M5 Junction 10 Improvements Scheme

Environmental Statement

Chapter 12: Materials and Waste

TR010063 – APP 6.10

Regulation 5(2)(a)

Planning Act 2008

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

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Gloucestershire COUNTY COUNCIL

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Infrastructure Planning

Planning Act 2008

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

M5 Junction 10 Improvement Scheme

Development Consent Order 202[x]

6.10 Environmental Statement: Chapter 12: Materials and Waste

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12. Materials and Waste

12.1. Introduction

12.1.1. This chapter presents the environmental assessment of the M5 Junction 10 Improvements Scheme ("the Scheme") for Materials and Waste based on the Scheme as it is described in Chapter 2 – The Scheme (Aapplication document TR010063/—APP/-6.2) and detailed in the General Arrangement Plans (application document TR010063 – APP 2.9). The chapter sets out the standards and methodologies that have been used to carry out the assessment of materials and waste for the Environmental Statement (ES). This chapter identifies and assesses the likely impacts of material use and waste generation associated with the Scheme, during construction. The chapter has been written in accordance with the Design Manual for Roads and Bridges (DMRB) standard LA 110 Material Assets and Waste.

12.1.2. It is anticipated that, during operation (stated as the opening year in DMRB LA 110) of the Scheme, negligible quantities of material assets would be required for maintenance and negligible quantities of waste would be produced. Material assets and waste during operation were therefore scoped out of further assessment, as stated in the Environmental Scoping Report. This decision is based on discussions with design engineers (for materials) and road maintainers (for waste) on previous schemes. Scoping out material assets and waste during operation is in line with requirements stated in Section 3.2 of DMRB LA 110, which sets out the need to do further assessment only where a scheme would generate large quantities of waste.

12.1.3. Materials are defined in DMRB LA 110 as "primary, recycled/secondary and renewable sources of materials required for constructing a project".

12.1.4. Waste is defined as per the Waste Framework Directive (2008/98/EC) as "any substance or object which the holder discards or intends or is required to discard."

12.2. Competent expert evidence

12.2.1. The lead author of this chapter is an Associate Waste Management Consultant and a Fellow of the Chartered Institute of Waste Management with over 16 years of knowledge and experience in producing EIAs and Site Waste Management Plans for major infrastructure projects.

12.3. Planning policy and legislative context

12.3.1. A summary of legislative requirements in relation to material assets and waste and how they apply to the Scheme is presented below. It should be noted that the details presented in this section are not intended to provide a full consideration of the relevant documents and their application to the Scheme. This information is provided within the Planning Statement and Schedule of Accordance with National Policy Statement (Aapplication document TR010063/—APP/-7.1) that accompanies the application for a DCO.

12.3.2. Many of the relevant UK acts and regulations relating to waste incorporate EU directives into UK Law. These include:

- EU Revised Waste Framework Directive (2008/98/EC) – implemented in law through the Waste Regulations as detailed below.
- EU Landfill Directive (1993/31/EC), as amended by the EU Directive (2003/33/EC) – implemented in law through the Environmental Permitting Regulations as detailed below.
- EU Hazardous Waste Directive (1991/689/EEC) – implemented in law through the Hazardous Waste Regulations as detailed below.
- EU Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures (including revisions) – implemented in law through the CLP (Classification, Labelling and Packaging) Regulations as detailed below.

12.3.3. Further to the above it should be noted that the European Commission Decision 2000/532/EC (which was then amended in 2014 (2014/955/EU)) established the European Waste Catalogue (EWC) list of waste types which provides a standardised way of describing waste. The EWC list of wastes was transposed into UK law (via the Hazardous Waste (Miscellaneous Amendments) Regulations 2015) and in some cases takes precedence on hazardous waste thresholds.

12.3.4. It should also be noted that while the United Kingdom has left the EU, the relevant Regulations still apply, however, future changes cannot be ruled out.

National policy

National Policy Statement for National Networks (NPS NN)

12.3.5. The NPS NN outlines the importance of managing resources and wastes to prevent and minimise environmental impacts. The resource and waste management measures outlined in the 'Waste Management' chapter should be adhered to and considered throughout all stages of the Scheme. Management measures are inclusive of but not limited to, the implementation of the waste hierarchy (see Figure 12-7~~Figure 12-7~~), the correct management of waste both on-site and off-site and ensuring the appropriate waste infrastructure for waste treatment and disposal.

National Planning Policy Framework (NPPF)

12.3.6. The NPPF's goal of supporting sustainable development identifies the importance of using natural resources prudently and minimising waste. It identifies that strategic policies should make provision for minerals and waste management. Section 17 focuses on "Facilitating the sustainable use of minerals", and states planning policies should include consideration of the following points:

- Provide for the extraction of mineral resources of local and national importance, except for peat.
- Take account of the contribution that recycled materials and minerals waste can make to supply of materials.
- Safeguard mineral resources by defining Mineral Safeguarding Areas (MSA).

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

12.3.7. The Plan shows what the UK government will do to improve the environment, within a generation. It sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first.

12.3.8. Chapter 4 of the Plan addresses 'Increasing resource efficiency and reducing pollution and waste'. It aims to minimise waste, reuse materials as much as possible and manage materials at the end of their life to minimise the impact on the environment. It will do this by:

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

12.3.9. The Plan also aims to ensure that resources from nature are used more sustainably and efficiently. The Plan will do this by:

- Maximising the value and benefits from resources, doubling resource productivity by

2050.

- Improving the approach to soil management: by 2030 all of England's soils will be managed sustainably, with natural capital thinking will develop appropriate soil metrics and management approaches.

Resources and Waste Strategy for England 2018

12.3.10. The Strategy sets out national policy for minimising waste, promoting resource efficiency and moving towards a circular economy. The Strategy focuses on the importance of driving waste management up the waste hierarchy and states the importance of considering the Government's ambition of achieving zero avoidable waste.

12.3.11. The Strategy is based around two overarching objectives which aim to maximise the value of resource use and to minimise waste and its impact on the environment.

12.3.12. The Strategy puts a strong emphasis on waste prevention through making products using fewer natural resources. The Strategy references the UK statistics on waste which show that over 90% of non-hazardous construction and demolition waste was recovered in 2016.

Waste Management Plan for England 2021

12.3.13. The Plan for England focuses on waste arisings and their management. Its core aim is to bring current waste management policies under the umbrella of one national plan.

12.3.14. It is a high-level, non-site specific document that provides an analysis of the current waste management situation in England and evaluates how implementation of the objectives and provisions of the Waste (England and Wales) Regulations 2011 will be undertaken.

12.3.15. It references the critical issues of proximity principle and the circular economy which should enable the repair, remanufacture and reuse items to reduce waste generation.

The Environmental Protection Act 1990

12.3.16. The Act implements integrated pollution control for the disposal of waste to air, land and water, including solid waste disposal.

12.3.17. As part of this, under Section 34, the Act imposes a Duty of Care on anyone who produces, imports, keeps, stores, transports, treats or disposes of waste.

