impact is not significant for materials.

11.1. Introduction

11.1.1. This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the 'EIA Regulations'). As part of the Environmental Impact Assessment (EIA) process, this Environmental Statement (ES) chapter reports the potential significant effects for ground conditions, contaminated land, waste and material resources as a result of the proposed development. This assessment includes a review of existing baseline conditions (as reported in the Phase 1 Land Quality Assessment report prepared by Sweco in 2023), consideration of potential impacts and identification of proportionate mitigation for likely significant adverse effects resulting from the proposed development.

11.1.2. The approach to this assessment follows the EIA Scoping Report (March 2023) submitted to Pembrokeshire County Council (PCC) and consultation outlined in Section 11.3 and has been prepared in accordance with the EIA Scoping Opinion (May 2023) received from PCC. The assessment has been undertaken in accordance with the methodologies specified in the EIA Scoping Report, applying guidance from the Environment Agency's Land Contamination Risk Management (LCRM) and the Institute of Environmental Management and Assessment (IEMA).

11.1.3. Chapter 3 (Proposed Development) contains a detailed description of the proposed development referred to in this chapter. In summary, the proposed development will be situated wholly within the decommissioned airfield area in the east of Cawdor Barracks. The Receiver (Rx) Array will have a total of 21 receiver antennas, and the Transmit (Tx) Array will comprise six transmitter antennas. Each antenna will be constructed upon a square concrete ground foundation (approximately 5.5 m by 5.5 m). It is anticipated the foundation depth will be no greater than 2.2 m. The proposed development and associated infrastructure will be constructed in the former airfield on existing runway hardstanding where possible and excavation below ground will be minimised. Due to nature of the subsurface geology, it is anticipated that piled foundations will not be required.

11.1.4. For assessment of impacts on water bodies, see Chapter 12 (Water Environment, Flood Risk and Drainage).

11.1.5. This chapter is supported by the following appendices, and includes cross-references to other chapters and figures where appropriate:

- Appendix 11.1 (Assessment Methodology – Contaminated Land);
- Appendix 11.2 (Assessment Methodology – Waste and Materials); and
- Appendix 11.3 (Sweco Phase 1 LQA).

11.2. Legislation and Policy

11.2.1. The national legislation and regulatory frameworks applicable in this assessment are summarised in this section, along with relevant local policy considerations.

Legislation

11.2.2. The principal legislative drivers relating to potentially contaminated land and waste are:

- Wildlife and Countryside Act 1981[195];
- Environmental Protection Act 1990 (Part IIA)[196];
- Environmental Protection Act 1990 (Part II Section 34)[197];
- Water Resources Act 1991[198];
- Environment Act 1995[199];
- Water Act 2003[200];
- The Hazardous Waste (England and Wales) Regulations 2005[201];
- Dangerous Substances Directive 2006/11/EC[202];
- The Contaminated Land (Wales) Regulations 2006[203];
- The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009[204];
- Environmental Permitting (England and Wales) Regulations 2016[205]
- The Groundwater (England and Wales) Regulations 2009[206];
- The Waste (England and Wales) Regulations 2011[207];

[195] Wildlife and Countryside Act 1981. [Online] Available at: https://www.legislation.gov.uk/ukpga/1981/69 [Accessed 11 November 2025].

[196] Environmental Protection Act 1990. [Online] Available at: https://www.legislation.gov.uk/ukpga/1990/43/part/IIA [Accessed 11 November 2025].

[197] https://www.legislation.gov.uk/ukpga/1990/43/part/II/crossheading/duty-of-care-etc-as-respects-waste

[198] Water Resources Act 1991. [Online] Available at: https://www.legislation.gov.uk/ukpga/1991/57/contents [Accessed 11 November 2025].

[199] Environment Act 1995. [Online] Available at: https://www.legislation.gov.uk/ukpga/1995/25/contents [Accessed 11 November 2025].

[200] Water Act 2003. [Online] Available at: https://www.legislation.gov.uk/ukpga/2003/37/contents [Accessed 11 November 2025].

[201] The Hazardous Waste (England and Wales) Regulations 2005. [Online] Available at: https://www.legislation.gov.uk/uksi/2005/894/contents [Accessed 11 November 2025].

[202] Directive 2006/11/EC of the European Parliament and of the Council. [Online] Available at: https://www.legislation.gov.uk/eudr/2006/11/body [Accessed 11 November 2025].

[203] The Contaminated Land (Wales) Regulations 2006. [Online] Available at: https://www.legislation.gov.uk/wsi/2006/2989/contents [Accessed 11 November 2025].

[204] The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009. [Online] Available at: https://www.legislation.gov.uk/wsi/2009/995/contents [Accessed 11 November 2025].

[205] Environmental Permitting (England and Wales) Regulations 2016. [Online] Available at https://www.legislation.gov.uk/uksi/2016/1154/contents [Accessed 16 December 2025].

[206] The Groundwater (England and Wales) Regulations 2009. [Online] Available at: https://www.legislation.gov.uk/ukdsi/2009/9780111480816 [Accessed 16 December 2025].

[207] The Waste (England and Wales) Regulations 2011. [Online] Available at: https://www.legislation.gov.uk/uksi/2011/988/contents [Accessed 11 November 2025].

- The Contaminated Land (Wales) (Amendment) Regulations 2012[208];
- The Town and Country Planning (Development Management Procedure) (Wales) Order, 2012[209];
- The Hazardous Waste (Miscellaneous Amendments) (Wales) Regulations 2015[210];
- The Construction (Design and Management) Regulations 2015[211];
- The Environmental Permitting (England and Wales) Regulations 2016[212];
- The Groundwater (Water Framework Directive) (Wales) Direction 2016[213];
- Environment (Wales) Act 2016[214];
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[215]; and
- The Waste (Circular Economy) (Amendment) Regulations 2020[216].

National Policy

11.2.3. Planning Policy Wales[217] (PPW) 2024 sets out the Welsh Government's planning policy framework for the whole of Wales to support the objectives of Future Wales: The National Plan 2040[218]. The PPW includes the Welsh Government's expectations for the content and quality of planning applications and local plan policy. The PPW sets out the policy which the proposed development should comply with. It is also the basis for informing a judgement on the impacts of a development, for example whether the proposed development is consistent with the requirements of the PPW.

11.2.4. The following planning policies have been considered for the development of this chapter:

[208] The Contaminated Land (Wales) (Amendment) Regulations 2012. [Online] Available at: https://www.legislation.gov.uk/wsi/2012/283/made [Accessed 11 November 2025].

[209] The Town and Country Planning (Development Management Procedure) (Wales) Order 2012. [Online] Available at: https://www.legislation.gov.uk/wsi/2012/801/contents [Accessed 11 November 2025].

[210] The Hazardous Waste (Miscellaneous Amendments) (Wales) Regulations 2015. [Online] Available at: https://www.legislation.gov.uk/wsi/2015/1417/body [Accessed 11 November 2025].

[211] The Construction (Design and Management) Regulations 2015. [Online] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents [Accessed 11 November 2025].

[212] The Environmental Permitting (England and Wales) Regulations 2016. [Online] Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents [Accessed 11 November 2025].

[213] The Groundwater (Water Framework Directive) (Wales) Direction 2016. [Online] Available at: https://www.gov.wales/groundwater-water-framework-directive-wales-directions-2016 [Accessed 11 November 2025].

[214] Environment (Wales) Act 2016. [Online] Available at: https://www.legislation.gov.uk/anaw/2016/3/contents [Accessed 11 November 2025].

[215] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. [Online] Available at: https://www.legislation.gov.uk/uksi/2017/407/contents [Accessed 11 November 2025].

[216] The Waste (Circular Economy) (Amendment) Regulations 2020. [Online] Available at: https://www.legislation.gov.uk/uksi/2020/904/contents/made [Accessed 11 November 2025].

[217] Welsh Government (2024). Planning Policy Wales. [Online] Available at: https://www.gov.wales/planning-policy-wales [Accessed 11 November 2025].

[218] Future Wales: the national plan 2040 | GOV.WALES

- Minerals Technical Advice Note (Wales) 1: Aggregates[219]; and
- Technical Advice Note 21: Waste[220].

Local Policy

11.2.5. Local policy is provided by the PCC Local Development Plan (LDP) (adopted 2013)[221].

11.2.6. The LDP provides a detailed framework for planning decisions on how land is used and developed. It presents land use objectives and a strategy to complement national policy and to support sustainable development so that development is built to achieve positive economic, social and environmental impacts. The strategy is supported by 16 Strategic Policies (SP) and General Policies and includes objectives for development of brownfield land where it is suitable for development in preference to greenfield land and protection of water resources.

11.2.7. With respect to materials and waste, Chapters 5 and 6 of the LDP contain relevant strategies and policies regarding waste, materials and mineral sites. Strategic Policy SP 6 relates to materials and minerals strategy, and SP 11 relates to waste. LDP policies GN.22 – GN.25, and GN.40 - GN.42 relate to waste, materials and minerals.

11.2.8. SP 6 sets out a need to maintain reserves of minerals and safeguard known resources from permanent development. Following the Minerals Technical Advice Note 1 on Aggregates, a minimum of 10 years supply of hard rock and seven years of sand and gravel is required across the plan period. Proposal Maps are also provided in the LDP to indicate safeguarded mineral resources in Wales.

11.2.9. Policy GN.24 states that proposals to use recycled and secondary aggregates (including the use of construction materials arising from demolition) will be permitted under certain criteria.

11.2.10. SP 11 sets out a strategy to minimise the impact of waste on the environment and maximise resource use through reuse and recovery, avoiding disposal where possible.

11.2.11. Relevant to the PPW, Section 5.11: Making Best Use of Material Resources and Promoting the Circular Economy, sets out: design choices to prevent waste; designing using locally sourced, alternative or recycled materials; sustainable waste management facilities; and mineral sites guidance. This section of the PPW states that certain preferences should be taken into account in planning decisions and early considerations when designing development proposals should consider:

- Designing out waste by using materials which are or can be remanufactured, refurbished, disassembled and recycled or can be deconstructed and reused;
- Designing in reused materials and elements, such as recycled and secondary materials.

11.2.12. Minimising earthworks cut and fill volumes, using locally sourced materials and promoting reuse and recycling of secondary aggregates and other appropriate recycled materials is encouraged. The PPW also states that the waste hierarchy is the key starting point for all waste management proposals and should be considered at an early stage as part of materials choice and design. The importance of aggregates should be taken into account when planning

[219] Welsh Assembly Government (2004). Minerals Technical Advice Note (Wales) 1: Aggregates. [Online] Available at: https://www.gov.wales/minerals-technical-advice-note-mtan-wales-1-aggregates [Accessed 11 November 2025].

[220] Welsh Government (2014). Technical Advice Note 21: Waste. [Online] Available at: https://www.gov.wales/technical-advice-note-tan-21-waste [Accessed 11 November 2025].

[221] Pembrokeshire County Council (2013). Local Development Plan: Planning Pembrokeshire's Future. [Online] Available at: https://www.pembrokeshire.gov.uk/adopted-local-development-plan [Accessed 11 November 2025].

applications are being considered, together with Minerals Technical Advice Notes and Technical Advice Notes.

11.2.13. This chapter makes reference to the current LDP and the planning statement for the proposed development considers emerging policies and therefore considers the LDP Review which is currently being developed.

Guidance

11.2.14. The following national guidance and accepted industry good practice is relevant to this assessment:

- Construction Industry Research and Information Association (CIRIA) Special Publication 73: Role and Responsibility in Site Investigation[222];
- A Guide for Safe Working on Contaminated Sites (R132)[223];
- British Standard (BS) 6187:2011: Code of Practice for Full and Partial Demolition[224];
- BS 5930:2015+A1:2020: Code of Practice for Ground Investigations[225];
- BS 10175:2011+A2:2017: Investigation of Potentially Contaminated Sites. Code of practice[226];
- Contaminated Land Risk Assessment – A Guide to Good Practice (C552)[227];
- Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination[228];
- Contaminated Land Statutory Guidance[229];
- Guidelines for Environmental Risk Assessment and Management: Green Leaves III[230];
- Development of Land Affected by Contamination: A Guide for Developers[231];
- Land Contamination Risk Management (LCRM)[232];

[222] CIRIA (1991). Special Publication SP 73: Role and responsibility in site investigation.

[223] CIRIA (1996). A Guide for Safe Working on Contaminated Sites (R132).

[224] British Standards Institution (2011). BS 6187:2011 Code of practice for full and partial demolition.

[225] British Standards Institution (2020). BS 5930:2015+A1:2020 Code of practice for ground investigations.

[226] British Standards Institution (2017). BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice – Code of practice.

[227] CIRIA (2001). Contaminated land risk assessment. A guide to good practice (C552).

[228] Environment Agency (2006). Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination.

[229] Welsh Government (2012). Contaminated Land Statutory Guidance – 2012.

[230] Defra (2011). Guidelines for Environmental Risk Assessment and Management: Green Leaves III.

[231] Welsh Land Contamination Working Group (2023). Development of Land Affected by Contamination: A Guide for Developers.

[232] Environment Agency (2020) Land Contamination Risk Management (LCRM).

- Groundwater Protection Technical Guidance[233];
- Land Contamination Groundwater Compliance Points: Quantitative Risk Assessments[234];
- The Environment Agency's Approach to Groundwater Protection, Version 1.2[235]. As adopted by Natural Resources Wales (NRW) for guidance on the management and protection of groundwater;
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[236];
- Assessing Risks Posed by Hazardous Ground Gases to Buildings (C665)[237];
- Welsh Government Contaminated Land Statutory Guidance – 2012[238];
- Natural Resources Wales Standard rules SR2017 No1: Use of waste in a deposit for recovery operation (Construction, reclamation, restoration or improvement of land other than by mobile plant) 2016[239]; and
- Guidance for the Safe Development of Housing on Land Affected by Contamination: R&D Publication 66[240].

MOD Policy

11.2.15. The following Ministry of Defence (MOD) Policies will be given due regard as part of the design and assessment work:

- Sustainable MOD Strategy Waste Management 2015-2025[241];
- MOD Climate Change and Sustainability Strategic Approach 2021[242]; and
- JSP 850 Infrastructure and Defence Estate Policy 2021. This includes policy on:
  - Environmental Management (JSP 418);
  - Health and Safety;
  - Net Zero (JSP 850 Part 2, Building Performance Standards (BPS) 0.1);
  - Water management;

[233] Environment Agency (2017a) Groundwater Protection Technical Guidance.

[234] Environment Agency (2017b) Land Contamination Groundwater Compliance Points: Quantitative Risk Assessments.

[235] Environment Agency (2018) The Environment Agency's approach to groundwater protection February 2018 V1.2.

[236] Department for Environment, Food and Rural Affairs (Defra) (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

[237] CIRIA (2007). Assessing Risks Posed by Hazardous Ground Gases to Buildings (C665).

[238] Welsh Government (2012). Contaminated Land Statutory Guidance – 2012.

[239] National Resources Wales (2016) Wales Standard rules SR2017 No1: Use of waste in a deposit for recovery operation (Construction, reclamation, restoration or improvement of land other than by mobile plant).

[240] Environment Agency, National House-Building Council and Chartered Institute of Environmental Health (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination: R&D Publication 66.

[241] Ministry of Defence (2015). Sustainable MOD Strategy Waste Management 2015-2025.

[242] Ministry of Defence (2021). Ministry of Defence Climate Change and Sustainability Strategic Approach.

- Waste and Resource Management;
- Whole Life approach; and
- MOD Net Zero Carbon Policy.

11.3. Methodology

11.3.1. The following section describes the methodology used to determine the likely significant effects on ground conditions and contaminated land, waste and material resources as a result of the proposed development during construction and operational phases.

11.3.2. A separate assessment of significant effects during the decommissioning phase has not been undertaken because it is not known what the environmental baseline conditions will be at that time. The PCC letter dated 20 May 2024 states "it is likely that a planning condition will require full details of the decommissioning phase, including a more complete assessment of environmental effects, at a certain trigger point prior to the decommissioning date". Impacts associated with the construction phase are likely to be similar to those during decommissioning, albeit of similar or lower magnitude.

11.3.3. Baseline conditions for the proposed development have been established in the Stage 1 Phase 1 LQA report prepared by Sweco in 2023 (Sweco Phase 1 LQA report). There have been no changes to land use since the time of the Sweco Phase 1 LQA report and site access remains controlled under the same ownership. The information presented in the Sweco Phase 1 LQA report is therefore considered to remain relevant for the purpose of this assessment. The Sweco Phase 1 LQA report includes a review of third party regulatory data presented in a Landmark Envirocheck Report (ref: 305022956_1_1), historical site investigation reports and pertinent site records provided by the MOD where available which were supplemented by site inspection and interviews with site personnel undertaken by Sweco on 22 and 23 November 2022. The baseline conditions established in the Sweco Phase 1 LQA report include the whole of Cawdor Barracks.

11.3.4. Published environmental and geological data from sources including British Geological Survey[243] (BGS 1:50,000 Sheet 209 (St Davids)) and DataMapWales[244] (DigiMapGB-50) have also been reviewed in the preparation of this chapter to update the Sweco Phase 1 LQA report baseline conditions where applicable.

11.3.5. The materials and waste assessment within this chapter has been undertaken in accordance with the 2020 IEMA guidance[245] on the key terms, concepts and considerations for assessing the environmental impacts and effects of materials and waste, as part of the EIA process.

Study Area

11.3.6. The location of the proposed development and key environmental constraints can be found in Figure 3.1 (Proposed Development Overview) and Figure 3.3 (General Constraints Plan).

[243] British Geological Survey (n.d.). BGS Geology Viewer. [Online] Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ [Accessed 11 November 2025].

[244] Welsh Government (n.d.). DataMapWales. [Online] Available at: https://datamap.gov.wales [Accessed 11 November 2025].

[245] IEMA (2020). IEMA guide to: Materials and Waste in Environmental Impact Assessment. Available at: https://www.isepglobal.org/content/materials-and-waste-in-environmental-impact-assessment-march-2020/ [Accessed: November 2025]

11.3.7. The study areas used for the assessment are based on professional judgement and guidance referenced in UK best practice (LCRM232 and R&D66240) and are considered to be typical at the hazard identification stage.