12.3.18. This will mean that the Applicant and all contractors must take all reasonably practical steps to ensure that:

- Waste is consigned only to a registered waste carrier, licensed waste contractor, local authority waste collector or person dealing with waste in ways that are exempt from licensing.
- Waste that is disposed of is accompanied by a detailed written description of the waste to ensure its safe handling, treatment and disposal (waste transfer notes are to be kept for a minimum of two years and hazardous waste consignment notes are to be kept for a minimum of three years).
- Waste is securely contained to prevent it escaping to the environment.
- Appropriate measures are taken to ensure that others involved in the handling and disposal of waste do so in accordance with all applicable Regulations.
- Copies of registration certificates should be obtained for all waste contractors and waste carriers used as part of the Scheme and it should be ensured that they are on the Environment Agency's 'Public Register of Waste Carriers, Brokers and Dealers'.
- Checks should be made on the destination of each waste, ensuring that each waste management facility is licensed to accept the waste. Duty of Care audits of carriers and waste management facilities are advisable.

Clean Neighbourhoods and Environment Act 2005

12.3.19. Chapter 16 of the Act prescribes the correct transportation, collection, disposal and management of waste and prohibits fly tipping.

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

12.3.20. The Regulations put in place requirements to ensure that sites that produce certain materials and undertake certain activities (such as the storage, use or treatment of waste) have a permit or exemption from the regulator (i.e., the Environment Agency).

12.3.21. Permit or exemption details of all sites that manage waste from the Scheme will be checked to ensure waste is being managed in accordance with all applicable legislation and policies and in accordance with good practice.

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

12.3.22. The Regulations transpose the Revised EU Waste Framework Directive (2008/98/EC) into law and require organisations to manage waste in accordance with the waste hierarchy, to prevent waste going to landfill.

12.3.23. Waste management contractors working on the Scheme will be required to provide evidence that the waste hierarchy has been applied. This evidence can be in the form of waste transfer notes and hazardous waste consignment notes, which themselves must be kept for two and three years, respectively.

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

12.3.24. The Regulations transpose the Revised EU Waste Framework Directive (2008/98/EC) into law, providing a definition of hazardous waste. It also ~~and~~ requires a hazardous waste consignment note to be produced for movement of hazardous waste with ~~.~~all waste classified by a six-digit code.

Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 (as amended)

12.3.25. The Regulations have a key objective to reduce the amount of WEEE that goes to landfill. This is to be achieved by making producers responsible for the collection, treatment and recovery of WEEE, including the associated costs.

12.3.26. For the Scheme, all WEEE produced in the construction and operation phases must be segregated and managed separately from other wastes, with relevant paperwork provided as described above.

The Waste Batteries and Accumulators Regulations 2015

12.3.27. The Regulations main requirements are that producers of batteries and accumulators must either take back waste batteries and accumulators or fund the collection and recycling of them.

12.3.28. All batteries produced in the construction and operation phases of the Scheme must be segregated and managed separately from other wastes.

The CLP (Classification, Labelling and Packaging) Regulation 2008

12.3.29. The CLP Regulation was introduced in a staggered manner between 1999 and 2015. It should be noted that the CLP Regulation has replaced the Dangerous Substances Directive (67/548/EEC) and the Dangerous Preparations Directive (1999/45/EC). To summarise, the Regulation provides guidance on the application of the CLP criteria for hazards (physical, health and environmental). With specific reference to the Scheme, the Regulation should be used to support the classification of both waste and materials. All waste should be classified by a six-digit code, which must be recorded on all waste transfer notes and hazardous waste consignment notes for the movement of waste from the construction and operation phases of the Scheme.

Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000

12.3.30. The Regulations require the safe disposal or decontamination of all equipment that contains polychlorinated biphenyls (PCBs). Equipment containing 5 litres or more of PCB

substance or mixture is also covered by the Regulations. PCBs can be present in old electrical equipment which may be removed as part of the Scheme.

Environmental Damage (Prevention and Remediation) (England) Regulations 2017

12.3.31. The Regulations introduce obligations to ensure the polluter pays for any environmental damage caused. The Regulations require caution to be taken when managing sites to prevent damage to water, land and biodiversity. Such damage could be caused by poor waste management practices and as such the generation of waste from the Scheme must be managed in accordance with all applicable legislation and policies and in accordance with good practice.

The Control of Asbestos Regulations 2012

12.3.32. The Regulations require notification to the appropriate authority of all notifiable asbestos works (as specified in the Regulations), the medical surveillance (from April 2015) and health records for employers dealing with asbestos, the provision of the correct equipment and training for working with asbestos; and the documentation of the method, storage and disposal of asbestos waste. Any waste containing asbestos (such as insulation or lagging) must be stored and disposed of, in suitable packaging to prevent fibre release, in line with the Regulations. All asbestos must be removed by a licensed contractor who has undergone the appropriate training for the removal of asbestos and must wear the appropriate PPE. Written records must be kept of the workers and the likely level of exposure. The asbestos must only be disposed of at an appropriately permitted disposal site.

Regional and local policy

Minerals Local Plan for Gloucestershire (2018-2032) (adopted March 2020)

12.3.33. The plan highlights the importance of minerals to build our homes, infrastructure and even day to day products.

12.3.34. It summarises the drivers for change in the county and the vision and objectives for the plan period around mineral management, including the significance of mineral safeguarding and the future supply of materials.

12.3.35. The plan also highlights the value of sourcing minerals from secondary and recycled supplies under Policy SR01 - Maximising the use of Secondary and Recycled Aggregates which encourages mineral developments to minimise waste overall but ensure waste that is generated can be used for secondary and recycled aggregates.

12.3.36. It also highlights that non mineral developments should adopt sustainable design by minimising the use of primary materials, reusing or recycling waste and sourcing secondary and recycled aggregates.

~~12.3.35. The plan also establishes the value of sourcing minerals from secondary and recycled supplies.~~

Gloucestershire Waste Core Strategy (2012 – 2027)

~~12.3.36.~~12.3.37. The Strategy stresses the importance of reducing waste in the future as well as reusing and increasing recycling.

~~12.3.37.~~12.3.38. For the waste that cannot be managed in those ways, the Strategy also sets out the requirements for facilities that can recover energy from the remaining waste, to ensure this can be effectively managed in the future.

~~12.3.38.~~12.3.39. The Strategy sets out what facilities will be needed over the plan period, where they will be built and when, as well as taking into consideration issues such as flood risk in the county.

12.3.40. In relation to construction and demolition (C&D) waste, ~~the~~ Strategy Policy WCS2 (Waste Reduction) expects that all development will incorporate the principles of waste minimisation and re-use. This policy is further supported by a Supplementary Planning Document (Waste Minimisation in Development Projects).

~~12.3.39. notes there is sufficient capacity to manage this stream over the plan period although efforts will need to be made to continue to divert 50% of C&D waste from landfill, in line with the national target set down for 2012.~~

Gloucester, Cheltenham and Tewkesbury Joint Core Strategy 2011-2031

~~12.3.40.~~12.3.41. Policy SD3 Sustainable Design and Construction recognises that development has a significant and direct impact on the environment, through the use of finite natural resources and the generation of waste and that sustainable design and construction should seek to use resources efficiently and decrease waste during the construction, use and decommissioning phases of developments.

12.4. Methodology

12.4.1. An environmental assessment, as defined in DMRB LA 110, has been carried out to assess the impacts of material assets and waste from the Scheme during its construction phase. The assessment process comprised of the following tasks:

- Review of relevant legislation and guidance to identify material and waste management objectives and targets.
- Establish the baseline demand for material assets and the baseline capacity of waste management infrastructure.
- Review of the Bill of Quantities (BoQ) to establish the quantities and types of materials to be used and wastes to be generated during construction.
- Identify and assess the impacts of the Scheme by comparing the information in the BoQ against the baseline data.
- Identify mitigation measures to prevent, reduce, reuse, recycle and/or recover materials and wastes from the Scheme.

Assessment criteria

12.4.2. An assessment of the level of environmental effect from the use of material assets and generation of waste has been made using the criteria in Table 12-1 below, which are set out in DMRB LA 110.

Table 12-1 - Criteria for classifying the environmental effects

Significance category	Description
Very large	Material Assets 1) no criteria: use criteria for large categories. Waste 1) >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or 2) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
Large	Material Assets 1) project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; 2) aggregates required to be imported to site comprise <1% re-used / recycled content; and 3) project sterilises ≥1 mineral safeguarding site and/or peat resource. Waste

Significance category	Description
	1) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and 2) >50% of project waste for disposal outside of the region.
Moderate	Material Assets 1) project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target. Waste 1) >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 2) 1-50% of project waste for disposal outside of the region.
Slight	Material Assets 1) project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target. Waste 1) ≤1% reduction or alteration in the regional capacity of landfill; and 2) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Neutral	Material Assets 1) project achieves >99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2) aggregates required to be imported to site comprise >99% re-used / recycled content. Waste 1) no reduction or alteration in the capacity of waste infrastructure within the region.

Table Source: LA 110, Table 3.13.

12.4.3. Table 12-1 defines ‘neutral’ to ‘very large’ environmental effects for both material assets and waste.

12.4.4. The effects of the Scheme can then be defined as significant or not significant, as shown in Table 12-2~~Table 12-2~~ below.

Table 12-2 - Significance criteria for material assets and waste

Significance	Description
Significant (one or more criteria met)	Material Assets: 1) category description met for moderate or large effect. Waste: 1) category description met for moderate, large or very large effect.

Significance	Description
Not significant	Material Assets: 1) category description met for neutral or slight effect. Waste: 1) category description met for neutral or slight effect.

Table Source: LA 110, Table 3.14

Data sources

12.4.5. The baseline has been established through a desk-based review of data from the following sources:

- Mineral Products Association, Profile of the UK Mineral Products Industry[1].
- Mineral Products Association, Regional Overview and Forecasts of Construction and Mineral Products Markets in Great Britain[2].
- South West Aggregates Working Party Annual Report, 2021[3].
- UK Steel, Key Statistics Guide, 2022[4].
- Environment Agency, Remaining Landfill Capacity, 2021[5].
- Environment Agency, Waste Data Interrogator, 2021[6].
- Gloucestershire Policies Map[7].
- Department of Food and Environment Multi-Agency Geographical Information for the Countryside (MAGIC) online mapping.

12.4.6. The assessment itself will use information from the Scheme's BoQ.

Limits of deviation

12.4.7. The assessment has been conducted within the Limits of Deviation (LoD) outlined within Chapter 2 - The Scheme (Aapplication document TR010063/APP/6.2). The vertical and lateral LoD for the Scheme have been reviewed with respect to sensitive receptors identified within this ES chapter, and would not affect the conclusions of the assessment reported in this chapter.

12.5. Consultation

12.5.1. Consultation on the methodology adopted for the PEIR materials and waste chapter was undertaken with statutory consultation bodies with responses from them having been addressed in this ES chapter.

12.5.2. Consultation with National Highways was also undertaken with responses from them having been addressed in this ES chapter.

12.5.3. Full details of the consultation on the PEIR report is provided in Chapter 1 - Introduction (Aapplication document TR010063/APP/6.2).

12.5.4. The method has not changed from that detailed in the PEIR.

[1] Mineral Products Association, 2021. Profile of the UK Mineral Products Industry 2020
[2] Mineral Products Association, 2023. Regional Overview and Forecasts of Construction and Mineral Products Markets in Great Britain Spring 2023
[3] South West Aggregates Working Party, 2022. Annual Report 2021
[4] UK Steel, 2022. Key Statistics Guide April 2022
[5] Environment Agency, 2022. Remaining Landfill Capacity 2021
[6] Environment Agency, 2022. Waste Data Interrogator 2021
[7] Gloucestershire County Council, 2020. Policies (Proposals) Map 2020

12.6. Baseline conditions

12.6.1. The baseline information presented in the following sections has been used to assess the Scheme's impact and determine the significance of the effect.

Study area

12.6.2. Two study areas have been defined for the assessment, as per DMRB LA 110. These are:

- First Study Area – the DCO Order limits including temporary construction areas (such as construction compounds) where construction materials will be consumed, and waste generated.
- Second Study Area - this will cover the feasible sources and availability of materials required to construct the main elements of the Scheme and suitable recovery and waste management infrastructure that could accept arisings and/or waste generated by the Scheme.

12.6.3. Based on the DMRB LA 110 the Second Study Area will be the South West region of England. The Second Study Area takes into account the proximity principle which should ensure that the most appropriate material sources and waste management facilities are utilised while balancing other issues such as logistics, cost and environmental impacts of sourcing materials and managing waste at greater distance.

First Study Area – Material assets and waste current state

12.6.4. The current material asset use and waste generation and disposal are both expected to be low. The types of material assets used are likely to be aggregate, asphalt, concrete and steel with the wastes being the same in addition to soil (from excavations) and municipal waste, based on experience from other similar projects.

12.6.5. The current availability of material assets would be large quantities of soil and small quantities of asphalt, aggregate, concrete and steel from demolition or the taking up of redundant road constructions, and masonry and timber etc from building demolition.

First Study Area – Mineral Safeguarding Areas and peat resource current state

12.6.6. The Gloucestershire Policies Map shows a sand and gravel Mineral Safeguarding Area (MSA) immediately beneath and adjacent to the Scheme, as shown in Figure 12-1~~Figure 12-1~~ (provided in Appendix 12.1 (A~~a~~pplication document TR010063/~~-~~-APP/~~-~~6.15)).

12.6.7. There are no Blanket Bogs, Lowland Fens or Lowland Raised Bog areas along the Scheme. Therefore, there are no areas that are / could give rise to peat reserves.

Figure 12-1 - Mineral safeguarded areas and peat resources -within the Order limits

Provided in Appendix 12.1 (A~~a~~pplication document TR010063/~~-~~-APP/~~-~~6.15)

Second Study Area – Material assets current state

12.6.8. The baseline for the current availability of materials required to construct the main elements of the Scheme is presented below. Table 12-3~~Table 12-3~~ provides a breakdown of annual sales of material assets in South West England and the UK, from the most recent data available.