11.3.8. The following study areas presented in this chapter comprise:

- **Ground conditions and contaminated land**: 250 m from the application boundary as shown in Figure 3.1 (Proposed Development Overview) and Figure 3.2 (Proposed Construction Overview).
- A study area of 1 km from the application boundary is used for controlled water receptors including groundwater dependent terrestrial ecosystems (GWDTE).
- The assessment of radiological and Unexploded Ordnance (UXO) hazards is reported in the Sweco Phase 1 LQA report which refers to Cawdor Barracks.
- **Use of materials**: The study area extends to the availability of construction materials (aggregate and concrete) within Wales and the Pembrokeshire sub-region.
- **Waste**: As data regarding the capacity of inert and non-hazardous landfills in Wales has not been updated since 2018, using the proximity principle, the study area for the capacity of remaining landfill void is Wales, and the regions of South West and West Midlands in England. The proximity principle, referred to in IEMA guidance, relates to treating and disposing of waste as near as practicable to its place of production. It is widely recognised that using a study area with greater than regional consideration may be necessary to take a realistic account of interregional movement of material assets and waste within the UK, recognising that cross-boundary movements are likely to occur. On a national level, there are no hazardous waste landfill sites in Wales. Therefore, using the proximity principle, the study area (national) for the management of hazardous wastes is England.

Consultation

11.3.9. An EIA Scoping Report was submitted to PCC in March 2023. An EIA Scoping Opinion was received in response to the EIA Scoping Report in May 2023. The applicant's responses to the EIA Scoping Opinion are contained in Appendix 2.1 (DARC EIA Scoping Opinion Response Table).

11.3.10. An update to the assessment approach on the timings of ground investigation works was agreed with PCC as per Appendix 2.2 (DARC EIA Scoping Opinion Follow Up Letter), concluding that detailed ground investigation will be undertaken prior to and to inform the detailed design process following consent of the proposed development

11.3.11. No further consultations have been made in relation to this chapter.

Assessment Criteria

11.3.12. This chapter identifies and assesses likely significant effects relating to ground conditions and land contamination, together with waste generation and materials use during the construction and operational phases of the proposed development.

11.3.13. Unless otherwise specified the assessment approach and methodology has been undertaken in accordance with the scoping opinion, industry best practice and guidance.

Ground Conditions and Contaminated Land

11.3.14. The assessment of significance takes into account the effect of the mitigation measures described within this chapter. The magnitude of the impact and the sensitivity of the receptor

are combined when determining the significance of the effect upon the ground conditions and contaminated land assessment.

11.3.15. The ground conditions and contaminated land assessment methodology is provided in Appendix 11.1 (Assessment Methodology – Ground Conditions and Contaminated Land).

Waste and Use of Materials

11.3.16. The materials and waste aspects of this chapter consider the impacts and effects from the use of material assets together with the generation and management of waste. Potential impacts on allocated mineral assets from the proposed development are also discussed.

11.3.17. The assessment methodology for materials and waste is provided in Appendix 11.2 (Assessment Methodology – Waste and Materials).

Assumptions and Limitations

11.3.18. The construction and operational phase assessments have been based on the proposed development description presented in Chapter 3 (Proposed Development) and the design presented in Figure 3.1 (Proposed Development Overview) and Figure 3.2 (Proposed Construction Overview) to establish a realistic worst-case assessment scenario.

11.3.19. Key assumptions and limitations associated with the ground conditions, contaminated land, materials and waste assessment are as follows:

- The contamination baseline has been established in the Sweco Phase 1 LQA report which summarises the findings of historical ground investigation undertaken within the application site and within the wider area of Cawdor Barracks, including:
    - Entec UK, Land Quality Assessment, Phase 1 Desk Study, DE Project No.: 08401, Final LQA Report, 25 February 2011;
    - Amec Environment & Infrastructure UK Ltd, Land Quality Assessment, Phase 2: Intrusive Survey, DIO Project: 08401, Final LQA Report, 13 February 2012; and
    - Amec Foster Wheeler, Cawdor Barracks – Targeted Groundwater and Vapour Assessment LQA, July 2015, Final LQA Report, 17 July 2015.
- The Sweco Phase 1 LQA report also includes summaries of older ground investigations reported within previous Phase 1 LQAs by third parties which have not been available to Jacobs for review. It should be noted that previous phases of ground investigation have targeted potentially significant sources of contamination and exploratory holes were not evenly distributed across Cawdor Barracks.
- The assessment presented in this chapter relies on the baseline conditions presented in the Sweco Phase 1 LQA report.
- Limited historical ground investigation is recorded within the footprint of the proposed development. As such, a precautionary approach has been undertaken with regards to the potential for contaminant linkages to be present.
- Recovery of site-specific information regarding ground conditions is being undertaken to inform geotechnical design of foundations and structures. These ground investigations include collection of land quality (soil and groundwater) and chemical data to refine the understanding of baseline conditions presented in this chapter.
- Cognisant that NRW has not produced landfill void estimates for years post-2018, the landfill void estimates for Wales as of 2024 have been forecast using professional

judgment. This was achieved by reviewing published landfill disposals tax statistics[246] to calculate the reported inert and non-hazardous waste sent to landfill between 2019 and the end of 2024. This has then been used to estimate the inert and non-hazardous landfill void remaining in Wales.

- The construction of the proposed development will be undertaken in accordance with relevant legislation, permits and good practice.
- Detailed construction information (including volumes of material resources) and estimated waste arisings are not yet available for the proposed development, and this assessment therefore draws on the proposed development as described in Chapter 3 and professional judgement to assess a reasonable worst case scenario.
- It is assumed as a reasonable worst case, for the purpose of this assessment, that prior to mitigation, construction demolition waste and excavation arisings, which are surplus to requirements, would require disposal to landfill.

11.4. Baseline Conditions – Ground Conditions and Contaminated Land

11.4.1. An overview of the existing baseline environmental conditions for the ground conditions and contaminated land assessment is given in this section.

11.4.2. The baseline conditions describe those areas within the proposed development where construction activities are expected to occur. It is considered unlikely that baseline conditions will alter significantly before construction begins.

11.4.3. The Sweco Phase 1 LQA report should be referred to for full details.

Site History

11.4.4. A full description of the historical development of the application site and wider Cawdor Barracks is provided in the Sweco Phase 1 LQA report which should be referred to for further detail. Key points relevant to this assessment are set out below.

11.4.5. The application site is located within the former airfield area of Cawdor Barracks. At the time of the Sweco Phase 1 LQA report, Sweco reported the airfield to comprise three redundant runways with associated infrastructure including dispersals and a redundant Explosive Storage Area (ESA). A ground to air beacon was located centrally within the airfield. Former infrastructure, including a bulk fuel installation (BFI), an oil water interceptor (OWI) and aircraft hangars, had largely been demolished. A spoil heap, tip/burning area and former Fire Training Area (FTA) had also been identified in the airfield, which was, at the time of the Sweco Phase 1 LQA report, being used by the army for training. A sports field and assault course had been established in the south-west of the airfield, a cross-country running course in the north and two clay pigeon shooting ranges at which live ammunition is reported to have been present. Arms training was undertaken in the ESA in the north of the airfield and specialist electronic warfare training exercises were also reported to have been undertaken there. A rally track demarked by old tyres was located in the north-east of the airfield and the airfield was also used by a radio-controlled aeroplane club.

[246] Welsh Government (2019 – 2024). Landfill Disposals Tax: Statistics and Research Series. [Online] Available at: https://www.gov.wales/landfill-disposals-tax-statistics [Accessed 11 November 2025].

11.4.6. The Technical Area and Barracks were located adjacent to the airfield within a separate secured compound. The Technical Area features a range of ancillary buildings and structures, a secure compound used by the US military, operational BFI, paints, oils, and lubricants (POL) points, a vehicle washdown area and a 25 m live firing range. The Barracks consists of a series of accommodation blocks, mess halls and married quarters.

Geology

11.4.7. The following geological conditions have been determined based on available data taken from the Sweco Phase 1 LQA report and the British Geological Survey (BGS)[247].

Made Ground

11.4.8. Made ground was recorded during the ground investigation undertaken by Amec in 2012, with a maximum thickness of 3.6 m in the north of the airfield. Made ground is also expected to be present within localised areas associated with the construction of the runway, infrastructure and taxiways, as well as in areas of filled or disturbed ground reported within the Sweco Phase 1 LQA report. There is a potential for unmapped or un-investigated made ground within other areas.

11.4.9. Made ground encountered during the Amec ground investigation comprised a mixture of clay, gravel and sand with gravel and/or cobble content of mudstone, sandstone, igneous rock and anthropogenic materials. The anthropogenic constituents included macadam, brick, concrete, metal fragments, clinker, bitumen, tile, plastic, wood and ceramics.

Superficial Deposits

11.4.10. BGS maps indicate the majority of the airfield is not recorded to be underlain by superficial deposits. Glaciofluvial deposits are recorded in the south and Till deposits are recorded in the north-east.

11.4.11. The Amec Phase 2 LQA report (2012) documents a range of superficial deposits encountered during the intrusive site investigation across the wider Cawdor Barracks. At the southern extent of the airfield, superficial deposits were recorded as sand and gravel and firm gravelly clay with cobbles of mudstone identified as Glacial Till above weathered mudstone with thicknesses up to approximately 3 m. To the north of the proposed Rx Array, sandy gravelly clay, gravelly sand and gravelly clayey silt were identified to a maximum depth of 4.3 m below ground level (bgl).

Bedrock Geology

11.4.12. BGS maps indicate the bedrock geology beneath the application site comprises sandstone and mudstone attributed to the Lingula Flags Formation. The Ramsey Sound Group – Tuff is recorded beneath the south of the proposed Tx Array.