Table 12-3 - Availability of material assets in South West England

Material assets	Annual sales in South West England (Million Tonnes)	Annual sales in UK (million tonnes)
Aggregate	30.8	120
Recycled & secondary aggregate	4.8~~6~~	71
Asphalt	2.1	20

Material assets	Annual sales in South West England (Million Tonnes)	Annual sales in UK (million tonnes)
Concrete*	2.6	33.3
Steel	Not Available	10.8

Table Source: MPA, Profile of the UK Mineral Products Industry, 2020; MPA, Regional Overview and Forecasts of Construction and Mineral Products Markets in Great Britain, 2023; South West Aggregates Working Party Annual Report: 2022~~1~~ and UK Steel, Key Statistics Guide, 2022.
* cubic metres have been converted to tonnes using density of 2.38 tonnes/m^3.

12.6.9. Further to the above on a local scale, supply of recycled aggregate in Gloucestershire is in excess of 100,000 tonnes per annum, largely coming from construction and demolition material. ~~At~~ Additionally ~~present there is no production of~~ secondary aggregate in Gloucestershire is available ~~, however, it is possible that~~from the new EfW facility at Javelin Park which is estimated to be generating 47,500 tonnes secondary aggregate (based on an output of approximately 25% from the total throughput of waste being around 190,000 tonnes).

~~12.6.9. could generate up to 45,000 tonnes per annum of incinerator bottom ash aggregate.~~

12.6.10. Table 12-4~~Table 12-4~~ presents the targets for use of recycled or secondary aggregates in construction of the Scheme. The target for South West England is 22% and will be used to assess the Scheme's aggregate use.

Table 12-4 - Recycled aggregate targets

Region	Recycled content target (alternative materials)	Total aggregate provision (million tonnes)
South West	22%	656
England	25%	3,908

Table Source: Design Manual for Roads and Bridges LA 110 material assets and waste (2019).

Second Study Area – Waste current state

12.6.11. The baselines to assess against for the Scheme's generation of wastes during construction are presented below.

12.6.12. The remaining landfill capacity data for the Second Study Area, is calculated by the Environment Agency and is presented below in Table 12-5~~Table 12-5~~.

Table 12-5 - Remaining landfill capacity

Waste stream	South West England (m3)
Inert and non-hazardous	25,570,506
Hazardous	1,238,752

12.6.13. The capacity of waste management infrastructure for the Second Study Area, is calculated by the Environment Agency and is presented below in Table 12-6~~Table 12-6~~.

Table 12-6 - Waste infrastructure capacity baseline

Waste stream	South West England (tonnes)
Inert and non-hazardous	5,433,230
Hazardous	42,971

12.6.14. Further to the above on a local scale, the nearest non-hazardous and hazardous landfills are relatively close to the Scheme (near Bishop's Cleeve). There are also a number of mineral workings around Gloucestershire which accept inert waste.

Second Study Area - Mineral Safeguarding Areas and peat reserves current state

~~12.6.14.~~12.6.15. The Gloucestershire Policies Map shows MSAs close to the Scheme. These are shown in Figure 12-2~~Figure 12-2~~ (provided in Appendix 12.1 (Aapplication document TR010063/~~-~~-APP/~~-~~6.15)).

~~12.6.15.~~12.6.16. There are also Blanket Bogs, Lowland Fens and/or Lowland Raised Bogs in the Second Study Area, however they are not close to the Scheme.

Figure 12-2 - Mineral safeguarded areas and peat resources within the County

Provided in Appendix 12.1 (Aapplication document TR010063/~~-~~-APP/~~-~~6.15)

First Study Area – Mineral Safeguarding Areas and peat resource future state

~~12.6.16.~~12.6.17. The likely future state (in the absence of the Scheme) of MSAs and peat resources within the First Study Area are expected to remain the same due to the protection provided to them largely preventing development on or within them.

Second Study Area – Material assets likely future state

~~12.6.17.~~12.6.18. The likely future state of material asset use is expected to be very similar to the current state, potentially reducing as fewer primary materials are used, replaced by those from sustainable sources, as encouraged by the Minerals Local Plan.

Second Study Area – Waste likely future state

~~12.6.18.~~12.6.19. The likely future remaining landfill and management infrastructure capacity is shown in the figures below, for the South West. The estimates use historic and current Environment Agency data and extrapolates it forward, using a Microsoft Excel formula, to 2027, the opening year of the Scheme.

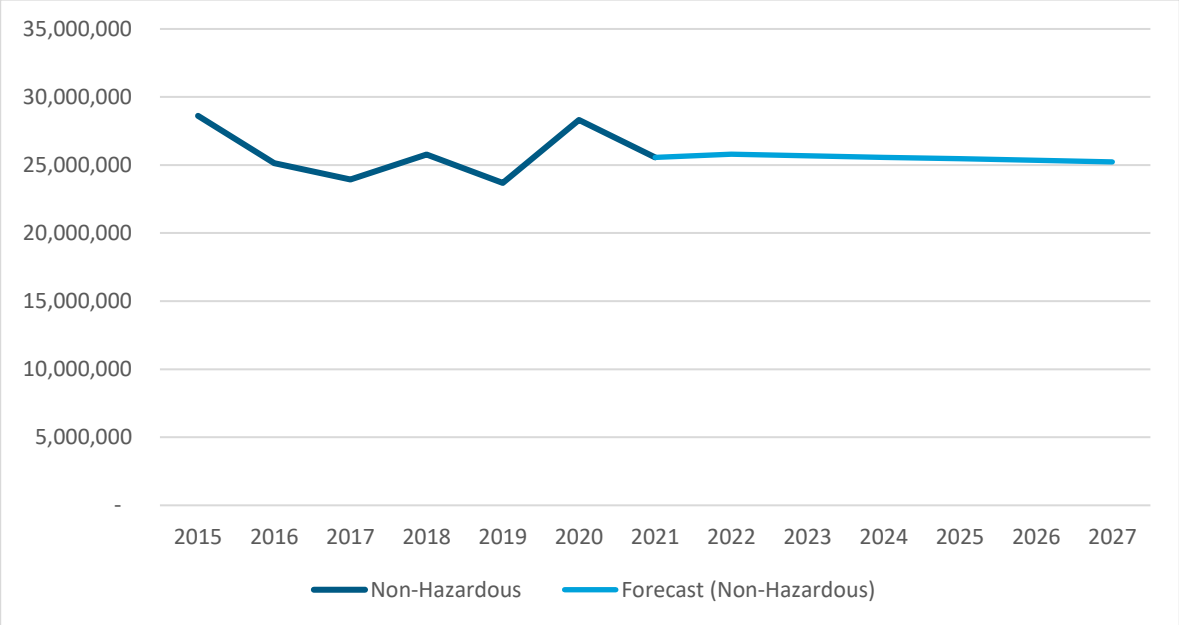

Figure 12-3 - Estimated future remaining landfill capacity (non-hazardous and inert)

~~12.6.19.~~12.6.20. The graph above shows a relatively static state for landfill capacity, which is likely a reflection of the national trend to send less waste to landfill (with it instead being recycled or incinerated). This therefore means that capacity has remained stable.

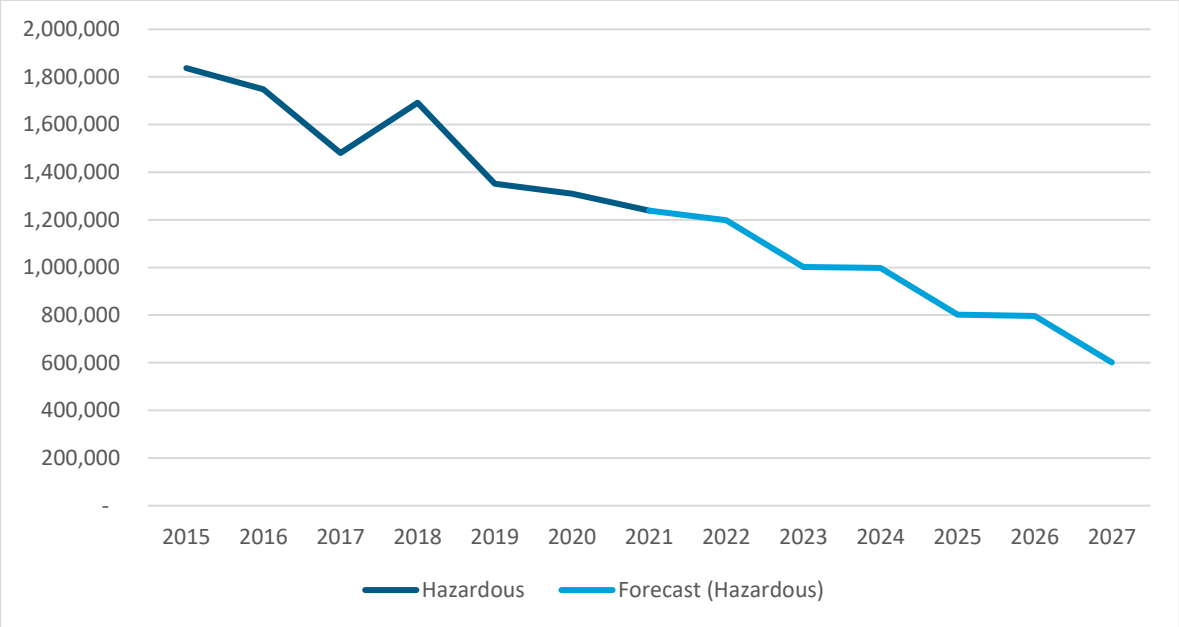

Figure 12-4 - Estimated future remaining landfill capacity (hazardous)

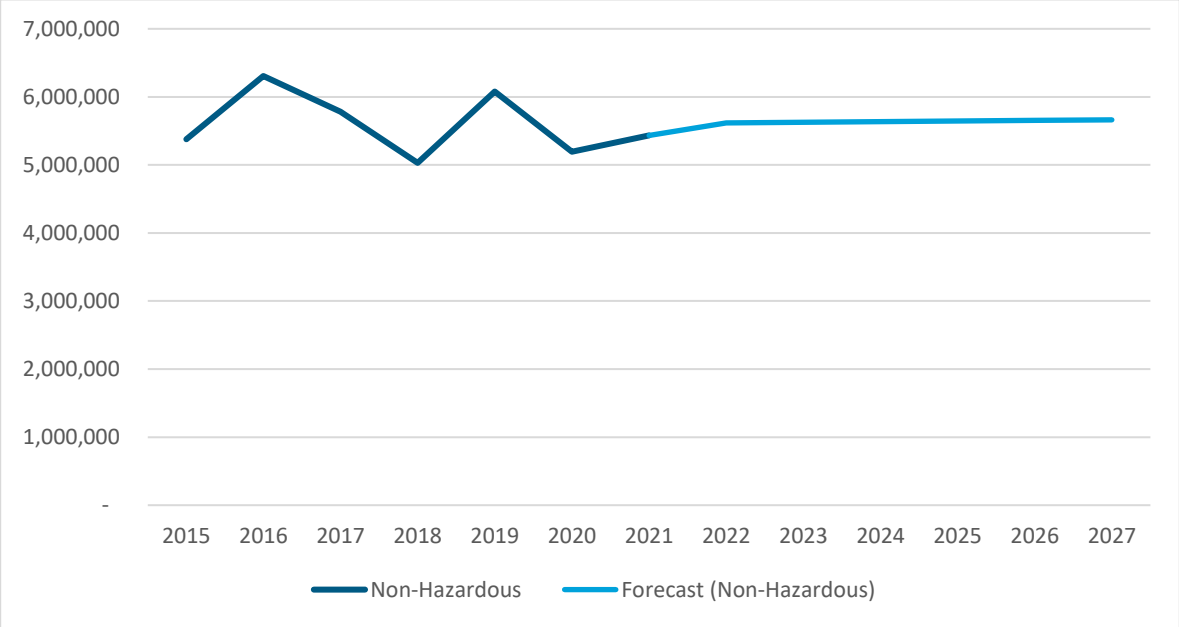

Figure 12-5 - Estimated future waste management infrastructure capacity (non-hazardous and inert)

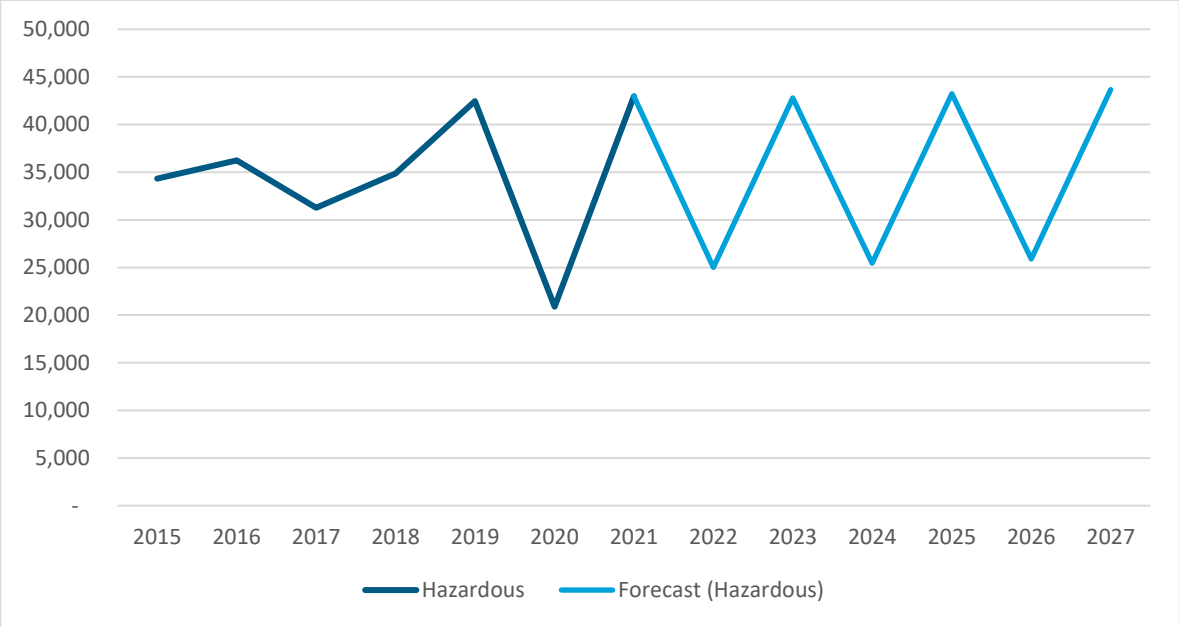

Figure 12-6 - Estimated future waste management infrastructure capacity (hazardous)