11.4.13. St Non's Sandstone Formation is mapped in the south-west and the Triffleton Group – Muddy Sandstone is mapped beneath the far north of the airfield. Two unnamed igneous intrusions, Ordovician-Microtonalite, are mapped within the area of the proposed Rx Array.

11.4.14. The Amec Phase 2 LQA Report (2012) records that mudstone was encountered beneath the airfield at depths between 0.4 m to 4.3 m bgl.

[247] British Geological Survey (n.d.). BGS Geology Viewer. [Online] Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ [Accessed 11 November 2025].

11.4.15. The application site lies approximately 0.5 km north of the Regionally Important Geodiversity Site at Pwll March248. Statutory and non-statutory designated geological sites were scoped out of the assessment through the scoping process and are not considered further within the assessment presented in this chapter.

Hydrogeology

11.4.16. The superficial glaciofluvial deposits are designated by NRW as a Secondary A Aquifer and the Glacial Till is designated as a Secondary Undifferentiated Aquifer. Secondary A Aquifers are those that comprise permeable layers that can support local water supplies. They may provide an important source of baseflow to rivers. Secondary Undifferentiated Aquifers are those where it is not possible to apply either a Secondary A or Secondary B definition due to the variable characteristics of rock type. They typically have minor value.

11.4.17. The Lingula Flags Formation and Ramsey Sound Group are designated as Secondary B Aquifers. Secondary B Aquifers are largely lower permeability strata that may store and yield limited amounts of groundwater.

11.4.18. The bedrock geology attributed to the Triffleton Group and the St Non's Sandstone Formation are also classified as Secondary B Aquifers.

11.4.19. Previous ground investigation (Amec, 2012) encountered groundwater at depths between 0.5 m bgl and 6.6 m bgl. More recent ground investigation (Amec Foster Wheeler, 2015) encountered groundwater at depths between 0.5 m and 4.0 m bgl within sandstone and mudstone bedrock, and groundwater flow was inferred to be driven by fracture flow. Groundwater from the relatively raised plateau of the airfield was inferred to flow radially outwards from the application site.

11.4.20. Groundwater Vulnerability mapping (Landmark Envirocheck Report, ref: 305022956_1_1, and BGS GeoIndex249) indicates that groundwater within the bedrock and superficial aquifers is classed as medium to high vulnerability.

11.4.21. The bedrock and superficial aquifers are included in the Water Framework Directive (WFD) Cleddau and Pembrokeshire groundwater body (GB41002G200400), within the Cleddau and Pembrokeshire operational catchment and the Western Wales groundwater management catchment. The groundwater body has good quantitative status, poor chemical status, and poor overall status (Cycle 3, 2021 to 2027, NRW 2023250).

11.4.22. Data produced by NRW indicates the application site does not lie within a Groundwater Source Protection Zone and there were no recorded licensed groundwater abstractions within 1 km of the ownership boundary reported in the Sweco Phase 1 LQA report251.

11.4.23. Several groundwater-fed springs that feed unnamed surface water streams are recorded at the western and eastern boundaries of Cawdor Barracks (Amec Foster Wheeler, 2015).

[248] Welsh Government (n.d.). DataMapWales. [Online] Available at: https://datamap.gov.wales [Accessed 11 November 2025].

[249] British Geological Survey (n.d.). GeoIndex Onshore. [Online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed 11 November 2025].

[250] Welsh Government (n.d.). DataMapWales. [Online] Available at: https://datamap.gov.wales [Accessed 11 November 2025].

[251] Landmark (2022). Envirocheck Report, ref: 305022956_1_1.

11.4.24. GWDTE and statutory designated wetland areas are not identified by NRW within 1 km on the NRW Map Viewer252.

Hydrology

11.4.25. There are a number of surface water features recorded within 1 km of the application site[245].

11.4.26. The River Solva, a WFD watercourse, flows east to west towards Solva Harbour approximately 950 m north of the application site boundary at its closest proximity. The River Solva has an overall WFD rating of 'Good'. Brandy Brook, also a WFD watercourse with an overall WFD rating of 'Moderate', lies more than 2 km to the east of the application site. Several unnamed watercourses originate close to the perimeter of the application site and appear to flow towards the River Solva and Brandy Brook or directly into St. Brides Bay.

11.4.27. Within 1 km of the application site, approximately 16 springs are recorded at a range of distances, including at the perimeter of the application site.

11.4.28. One reservoir and several ponds are also recorded within 1 km of the application site.

Radiological Hazards

11.4.29. The Sweco Phase 1 LQA report presents the findings of radiological records provided by the Defence Science and Technology Laboratory for Cawdor Barracks. The review by Defence Science and Technology Laboratory concluded that to the best of their knowledge they were not aware of any radiological contamination.

11.4.30. The Amec Phase 2 LQA (2012) undertook a radiological walkover survey at the former site tip/burning area and the FTA in the north of the airfield. Radiological activity was greatest within the FTA, however the report states that readings were not significantly in excess of background levels.

11.4.31. The Sweco Phase 1 LQA report concludes that the presence of significant radiological contamination is unlikely based on the review of available records.

Unexploded Ordnance

11.4.32. The Sweco Phase 1 LQA report summarises information from UXO Estate Intelligence for land within Cawdor Barracks completed by the Defence Infrastructure Organisation (DIO) in July 2019. The report states that parts of the former airfield were used as a training area (dry training with no ammunition) and spent small arms cartridges were observed within the former ESA in the north of the airfield during the Sweco site inspection in November 2022.

Radon

11.4.33. The UK Health Security Agency UK maps of Radon[253] indicate the application site falls in areas classified as between 10% and over 30% radon potential, and radon protection measures are recommended for buildings and sub-surface structures.

[252] Natural Resources Wales (n.d.). Interactive Map Viewer. [Online] Available at: https://experience.arcgis.com/experience/dd852f0e12864928973e3e165a1b4631/page/English?views=Home [Accessed 11 November 2025].

[253] UK Health Security Agency (n.d.). UK maps of radon. [Online] Available at: https://www.ukradon.org/information/ukmaps [Accessed 11 November 2025].

Potential Sources of Contamination

11.4.34. Potential sources of contamination are reported within Cawdor Barracks in the Sweco Phase 1 LQA report, including several within the application site. The Sweco Phase 1 LQA report should be consulted for full details.

11.4.35. Ground investigation undertaken by Amec in 2012 targeted areas considered to have the highest potential for significant contamination. The Sweco Phase 1 LQA report concluded that, based on the review of previous Phase 1 and Phase 2 LQA reports, widespread significant contamination was unlikely to have occurred as a result of historical land use activities. Potential contaminants of concern were considered by Sweco to be metals, hydrocarbons, inorganic and organic compounds, PCBs, explosive residues, PFAS and asbestos-containing material (ACM).

Sensitive Receptors – Contaminated Land

11.4.36. The following potentially sensitive receptors have been identified as summarised in Table 11.1.

Table 11.1: Potentially Sensitive Receptors

Receptor	Description	Sensitivity
Human health	Construction workers	High
	Proposed development operational users and maintenance personnel	Medium
	Military personnel	Medium
	Tenant farmers who access the airfield to cut the grass	Medium
	Residential receptors including occupants of Cawdor Barracks, Rickeston Hall (approximately 75 m west of the application boundary) and Newgale Lodge holiday lets (approximately 45 m east of the application boundary)	Very high
Controlled waters	Groundwater within the superficial glaciofluvial deposits (Secondary A Aquifer), Glacial Till (Secondary Undifferentiated Aquifer), the Lingula Flags Formation, Ramsey Sound Group, Triffleton Group and St Non's Sandstone Formation (Secondary B Aquifers)	Medium
	Surface water (River Solva, unnamed surface watercourses, a reservoir and ponds adjacent or near to the wider ownership boundary)	High

Potential Contaminant Pathways

11.4.37. Potential contaminant pathways include:

- Direct contact, ingestion and/or inhalation of contaminated soils, dust, gas/vapour and groundwater;
- Inhalation of asbestos fibres;
- Leaching and vertical migration of soil contaminants into groundwater;
- Lateral migration of contaminants via groundwater flow; and
- Direct runoff via ground surface and/or site drainage.

11.5. Baseline Conditions – Waste and Materials

11.5.1. An overview of the existing baseline environmental conditions for the waste generation and materials use assessment is given in this section.

11.5.2. Using the most recent data published for the landfill void capacity in Wales[254], landfill capacity data for Wales has been forecast to 2024 using landfill disposals tax statistics published by the Welsh Government between 2019 and 2024. This forecast has then been projected using trend analysis to the years 2026 – 2028 to assess likely regional landfill capacity during the construction period.

11.5.3. The most recent available data for materials has also been collated and is assumed unlikely to change significantly between now and the period of construction.

Registered Landfills

11.5.4. Landfill capacity is considered within this assessment. Disposal to landfill and use of available landfill capacity is, overall, a permanent, irreversible impact. Impacts on other types of waste management infrastructure (for example material recovery facilities) are temporary, with such waste management infrastructure better placed to meet the demands of the waste management market. In summary:

- Non-hazardous landfill:
    - As of 2018, four non-hazardous landfills were located within south-west Wales with a combined remaining void space of approximately 2,150,000 m^3.
    - There were a further eight non-hazardous landfills within the other regions of Wales with a combined remaining void capacity of 6,140,000 m^3.
    - The total remaining non-hazardous void capacity in Wales in 2018 was approximately 8,290,000 m^3.