Second Study Area – Mineral Safeguarding Areas and peat resource likely future state

~~12.6.20.~~12.6.21. The likely future state (in the absence of the Scheme) of MSAs and peat resources within the Second Study Area are expected to remain the same due to the protection provided to them largely preventing development on or within them.

12.7. Potential impacts

12.7.1. The potential impacts of the Scheme during construction are outlined below. These are based on the BoQ for the Scheme.

Construction

Material assets

12.7.2. Throughout construction material assets would be consumed to build the Scheme. The estimated potential material asset quantities to be consumed by the Scheme are shown in Table 12-7~~Table 12-7~~. These would be from primary sources e.g., no recycled content and would all be imported to site from regional supplies.

12.7.3. The material quantities below have been summarised from the following components that will be needed to construct the Scheme:

- Earthworks.
- Structures.
- Pavements.
- Drainage.
- Kerbs, Footways and Paved Areas.

12.7.4. The material quantities represent a worst case before mitigation measures are implemented.

Table 12-7 - Potential material quantities

Material assets	Primary material quantity (m^3)	Primary material quantity (tonnes)
Aggregate	981,524	1,068,891
Asphalt	44,201	106,083

Concrete	19,698	47,276
Steel	322	2,518

Mineral Safeguarding Areas

12.7.5. The Scheme is within a part of a MSA for sand and gravel, which could sterilise that part of the MSA. It should be noted that parts of the MSA are already sterilised by the existing infrastructure and that the part sterilised forms a very small section of the much larger MSA. Further to this due to the proximity to the road it is unlikely this part of a MSA would be worked.

12.7.6. Calculations show that the existing highway boundary occupies 9.40 Ha of the MSA for sand and gravel and that permanent land take for the Scheme occupies 34.66 Ha of the MSA for sand and gravel. A large proportion of the permanent land take for the Scheme will be the flood storage area which will mean the sand and gravel here will most likely be excavated and either used on site or used offsite, therefore releasing the sand and gravel resource, rather than sterilising it. Overall the MSA for sand and gravel is 24,513 ha, therefore the Scheme will occupy an additional 0.1% of that, from what is already occupied by the existing highway boundary.

Landfill sites and waste management infrastructure

12.7.7. Throughout construction, waste would be generated and require treatment (in line with priorities set out in the waste hierarchy) or disposal. These wastes would be generated by activities including but not limited to demolition of existing sections of road, existing buildings, other general site clearance, excavations and offcuts from components such as drainage pipe, geotextile lining and fencing etc.

12.7.8. The estimated potential quantities of waste to be generated by the Scheme are shown in Table 12-8~~Table 12-8~~. Cubic metres and tonnes are used to aid comparison to the baseline data and wastes have been grouped into broad types.

12.7.9. The waste quantities represent a worst case before mitigation measures are implemented.

Table 12-8 - Potential waste quantities

Waste type	Waste quantity (m^3)	Waste quantity (tonnes)
Asphalt	15,231	36,555
Concrete	4,055	3,806
Metal	565	349
Mixed	269	419
Soil	184,461	230,577
Timber	114	72
Total	204,695	271,778

Operation

12.7.10. DMRB LA 110 states that operational activities are those which occur in the opening year 2027. It is considered that negligible material asset use will take place in this time, as the Scheme will just have opened. Consequently, operational material assets assessment has been scoped out. Similarly, it is considered that the opening year 2027 will not generate large quantities of waste relative to regional landfill capacity or have an effect on the ability of waste infrastructure within the local area to continue to accommodate waste from other sources. As such operational waste assessment has also been scoped out.

12.8. Mitigation measures

12.8.1. Mitigation measures have followed the waste hierarchy to prevent, reduce, reuse, recycle and recover, which is presented in Figure 12-7~~Figure 12-7~~.

Figure 12-7 - Waste hierarchy

12.8.2. Prevention and reduction of material asset use and waste generation at design stage (embedded mitigation) have included actions that:

- Shorten underpasses.
- Reduce footprint of junctions.
- Reduce road connection lengths.
- Reduce the vertical height of the River Chelt bridge to reduce embankment heights.
- Rationalise/reduce site compounds.

12.8.3. These actions will also minimise impact on the MSA that the Scheme is within, by ensuring the permanent footprint of the Scheme is as small as possible, which will minimise the area of the MSA which would be sterilised. Our calculations show that the existing highway boundary occupies 9.40 Ha of the MSA for sand and gravel and that permanent land take for the Scheme occupies 34.66 Ha of the MSA for sand and gravel. Overall the MSA for sand and gravel is 24,513 Ha, therefore the Scheme will occupy an additional 0.1% of that, from what is already occupied by the existing highway boundary. A large proportion of the permanent land take for the Scheme is for the flood storage area, which is itself a mitigation measure.

12.8.4. Reduction and reuse will be achieved on the Scheme through the reuse of excavated soils in the constructions of embankments etc. through a cut/fill mechanism. This will ensure 70-99% of potential waste from the Scheme is reused on site. This reuse will be facilitated through the implementation of a Materials Management Plan (MMP) which will be produced under the CL:AIRE Definition of Waste: Code of Practice (DoWCoP). The MMP will be produced in conjunction with the Principal Contractor and a declaration submitted by a Qualified Person registered with CL:AIRE. A tracking system will be established and used to track the movement, storage and placement of excavated materials within the Scheme. Upon completion of the works, a verification report will be submitted to CL:AIRE. The reuse of soil onsite will reduce the need for the import of materials and the need for waste to be managed or disposed of offsite. This will also utilise some of the material within the MSA, further reducing sterilisation of the MSA.

12.8.5. The Principal Contractor will reduce primary material use through a commitment to use recycled materials, which should at minimum be in line with the 22% recycled aggregate as shown in Table 12-4~~Table 12-4~~. As highlighted in section 12.6.9 and Table 12-3~~Table 12-3~~ materials from sustainable sources are available at a local and regional level. Actions that will be taken by the Principal Contractor also include consideration of off-site manufacture of components and use of modular construction and other modern methods of construction. Discussions will also take place with the supply chain to use reusable packaging and take back unused materials, instead of them being disposed of.

12.8.6. To support the recycling and recovery aspect of the waste hierarchy, the Principal Contractor will set a target to recycle or recover wastes that leave site, therefore diverting them from landfill.