11.5.5. Using data from landfill disposals tax statistics published by the Welsh Government[246], the reported volume of standard rate (non-hazardous) waste disposed of to landfill every quarter between 2019 and 2024 was negated from the total non-hazardous void capacity figure in 2018 as stated above. This predicts that non-hazardous landfill void capacity in Wales at the end of 2024 was approximately 4,706,585 tonnes.

- Inert landfill:
    - In 2018, there were no inert landfills within south-west Wales, and six inert landfill sites in the combined regions of Wales with a total remaining capacity of approximately 1,840,500 m^3.

11.5.6. Using data from landfill disposals tax statistics published by the Welsh Government[246], the reported volume of lower rate (inert) waste disposed of to landfill every quarter between 2019 and 2024 was negated from the total inert landfill capacity figure in 2018 as stated above. This predicts that there is no remaining inert landfill void capacity in Wales as of 2024. Using the proximity principle, the baseline remaining non-hazardous and inert landfill capacity for this assessment will include the remaining non-hazardous and inert landfill capacity for both the South West and West Midlands regions of England. The combined non-hazardous landfill void capacity estimated in Wales, the South West and West Midlands regions in 2024 is 32,690,035

[254] Natural Resources Wales (2024). Remaining Landfill Void in Wales. [Online] Available at: https://datamap.gov.wales/documents/3249 [Accessed 11 November 2025].

tonnes. The combined inert landfill void capacity estimated in the combined regions in 2024 is 26,166,000 tonnes. This has been forecast using landfill capacity trends indicated by data in the Waste Data Interrogator [255] and the landfill disposals tax statistics to estimate an approximate average of 25,391,539 tonnes of non-hazardous landfill void capacity and 22,140,089 tonnes of inert landfill void capacity remaining between 2026-2028 (the construction phase of the proposed development).

- Hazardous Landfill:
    - There are no hazardous landfills in Wales.
    - Using the proximity principle, the closest hazardous waste landfills are located in the South West region of England which had a remaining capacity of 468,000 tonnes as recorded at the end of 2024[256].
    - The total remaining hazardous waste landfill void capacity within England at the end of 2024 was 14,772,000 tonnes.

11.5.7. The waste receptor sensitivity has been established based on the landfill capacity forecast established using Waste Data Interrogator and landfill disposals tax statistics[246] for Wales data trends from between 2019 and 2024 (assuming a density of non-hazardous waste of 0.83 tonnes/m^3 and a density of inert waste of 1.5 tonnes/m^3[257]) and set out in Table 11.2.

Table 11.2: Landfill Capacity and Receptor Sensitivity

Receptor	Sensitivity	Description
Non-hazardous landfill	Very high	Baseline landfill capacity is likely to reduce very considerably (by >10%) across the construction and/or operational phases (without the proposed development).
Inert landfill	Very high	Baseline landfill capacity is likely to reduce very considerably (by >10%) across the construction and/or operational phases (without the proposed development).
Hazardous landfill	Very high	Baseline landfill capacity is likely to reduce very considerably (by >10%) across the construction and/or operational phases (without the proposed development).

Materials

Primary (Virgin) Aggregates

11.5.8. Collation of the results of the 2023 Aggregate Minerals Survey for Great Britain[258] report:

[255] https://www.data.gov.uk/dataset/59ab8448-3905-49c6-9122-ae762f96f66b/2023-waste-data-interrogator

[256] Environment Agency (2025). 2024 Waste Data Interrogator. [Online] Available at: https://www.data.gov.uk/dataset/81f9d676-e77c-4d68-ab0c-b67e0b0b353e/2024-waste-data-interrogator

[257] Department for Transport (2015). High Speed Rail (London – West Midlands) Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement. Volume 5: Technical appendices, Waste and material resources. [Online] Available at: https://assets.publishing.service.gov.uk/media/5a80ac1fe5274a2e87dbb2ad/Waste_and_material_resources__WM-001-000__WM-001-000_annex__WM-002-000_.pdf [Accessed 18 December 2025]

[258] British Geological Survey (2025) Collation of the Results of the 2023 Aggregate Minerals Survey for Great Britain. [Online] Available at: https://www.gov.uk/government/publications/aggregate-minerals-survey-for-great-britain-2023 [Accessed 11 November 2025].

- 631,091 thousand tonnes of total permitted reserves of primary aggregates in Wales on 31 December 2023.
- Total primary aggregate sales of 15,341 thousand tonnes in 2023, with 11,479 thousand tonnes consumed in 2023.

11.5.9. PCC LDP (up to 2021) notes that the Council as Minerals Planning Authority must maintain a minimum land-bank (permitted reserves) of 10 years for hard rock and a seven-year land-bank for sand and gravel.

11.5.10. PCC's Minerals Background Paper for the LDP 2 (2019)259 confirms there is a significant reserve of crushed rock in Pembrokeshire, equating to a land-bank of at least 46 years. There is no sand and gravel production in Pembrokeshire outside of the National Park (which is not required to keep a sand and gravel land-bank). The sand and gravel land-bank for the adjacent Powys and Carmarthenshire is more than 50 years, and Ceredigion has a land-bank of five years.

Alternative (Secondary and Recycled) Aggregates

11.5.11. NRW Construction and Demolition Waste Survey for 2019[260] reported that:

- Approximately 3.4 million tonnes of construction and demolition waste (CDW) was generated in Wales in 2019.
- Of the CDW, approximately 45% comprised mixed wastes (which included mixed aggregates) whilst approximately 7% was specifically segregated aggregates. The segregated aggregates represented approximately 260,000 tonnes.
- Overall, approximately 75% of CDW (2.6 million tonnes) was recycled.
- The Welsh Government published Future Wales: The National Plan 2040[261] (published 2021) which identifies opportunities within the minerals sector. The report states that the Welsh Government target to increase the proportion of aggregates production in Wales from secondary and recycled sources to at least 25% of total aggregates supply has been exceeded. The Welsh Government have aspirations to move beyond the current estimate of 30% of supply deriving from secondary and recycled sources.

Concrete and Steel

11.5.12. The Mineral Products Association (MPA) reported 52.7 million tonnes of ready-mix concrete was produced in the UK's 1,062 concrete and mortar plants during 2021.

[259] Pembrokeshire County Council (2019). Background Paper for Local Development Plan 2: Minerals. [Online] Available at: https://www.pembrokeshire.gov.uk/local-development-plan-review/ldp2-evidence-base [Accessed 11 November 2025].

[260] Natural Resources Wales (2019). Construction and Demolition Waste Survey for 2019. [Online] Available at: https://naturalresources.wales/evidence-and-data/research-and-reports/waste-reports/construction-and-demolition-waste-survey-2019/?lang=en [Accessed 11 November 2025].

[261] Welsh Government (2021). Future Wales: The National Plan 2040. [Online] Available at: https://www.gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf [Accessed 11 November 2025].

11.5.13. The Welsh Government[262] reported that approximately 3,730,000 tonnes of steel were produced in Wales during 2022.

Asphalt

11.5.14. The MPA[263] reported that approximately 28.3 million tonnes of asphalt was produced in the UK in 2021. In 2022, there were over 270 asphalt production plants within the UK.

11.5.15. The key construction material sensitivity has been established based on the IEMA 2020 guidance and is presented in Table 11-3.

Table 11.3: Determination of Sensitivity – Materials

Material Resource (Receptor)	Sensitivity	Description
Primary (virgin) aggregates	Negligible	
Alternative (secondary and recycled) aggregates	Negligible	
Concrete	Negligible	Baseline evidence suggests there are no issues surrounding the national supply and stock of these key construction products.
Steel	Negligible	
Asphalt	Negligible	
Brawdy Quarry	Negligible	Brawdy Quarry is assessed as having negligible sensitivity as this site is not operational and has been restored.

Minerals Sites

11.5.16. Proposal Maps 13[263] and 14[264] of the PCC Adopted LDP indicate that there are sand and gravel and hard rock resources mapped near to the proposed development.

11.5.17. As the proposed development will not be encroaching on undeveloped land, these mineral resources should be unaffected by the construction works.

11.5.18. A Mineral and Quarry Sites Buffer (Policy GN. 25 of the LDP) extends into the footprint of the proposed development. Policy GN. 25 states that new mineral extraction and new sensitive development will not normally be permitted within buffer zones around mineral working sites, where such uses would potentially have an adverse impact on one another because of their close proximity.

11.5.19. The Mineral and Quarry Sites Buffer is associated with Brawdy Quarry. PCC's Local Development Plan 2 (LDP2) review evidence base includes a background paper on

[262] Welsh Government (n.d.). Stats Wales. [Online] Available at: https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Economic-Indices/Indices-of-Production-and-Construction/ironandsteelproduction-by-year-measure-area [Accessed 11 November 2025].

[263] Pembrokeshire County Council (2013). Adopted Local Development Plan – Proposal Map 13. [Online] Available at: https://www.pembrokeshire.gov.uk/LDP/adopted/maps.asp?proposal_id=13 [Accessed 11 November 2025].