12.8.7. Waste that cannot be recycled or recovered, such as hazardous wastes, including any contaminated soil will be identified, removed, and kept separate from other construction wastes, to avoid contaminating 'clean' materials. It would then be removed from site by a licensed contractor and taken to a licensed facility for appropriate management.

12.8.8. Impacts from material asset use and waste generation will be managed during construction through the implementation of an Environmental Management Plan (EMP) in accordance with DMRB LA 120. The EMP (application document TR010063 - APP 7.3) will include the MMP and a Site Waste Management Plan (SWMP). As part of the SWMP, the Principal Contractor will have to monitor waste arisings and management practices.

12.8.9. Further to the above, mitigation measures associated with transport of materials and waste and greenhouse gas emissions are identified in their respective chapters of this ES, including Chapter 5 - Air Quality (Aapplication document TR010063/—APP/-6.3), Chapter 6 - Noise and Vibration (Aapplication document TR010063/—APP/-6.4), Chapter 13 - Population and Human Health (Aapplication document TR010063/—APP/-6.11) and Chapter 14 - Climate (Aapplication document TR010063/—APP/-6.12).

Enhancement measures

12.8.10. No enhancement measures have been identified at this stage.

12.9. Residual effects

12.9.1. The section below summarises the assessment of the likely significant effects arising from construction in the form of:

- Depletion of natural resources.
- Sterilisation of MSA's.
- Generation/management of waste on site.
- Impacts on landfill void capacity.
- Alignment to policy and legislative framework for sustainable development/material resources and waste.

Construction

Materials

12.9.2. The criteria in Table 12-1 have been followed to establish the residual effects described below.

12.9.3. The design, as submitted, includes the reuse of a minimum of approximately 201,765 tonnes/ 148,409 m^3 of potential waste on site which would substitute the use of primary materials (representing the reuse onsite of at least 70% of total potential waste) with the majority of the remaining potential waste requiring management offsite also expected to be recovered/recycled.

12.9.4. Further to this is the expectation that the Principal Contractor will commit to the use of aggregates with at least 22% recycled content, in line with the regional percentage minimum target.

12.9.5. The Scheme is within a MSA for sand and gravel (as was all the existing road structure that forms part of the Scheme).

12.9.6. Following application of the mitigation measures above, the table below summarises the quantities of materials that will be imported to the Scheme from primary sources.

Table 12-9 - Material quantities required after mitigation

Material assets	Primary material quantity (m^3)*	Primary material quantity (tonnes)*
Aggregate	664,873	707,840
Asphalt	28,970	69,528
Concrete	15,643	43,470
Steel	322	2,518

*figures based on a 70% minimum reuse of waste materials.

12.9.7. The Scheme achieves at least 70% overall material recovery of non-hazardous CDW to substitute for primary materials and aggregates required to be imported to the site and will comprise re-used/recycled content in line with the relevant regional percentage of 22%. The Scheme would have a slight adverse effect, which as shown in Table 12-2~~Table 12-2~~, is not significant.

12.9.8. This assessment takes into consideration that the Scheme is within a MSA, however only a very small part of what is an extensive MSA would be sterilised which is considered would have a slight adverse effect which is not significant (in addition to what is already sterilised by the existing road structure).

Waste

12.9.9. The criteria in Table 12-1 have been followed to establish the residual effects described below.

12.9.10. The estimated waste quantities to be generated by the Scheme (that require management offsite) and the percentage change this will cause to waste infrastructure is shown in Table 12-10~~Table 12-10~~.

12.9.11. The estimated waste takes into consideration the potential waste reused on site (as above i.e. at least 70%) and the expectation that the Principal Contractor will make a commitment to achieve, at minimum, a 95% recovery rate/diversion from landfill rate for wastes managed offsite.

Table 12-10 - Waste assessment

Receptor	Waste baseline	Estimated waste	% Change
Waste infrastructure (inert and non-hazardous tonnes)	5,433,230	70,013	1.29
Landfill (inert and non-hazardous m^3)	25,570,506	2,814	0.01

~~12.9.12. *figures based on a 70% minimum reuse of waste materials~~

~~12.9.13.~~12.9.12. Based on all the information in paragraph 12.9.11 and Table 12-10~~Table 12-10~~, the Scheme would have ≤1% reduction in the regional capacity of landfill and the waste infrastructure is likely to have sufficient capacity to accommodate waste from the Scheme, without compromising its integrity (based on all mitigation measures being implemented).

~~12.9.14.~~12.9.13. The Scheme would have a slight adverse effect (based on all mitigation measures being implemented), which as shown in Table 12-2~~Table 12-2~~, is considered not significant.

Operation

~~12.9.15.~~12.9.14. DMRB LA 110 states that operational activities are those which occur in the opening year 2027. It is considered that negligible material asset use will take place in this time, as the Scheme will just have opened. Similarly, it is considered that the opening year will not generate large quantities of waste relative to regional landfill capacity or have an effect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources. As such operational material asset use and waste generation assessment has been scoped out.

12.10. Cumulative effects

12.10.1. This section considers the cumulative effects of the Scheme and the Scheme interacting with other Reasonably Foreseeable Future Projects (RFFPs) within the materials and waste topic.

12.10.2. The further consideration of cross-topic intra-Scheme and inter-project cumulative effects is reported in Chapter 15 - Cumulative Effects Assessment (Aapplication document TR010063/APP/6.13).

Intra-Scheme in-combination cumulative effects assessment (single project impacts) within topic

12.10.3. The focus of the intra-Scheme CEA is understanding how receptors may experience a number of different types of impacts from the Scheme at the same time. Within the topic assessments, the materials and waste assessment methodology explores the impacts on the materials market and waste infrastructure. There is only a single source of impact from the Scheme relating to these receptors, thus the potential for intra-Scheme effects within the topic has been scoped out.

12.10.4. On the basis of the above, there are no intra-Scheme cumulative effects from the assessment of materials and waste to report in this section.

12.10.5. A comprehensive assessment of cross-topic intra-Scheme effects on all receptors is provided in Chapter 15 – Cumulative Effects Assessment (application document TR010063 – APP 6.13).

Inter-project cumulative effects assessment (different project impacts) within topic

12.10.6. To complete the cumulative effects assessment inter-project 'within topic' element, the materials and waste assessment has been completed with reference to the list of RFFPs that has been developed for the Scheme. The list is based on a review of all developments known to the planning system using the methodology described in Chapter 4 – Environmental Assessment Methodology of the ES (Aapplication document TR010063/APP/6.2).

12.10.7. The RFFP long-list has been screened to identify projects that are considered to have a realistic prospect of interacting with the Scheme from the perspective of materials and waste. The shortlist of RFFPs was compiled based on professional judgement, focusing on the following characteristics:

- RFFPs that would be at a comparable scale to the Scheme.
- RFFPs that would be of a comparable construction type to the Scheme.
- RFFPs that may potentially require the same types or quantities of materials as the Scheme.
- RFFPs that could generate the same types or quantities of waste as the Scheme, either in construction or operation.

12.10.8. The following four RFFPs have been shortlisted:

- 16/02000/OUT Elms Park (relating to land allocated under Policy A4 - North West Cheltenham Development Area), North West Cheltenham off Tewkesbury Road Uckington. Outline application for up to 4115 new homes providing a range and choice of mix and tenure. North West Cheltenham Development Area (allocation for 4285 homes and 23 hectares of business use).
- 20/00759/FUL Swindon Farm (relating to part of the land allocated under Policy A4 - North West Cheltenham Development Area), Tewkesbury Road Cheltenham Gloucestershire. Demolition of a residential propertydwelling and the erection of 260 residential propertiesdwellings (Use Class C3), new vehicular and pedestrian access off Manor Road, attenuation basin and ancillary infrastructure. (part of North West Cheltenham Development Area (allocation for 4285 homes and 23 hectares of business use).

- Joint Core Strategy (JCS) safeguarded site (Policy SD5): the safeguarded land to the north-west of Cheltenham (NE of M5 J10). Development for residential development (assumption of 2,000 residential properties used for assessment purposes).
- 22/01817/OUT / 22/01107/OUT (two identical applications to TBC and CBC relating to part of the land allocated under Policy A7 - West Cheltenham Development Area).

12.10.9. In particular this focuses on the requirements for construction materials, such as aggregate, concrete, asphalt and steel and the use of waste infrastructure to manage and/or dispose of large quantities of construction waste, in particular soil from excavations/site clearance.

12.10.10. The A417 project is identified as a strategic highway project within the CEA (Section 15.11, Chapter 15 – Cumulative Effects Assessment (Aapplication document TR010063/—APP/6.13)). The interaction of this strategic highway project with the Scheme was not considered as the timeframes do not overlap.

Construction

12.10.11. For the purposes of the CEA, a set of assumptions has been made regarding the likely progression of each RFFP through construction and operation, relative to the Scheme. These assumptions are provided in Table 15-3 of Chapter 15 – Cumulative Effects Assessment (Aapplication document TR010063/—APP/-6.13).

12.10.12. The assumptions indicate that each of the four RFFPs has the potential for some elements of construction to be concurrent with the construction of the Scheme. It is considered that due to their proximity to the Scheme, each RFFP has the potential to contribute to construction additive cumulative impacts on materials and waste.

12.10.13. There is insufficient data in the public domain relating to the RFFPs to undertake a quantitative cumulative assessment. From a qualitative perspective, the RFFPs identified above may experience the following cumulative impacts during the construction phase:

- Difficulty sourcing material types and quantities needed.
- Difficulty being able to find waste management facilities and/or landfill with the capacity to manage or dispose of their waste.

12.10.14. Mitigation measures will be implemented as part of the construction of the Scheme as outlined in Section 12.8. The other developments themselves will also be subject to the NPPF, meaning that they will require mitigation and control measures to be adopted during their construction through management plans to reduce impacts to the environment including excessive material use and/or excessive waste generation.

12.10.15. On the basis of the above assumptions, it is not expected that the combined impact of these potential additive cumulative effects will be greater than those effects predicted for materials and waste as outlined in this chapter. Only negligible to minor adverse additive cumulative effects on materials and waste are anticipated, which are classified as not significant. No additional mitigation is required.

Operation

12.10.16. As the operational phase has not been assessed, in line with the requirements of DMRB LA 110, the operational cumulative inter-project effects within topic have not been examined. However, as it is considered that negligible material asset use or generation of waste will occur, it is considered likely that negligible to minor adverse additive cumulative effects could occur, which are classified as not significant. No additional mitigation is required.

12.11. Assumptions and limitations

12.11.1. The assumptions applicable to the assessment methodology are outlined, as follows:

- All material and waste quantities have been converted into tonnes or cubic metres, from the design information provided, using conversion rates from Atkins Carbon Knowledgebase (materials) or the Waste and Resources Action Programme's

(WRAP) Site Waste Management Plan template (waste).

- All materials and wastes have been grouped according to main types.
- No hazardous waste has been identified at this stage, but this will be confirmed via a Ground Investigation as the Scheme progresses.

12.11.2. The following limitations have been identified for the assessment:

- The material assets used, and waste generated through construction of the Scheme have been estimated from the available design information (contained in the BoQ). These quantities will be updated as the design develops, and the construction programme becomes more advanced.
- The material assets and waste baselines presented in this chapter use publicly available data.
- The material assets and waste baselines use the most recently published data; however, this is sometimes two to three years old so does not reflect the exact current quantities.
- Indirect impacts, such as those from the offsite manufacture of products or extraction of minerals, are outside the scope of the assessment, as it is not possible at this stage to determine where products will be manufactured, or minerals extracted.
- Impacts associated with the transport of materials and waste are considered in their respective chapters, including Chapter 5 - Air Quality (Aapplication document TR010063/APP/6.3), Chapter 6 - Noise and Vibration (aapplication document TR010063/APP/6.4), Chapter 13 - Population and Human Health (Aapplication document TR010063/APP/6.15) and Chapter 14 - Climate (Aapplication document TR010063/APP/6.12).
- Data was not available at the time of writing this chapter to undertake a quantitative cumulative assessment.

12.11.3. It is not considered that these limitations and/or assumptions have affected the ability to undertake the assessment, nor the conclusions reported in this chapter.

12.12. Chapter summary

12.12.1. A material and waste assessment has been undertaken for the Scheme in accordance with the DMRB standard LA 110.

12.12.2. The chapter has summarised the quantities of material assets that would be required without mitigation and waste that could require management and disposal without mitigation.

12.12.3. Mitigation that follows the waste hierarchy is expected to be applied during detailed design and construction which will lead to material asset use and waste generation prevention, reduction, reuse, recycling, and recovery. In particular during construction this includes reuse of waste, use of aggregates with minimum 22% recycled content and recovery of 95% of wastes that are managed offsite.

12.12.4. Assessment following application of the mitigation measures demonstrates that during construction, the effect of material asset use and waste generation is estimated to be slight adverse, this is based on the Scheme meeting the following criteria (from Table 12-1):

- Material Assets
    1. project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials.
    2. aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.
- Waste
    1. ≤1% reduction or alteration in the regional capacity of landfill.
    2. waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.

12.12.5. As shown in Table 12-2~~Table 12-2~~ a slight significance category is classified as not significant.

12.12.6. Assessment for the operation phase has been scoped out as it is considered that during operation (defined in DMRB LA 110 as the opening year) there will be negligible material asset use or waste generation. This decision is based on discussions with design engineers (for materials) and road maintainers (for waste) on previous schemes.

12.12.7. The cumulative effects assessment has concluded that negligible to minor adverse effects are anticipated for inter-project connections, therefore no additional mitigation is anticipated. It has been concluded that there are no intra-Scheme connections therefore no additional mitigation is anticipated.

Appendices

Appendix 12.1 Materials and Waste Chapter Figures

Appendix 12.1 – Materials and Waste Chapter Figures is provided as a separate document (application document TR010063 – APP 6.15).

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