[264] Pembrokeshire County Council (2013). Adopted Local Development Plan – Proposal Map 14. [Online] Available at: https://www.pembrokeshire.gov.uk/LDP/adopted/maps.asp?proposal_id=14 [Accessed 11 November 2025].

minerals[265]. Appendix 4 of the background paper states that Brawdy Quarry was active until 2009 with production now ceased and the site has since been restored. Brawdy Quarry has not been identified as a candidate site within the LDP2 review.

11.6. Design Interventions and Controls

Design Interventions

11.6.1. The development of the proposed design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through design of the proposed development. These are referred to as design interventions. The principles of the design and mitigation hierarchy outlined in Chapter 2 (Methodology) have been followed. The first principle being to avoid potential adverse effects, if at all feasible, before seeking to minimise or mitigate for any unavoidable impacts. Design interventions for the proposed development are reported in Chapter 3 (Proposed Development).

11.6.2. Chapter 4 (Alternatives and Design Evolution) details the design alternatives that have been considered, including the environmental factors which have influenced the decision-making.

11.6.3. The iterative design process has sought to retain existing access roads and utilise existing runway pavement taking advantage of existing hardscape and reducing ground excavation where practicable and within operational constraints. This has been included in the design thereby minimising demolition of hardstanding, creation of waste and use of materials to build new roads.

11.6.4. Future ground investigation will be required prior to detailed development design, including further investigation of potential sources of contamination. This information will be used to support design of appropriate mitigation measures to address land contamination, ground gas/radon, radiological and stability hazards in line with LCRM232 such that the land is made suitable for use.

11.6.5. A micro-siting allowance has been included within the application site with the approach described in Chapter 3 (Proposed Development). This allows for the movement of the individual elements to avoid land constraints including potential contamination.

11.6.6. Drainage design interventions and controls related to preventing potential pollution of surface water and groundwater are considered in Chapter 12 (Water Environment, Flood Risk and Drainage).

Controls

11.6.7. Controls are included in the Environmental Management Measures Table contained within Appendix A of Appendix 3.1 (Framework Construction Environmental Management Plan (CEMP)). The Framework CEMP will be developed into the Detailed CEMP for implementation during construction will be secured by planning condition. Further information on the Framework CEMP is provided in Chapter 3 (Proposed Development).

11.6.8. The following measures are included in the Framework CEMP to be implemented to mitigate risks to human health (construction/demolition workers and off-site human receptors) and controlled waters:

[265] Pembrokeshire County Council (2019). Background Paper for Local Development Plan 2: Minerals. [Online] Available at: https://www.pembrokeshire.gov.uk/local-development-plan-review/ldp2-evidence-base [Accessed 11 November 2025].

- Construction and demolition best practice will be implemented. This will include (but not be limited to): pollution control, material and stockpile management, dust suppression, wheel washing, road sweeping, windbreak netting and isolation of drainage systems (where necessary).
- Construction workforce shall adopt appropriate health and safety procedures including use of personal protective equipment (PPE).
- Appropriate stockpile segregation, stockpile siting and containment measures to prevent potentially contaminative runoff, windblown dusts and vapours.
- Construction workforce will remain vigilant for unusual visual or odorous characteristics of soils and groundwater which could indicate the presence of contamination.
- Measures to mitigate risks associated with encountering potential UXO during demolition and construction works, including appropriate risk assessment and site inspection by specialist sub-contractors as required.
- Excavation works will be carried out to segregate clean soil materials for re-use where possible in line with the principles of the Waste Hierarchy[266]. Where CDW and excavation arisings cannot be re-used within the proposed development, opportunities would be sought to find appropriate non-landfill disposal routes, such as re-use off-site. Green waste generated during construction should be re-used on site (where possible) or recycled off-site through composting.
- As construction works progress, the detailed CEMP will be updated as required.
- For demolition and construction activities, potential risks to human health will be reduced by undertaking the works in accordance with an approved health and safety plan with an appropriate method statement and risk assessments for all activities.

11.6.9. Given the relationship between the use of material assets and the minimisation of waste, there is a considerable overlap between the control measures for material assets and waste. These will include, but not be limited to, the following:

- The appointed contractor will apply the principles of the Waste Hierarchy to the management of material assets and waste during the construction phase. Priority should be given to reusing suitable site-won arisings for engineering or backfill purposes wherever practicable over the import of earthworks materials.
- Where CDW and excavation arisings generated during construction cannot be used in the proposed development, opportunities will be sought where possible to re-use the materials on other construction projects.
- The appointed contractor will comply with all relevant legislation in relation to waste handling, storage, transport and disposal. They will consult with NRW for advice on waste practices, licences and exemptions where appropriate.
- The appointed contractor will prioritise the use of secondary or recycled materials. This will include the use of suitable CDW and excavation arisings within the proposed

[266] https://www.gov.wales/applying-waste-hierarchy-guidance

development that meets the Waste and Resources Action Programme (WRAP) Quality Protocol for the production of aggregates from inert waste[267].

- The principles of local and responsible sourcing of key material assets will be adopted by the appointed contractor. Where feasible, key materials such as aggregate, asphalt, steel and concrete will be responsibly sourced from suppliers who have a minimum ISO14001 certification (or equivalent) and, if available, Buildings Research Establishment (BRE) developed BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) certification for the material.

- In accordance with WRAP Material Logistics Plan (MLP) Good Practice Guidance[268], an MLP for material assets procurement and waste management will be developed and this will form part of the Detailed CEMP. It will detail how all construction phase material assets will be managed and identify opportunities to substitute recycled or secondary materials and products for those using primary materials. It will be updated regularly during the construction of the proposed development.

- A Site Waste Management Plan (SWMP) will be prepared to support the MLP. The SWMP will identify the types and likely quantities of wastes that may be generated, and set out, in an auditable manner, how waste will be reduced, re-used, managed and disposed of. An initial target of 80% diversion from landfill has been set for the construction phase.

- Production of a Materials Management Plan (MMP) by the appointed contractor, which will form part of the Detailed CEMP, will be developed to guide the re-use of excavated soils during construction.

- Procedures for the management of unexpected contamination during construction (including ACM) will be included in the Detailed CEMP. This will include a 'stop works' requirement in the event of encountering unexpected contamination, prior to inspection of the contamination by a suitably qualified geoenvironmental practitioner.

11.7. Potential Significant Effects

11.7.1. This section considers potential impacts on ground conditions, contaminated land, materials and waste with design interventions and other controls considered as mitigation. Where the impact of the proposed development on a receptor will result in a significant effect, this has been assessed below. This assessment is based on the design elements provided in Chapter 3 (Proposed Development). The assessment of impacts has been considered as a reasonable worst-case approach.

Ground Conditions and Contaminated Land

Potential impacts

11.7.2. The following sections identify potential impacts and effects associated with contaminated land that may occur as a consequence of the proposed development.

11.7.3. Potential negative construction impacts in terms of contamination include the following:

[267] WRAP (2016). Quality Protocol: Aggregates from inert waste. Available at: https://www.gov.uk/government/publications/sr2015-no39-use-of-waste-in-a-deposit-for-recovery-operation [Accessed: November 2025]

[268] WRAP (2007). Material Logistics Plan Good Practice Guidance.

- Human health:
    - Potential for exposure to contamination in soil and groundwater during construction activities;
    - Potential to mobilise contaminants in soils and groundwater as a result of ground disturbance;
    - Generation of dust, fibres and gases/vapours;
    - Introduction of fuels, chemicals and fluids relating to construction activities;
    - Potential to encounter UXO; and
    - Exposure to radiological contamination.
- Controlled waters:
    - Creation of preferential pathways such as service corridors for migration of potential contaminants to groundwater;
    - Alteration of potential for contaminants to mobilise (leach) from soils during construction;
    - Increased potential for contaminants to enter surface water through drainage or surface runoff; and
    - Potential to mobilise contaminants in soils and groundwater as a result of ground disturbance.

11.7.4. Potential negative impacts associated with the operational phase includes the introduction of potential contamination sources, through the storage and use of fuel oils. Small quantities of a range of chemicals and oils commonly used for general maintenance and cleaning applications are also anticipated. No further operational impacts are anticipated.

Determination of magnitude of potential impacts

11.7.5. The magnitude of potential impacts has been determined based on baseline conditions and are presented in Table 11-4.

11.7.6. Appendix 11.1 (Assessment Methodology – Contaminated Land) provides further commentary on the methodology of assessment of potential impacts.

Table 11.4: Determination of the Magnitude of Potential Impact for the Contaminated Land Assessment

Receptor	Impact Magnitude	Reasoning
Construction Phase		
Construction workers	Negligible adverse	Construction workers may be working in excavations and interacting with sub-surface materials and therefore could be in close contact with potentially contaminated soil, dust, fibres and groundwater during the construction phase. However, whilst potential sources of contamination have been identified within the application site, the presence of significant contamination is unlikely based on the baseline conditions reported in the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. Furthermore, the effects of potential contamination on construction workers are anticipated to be temporary, of localised impact and will be minimised with dedicated health and safety management protocols, use of appropriate PPE and implementation of procedures in accordance with CEMP. As such the impact magnitude is assigned as negligible adverse.
Military personnel	Negligible adverse	Military personnel are present within the wider barracks boundary. The presence of significant contamination within the application site is unlikely based on the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. Construction will be completed in accordance with the CEMP to manage pollution risk and to prevent off-site migration of potential contamination including dust, fibres, gas/vapours and odours, meaning the impact magnitude to military personnel is negligible adverse.
Tenant farmers	Negligible adverse	Tenant farmers may have access to the application site during the construction phase. However, they will not have access to the construction area and potential exposure periods will be limited. The presence of significant contamination within the application site is unlikely based on the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. Construction will be completed in accordance with the CEMP to manage pollution risk and to prevent off-site migration of contamination including dust, fibres, gas/vapour and odours meaning the impact magnitude is negligible adverse.
Residential receptors	Negligible adverse	Off-site residential receptors are present at Cawdor Barracks, Rickeston Hall and Newgale Lodge holiday lets. The presence of significant contamination within the application site is unlikely based on the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. Construction will be completed in accordance with the CEMP to manage pollution risk and to prevent off-site migration of contamination including dust, fibres, gas/vapours and odours. The impact magnitude to residential receptors is negligible adverse.
Surface water	Negligible adverse	Surface water bodies are present within the study area. There is potential for pollution from construction activities and potential for contaminants to enter surface water through drainage and/or surface runoff. Construction works will be in accordance with

Receptor	Impact Magnitude	Reasoning
		the CEMP which will include pollution control measures such as surface water and drainage management plans to prevent impacts on surface waters. Additionally, the presence of significant contamination within the application site is unlikely based on the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. As such the impact magnitude is considered to be negligible adverse.
Groundwater	Negligible adverse	Secondary A and Secondary B Aquifers are recorded in the study area. There is potential for pollution from construction activities to enter groundwater through drainage, leaching and surface runoff. Construction works will be in accordance with the CEMP which will include pollution control measures such as surface water and drainage management plans to prevent impacts on groundwater. Additionally, the presence of significant contamination within the application site is unlikely based the Sweco Phase 1 LQA report and the application site will be made suitable for use prior to development in line with LCRM. As such the impact magnitude is considered to be negligible adverse.
Operational Phase		
Proposed development operational users and maintenance personnel	Negligible adverse	Future operational users and maintenance personnel will be present during the operational phase; however, direct exposure to soil and/or shallow groundwater is considered unlikely because pre-construction design will be in accordance with LCRM to address unacceptable contaminant linkages. As such the impact magnitude is considered to be negligible adverse.
Surface water	Negligible adverse	Surface water bodies are present within the study area. There is potential for pollution from operational activities to enter surface waters through drainage and/or surface runoff. However, operational activities will be managed in accordance with environmental good practice pollution control and management systems, which will prevent introduction of new contamination sources and potential off-site migration during the operational phase. As such the impact magnitude is considered to be negligible adverse.

11.7.7. Assessment of potential impact on human health and groundwater during the operational phase was scoped out in the Scoping Report because sources of contamination will be assessed during construction and appropriate remediation/mitigation undertaken in accordance with LCRM such that there will be no further impacts to assess during operation. This includes assessment of the presence of soil and groundwater contamination, ground gas and/or vapours, radiological hazards and radon which will need to be addressed in the detailed development design prior to construction.

Determination of significance of effects

11.7.8. The significance of potential effects has been determined based upon the sensitivity of potential receptors and the magnitude of the impact.

Table 11.5: Significance Matrix

Receptor	Sensitivity	Magnitude	Significance
Construction Phase			
Construction workers	High	Negligible adverse	Minor adverse, not significant
Military personnel	Medium	Negligible adverse	Negligible or minor adverse, not significant
Tenant farmers	Medium	Negligible adverse	Negligible or minor adverse, not significant
Residential receptors	Very high	Negligible adverse	Minor adverse, not significant
Surface water	High	Negligible adverse	Minor adverse, not significant
Groundwater	Medium	Negligible adverse	Negligible or minor adverse, not significant
Operational Phase			
Proposed development operational users and maintenance personnel	Medium	Negligible adverse	Negligible or minor adverse, not significant.
Surface water	High	Negligible adverse	Minor adverse, not significant

11.7.9. Based on the current understanding of baseline conditions and incorporating the design interventions and controls set out in Section 11.6 of this chapter, the construction effects of the proposed development are considered to be minor to negligible for all sensitive receptors, and not significant in EIA terms.

11.7.10. Based on professional judgement and incorporating the design interventions and controls set out in Section 11.6 of this chapter, the operational effects are considered to be minor to negligible for all receptors, and not significant in EIA terms. This is due to the requirement for the site to be suitable for use prior to construction in accordance with LCRM and implementation of environmental management controls to prevent introduction of contamination sources during operation.

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Potential impacts - Construction

11.7.11. The proposed development does not require any demolition of existing above ground structures or buildings down to ground level.

11.7.12. Certain elements of the construction phase will require site clearance topsoil removal for the fungi relocation works (more detail provided in Chapter 8: Biodiversity) and removal of existing hardstanding to allow for construction of building and antenna foundations.

11.7.13. The main types of material assets used are likely to be aggregate, asphalt, and concrete with the wastes being the same in addition to soil (from excavations) based on experience from other similar projects.

11.7.14. Based upon the concept design and values provided by the design team it is anticipated that a quantity of approximately 5,100 m^3 of exfill waste materials would be generated during the construction. Approximately 3,200 m^3 of this material is anticipated to be retained on site.

Potential impacts - Operation

11.7.15. As would be expected for commercial and industrial development of similar function and scale, operation of the proposed development will generate de minimis quantities of office type wastes and a range of wastes consistent with maintenance and repair activities. The range and volume of such wastes are not expected to significantly add to the existing volumes of operational wastes streams currently generated. Such wastes would be subject to management under other relevant regulations and is expected to be aligned to the requirements of the Waste Hierarchy and applicable MOD policy.

Determination of magnitude of potential impacts

11.7.16. The magnitude of potential impacts for waste has been determined based on the baseline conditions and is presented in Table 11.6. Appendix 11.2 (Assessment Methodology – Waste and Materials) provides further commentary on the methodology of assessment of potential impacts.

Table 11.6: Determination of the Magnitude of Potential Impact – Waste

Receptor	Magnitude of Impact	Description
Non-hazardous landfill	Negligible	Waste generated by the proposed development will reduce the combined national (Wales), South West and West Midlands landfill void capacity baseline by <1%.
Inert landfill	Negligible	Waste generated by the proposed development will reduce the combined national (Wales), South West and West Midlands landfill void capacity baseline by <1%.
Hazardous landfill	Negligible	Waste generated by the proposed development will reduce national (England) landfill void capacity baseline by <0.1%.

11.7.17. The magnitude of potential impacts for materials has been determined based on the baseline conditions and is presented in Table 11.7. Appendix 11.1 (Assessment Methodology – Contaminated Land) provides further commentary on the methodology of assessment of potential impacts.

11.7.18. The overall magnitude of the potential impacts for materials is considered to be minor as it is not considered that at least one of the key construction materials will exceed 5% consumption of the baseline volumes. Table 11.7 provides further details on the assumed magnitude of impacts for each of the key construction volumes.

11.7.19. Brawdy Sandpit, a former allocated mineral site identified on Proposal Map 14 associated with a Mineral and Quarry Sites Buffer, has been identified by the Local Planning Authority as being a non-operational, restored site. As such, it is not anticipated that further mineral extraction will be undertaken on this former allocated site. Therefore, there is no change anticipated.

Table 11.7: Determination of the Magnitude of the Potential Impact – Materials

Receptor	Magnitude of Impact	Description
Primary (virgin) aggregates	Negligible	Initial estimates based upon the concept design and values provided by the design team suggests approximately 19,536* tonnes of aggregates may be used during construction.

Receptor	Magnitude of Impact	Description
		This quantity represents 0.0031% of the baseline availability and therefore results in a negligible magnitude (consumption of <1% of baseline availability).
Alternative (secondary and recycled) aggregates	Minor	Initial estimates based upon the concept design and values provided by the design team suggest approximately 19,536* tonnes of aggregates may be used during construction. This quantity represents 1.4% of the baseline availability of secondary aggregates and therefore results in a minor magnitude (consumption of between 1 and 5% of baseline availability).
Concrete	Negligible	Initial estimates based upon the concept design and values provided by the design team suggests approximately 3,751* tonnes of concrete may be used during construction. This quantity represents 0.01% of the baseline availability of concrete and therefore results in a negligible magnitude (consumption of <1% of baseline availability).
Steel	Minor	An estimation of the steel consumption for the proposed development has not been provided within the concept design or by the design team. The baseline availability of steel is currently 3,730,000 tonnes of steel. The proposed development is unlikely to consume >5% of the baseline availability (5% equates to a figure of 186,500 tonnes) which would result in a moderate magnitude. In lieu of steel volumes, a minor magnitude has been selected, assuming a reasonable worst-case scenario (steel consumption of 1-5% volume of the regional baseline, up to 186,500 tonnes).
Asphalt	Negligible	Initial estimates based upon the concept design and values provided by the design team suggest approximately 19,536* tonnes of aggregate (including concrete, gravel, asphalt and dirt) may be used during construction. The concrete component of this is estimated to be 3,571* tonnes. Conservatively, it has been assumed for this potential impact determination that the remainder of construction material is asphalt (15,965 tonnes). The quantity represents 0.06% of the baseline availability of asphalt and therefore results in a negligible magnitude (consumption of <1% of baseline availability).
Brawdy Quarry	No change	Brawdy sand pit has been restored and is no longer identified as a potential allocated mineral site. Therefore, there is no impact associated with the proposed development on this former allocated site.

*Conversion rates for aggregate and concrete have been taken as 2.0 t/m³ and 2.4 t/m³ respectively, from Hammond, G. P. and Jones, C. I. (2011), Embodied Carbon: The Inventory of Carbon and Energy (ICE), Version 2.0. Sustainable Energy Research Team, University of Bath, UK; with BSRIA, iCAT. ISBN 9780860227038.

11.7.20. The significance of potential impacts has been determined based upon the sensitivity of potential receptors and the magnitude of the impact.

Table 11.8: Determination of Effect – Waste

Receptor	Assessment of Effect
Non-hazardous landfill	Slight, not significant
Inert landfill	Slight, not significant
Hazardous landfill	Slight, not significant

11.7.21. Based upon a negligible sensitivity for all key construction materials and the highest key construction material magnitude of minor, the calculated effect is considered neutral or slight, which is not significant.

Table 11.9: Determination of the Effect – Materials

Receptor	Assessment of Effect
Primary (virgin) aggregates	Neutral, not significant
Alternative (secondary and recycled) aggregates	Slight, not significant
Concrete	Neutral, not significant
Steel	Slight, not significant
Asphalt	Neutral, not significant
Brawdy Quarry	Neutral, not significant

Summary of Significant Effects

11.7.22. No significant effects have been identified as a result of the construction and operation of the proposed development in relation to contaminated land, materials and waste.

National Park Special Qualities

11.7.23. In their landscape and visual scoping opinion consultation response dated 04 May 2023 the Pembrokeshire Coast National Park Authority (PCNPA) requested an assessment of the effect of the proposed development on the Special Qualities of the Pembrokeshire Coast National Park (PCNP). These 'Special Qualities' are defined as the characteristics and features of the National Park which individually, or in combination, contribute to making the National Park unique. One relates to the geology of the National Park which is considered in the table below. Others relate to other topics not considered relevant to the assessment of ground conditions and contaminated land, but are covered in other chapters of this ES (coastal splendour, diversity of landscape, distinctive settlement character, rich historic environment, richness of habitats and biodiversity, accessibility, space to breathe, remoteness, islands, tranquillity, and wildness, and the diversity of experienced and combination of individual qualities).

11.7.24. The following table provides a summary assessment of the effects of the proposed development on the 'diverse geology' Special Quality that relates to the PCNP.

Table 11.10: Assessment of Diverse Geology National Park Special Quality

Special Quality	Likely changes caused by proposed development	Are effects beneficial, neutral, or adverse and reasoned justification	Duration of effect	Are changes important? Do they conserve, enhance, or harm the Special Quality?
Diverse geology	As the proposed development is not within the PCNP, there will be no direct impacts on the geology of the	**Neutral**	NA	Quality conserved (unchanged).

	PCNP. Additionally, there are no statutory or non-statutory geological designations within or adjacent to the application site.	

11.8. Mitigation and Enhancement

11.8.1. With the design interventions and controls in place as described in Section 11.6, no significant effects have been identified at this stage of assessment, and therefore no further mitigation is required. This position will be revisited based on the findings of future site specific ground investigation.

11.9. Cumulative Effects

11.9.1. As part of the EIA process, the environment team has undertaken a coordinated, multidisciplinary approach to ensure cumulative effects are considered across disciplines and influence the design where appropriate.

11.9.2. The assessment of cumulative effects is presented in Chapter 17 (Cumulative Effects Assessment).

11.9.3. The proposed development is unlikely to have a significant cumulative effect with other developments. Works will be within already developed areas where possible and potential effects from contaminated land will be mitigated through application of LCRM, the Framework CEMP and operational procedures and measures outlined in Section 11.6.

11.9.4. Baseline information on material assets (materials availability) and waste (landfill capacity) is generated by the relevant authorities based on predicted regional demand projections (including consideration for other significant projects within the region).

11.9.5. Landfill and non-landfill infrastructure within the region is likely to have sufficient capacity to accommodate any waste from the proposed development and from other developments. Waste arisings requiring disposal to landfill would be expected to decline in the future in line with Welsh waste management targets and a drive to a more circular economy. Taking into account the committed mitigation measures for the proposed development, it is likely that cumulative generated wastes from any other developments would be diverted from landfill, with significant opportunity for the re-use, recycling or recovery of these wastes locally or within the region.

11.9.6. Upon considering the baseline availability of key construction materials within Wales, there is likely to be sufficient supply to facilitate the construction of both the proposed development and other concurrent development projects.

11.9.7. No significant intra-cumulative or inter-cumulative effects for this environmental topic are anticipated as a result of the proposed development.

11.10. Residual Significant Effects

11.10.1. The proposed development is not expected to give rise to significant (moderate or above) residual effects during either the construction or operational phases. The proposed development would comply with local, regional, and national policies.

Contaminated Land

11.10.2. Residual effects have been assessed based on the preceding sections. The Sweco Phase 1 LQA report indicates it is unlikely that significant contamination is present within the application boundary. Construction will be completed following application of LCRM to address unacceptable contaminant linkages, and the CEMP will implement procedures during construction to prevent off-site migration of dust, fibres odour and surface water. Operational activities will be managed in accordance with legislation and environmental good practice, which will mitigate potential off-site migration during the operational phase. As such, it has been assessed there will be no residual significant effects from contaminated land.

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11.10.3. Residual effects, once mitigation measures are taken into consideration, which have been identified based on the preceding baseline section are identified in Table 11.11.

Table 11.11: Assessment of Residual Effects

Receptor	Predicted Impacts	Nature of Effect							Pre-Mitigation Significance of Predicted Impacts	Predicted Residual Effects
		+ / -	Sensitivity	Magnitude of Impact	Direct / Indirect	Permanent / Temporary	Reversible / Irreversible	Short Term, Medium Term, Long Term		
Non-hazardous landfill	Reduction in landfill void capacity.	-	Very high	Negligible	Direct	Permanent	Irreversible	Long term	Slight, Not significant	The reduction in the void capacity was calculated assuming the full quantity of waste anticipated (approximately 1,900 m^3) is received by each type of landfill facility. If construction is undertaken in line with the suggested enhancement and mitigations (including an outline target to divert 80% of wastes from landfill), it is likely that a greater proportion of the waste will either be re-used on site during construction or diverted from landfill for disposal at a non-landfill facility. ***Therefore, the residual effects are considered not significant.*** Brawdy Sandpit is identified as being restored and therefore future extraction of mineral resources at this location is unlikely. ***Therefore, the residual effects are considered not significant.***
Inert landfill		-	Very high	Negligible	Direct	Permanent	Irreversible	Long term	Slight, Not significant.	
Hazardous landfill		-	Very high	Negligible	Direct	Permanent	Irreversible	Long term	Not significant	
Brawdy Sandpit	Impact on former allocated mineral site through construction within the mineral buffer zone.	-	Negligible	No change	-	-	-	-	Neutral, Not significant	

Materials	Consumption of key construction materials	-	Negligible	Negligible to minor	Direct	Permanent	Irreversible	Long term	Neutral to Slight, Not significant	The estimated volumes of key construction materials consumed are not considered to have a significant impact upon the baseline availability regionally and nationally (where applicable). If construction is undertaken in line with the suggested enhancement and mitigations (including focus on re-use of site-won materials to reduce important quantities), it is likely that the total volume of materials consumed would be further reduced. ***Therefore, the residual effects are considered not significant.***

11.11. Monitoring

11.11.1. No further monitoring is proposed as no significant effects have been identified based on readily available baseline information at this stage of assessment. This position will be revisited, and monitoring may be undertaken based on the findings of future site specific ground investigation for the proposed development.

11.12. Summary and Conclusions

11.12.1. Potential significant effects for ground conditions and contaminated land have been assessed for human health and controlled water receptors within the study areas. This chapter has also considered potential significant effects on material assets and waste resources. The construction and operational phases have been considered with implementation of design interventions and controls. The impact of cumulative effects with other developments has also been assessed.

11.12.2. Potential contamination may be present in soils and groundwater within the application site. However, previous assessment and intrusive ground investigations have not encountered evidence for the presence of widespread significant contamination. Further ground investigation is required to confirm geotechnical and ground engineering properties to inform detailed design of structures and foundations. This will include additional contamination testing of soils and groundwater in accordance with LCRM and will also support further assessment of materials management during construction.

11.12.3. With sufficient and appropriate design interventions and controls, the proposed development is not expected to give rise to significant (moderate or above) residual effects during the construction or operational phases.

11.12.4. The outcome of this assessment is based on the design interventions and controls described in this chapter including the implementation of LCRM, the Framework CEMP and operational environmental management systems.

11.12.5. The materials and waste assessment in this chapter has been undertaken in accordance with the 2020 Institute of Environmental Management and Assessment (IEMA) guidance on key terms, concepts, and considerations for assessing the environmental impacts and effects of materials and waste as part of the Environmental Impact Assessment (EIA) process.

11.12.6. The assessment of the impact of waste and resources on the proposed development considers the sensitivity of receptors and the magnitude of impact to calculate the overall effect. The sensitivity assessment for waste considers landfill void capacity, and based on current predictions, this would result in a very high sensitivity factor. However, the magnitude of impact is negligible; therefore, the overall impact is not significant for waste.

11.12.7. Based on a negligible sensitivity for all key construction materials and the highest key construction material magnitude being minor, the calculated effect is considered neutral or slight; therefore, the overall impact is not significant for materials.