



MetroWest+

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council

6.15, Environmental Statement, Volume 2, Chapter 12 Materials and Waste

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)

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Materials and Waste

12.1 Introduction

12.1.1 The Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme (“the DCO Scheme”), comprising the nationally significant infrastructure project (“NSIP”) and its associated development, has the potential to give rise to likely significant environmental impacts and effects in relating to the use and consumption of materials and the production and management of waste.

12.1.2 This chapter:

- describes the relevant legal and policy framework which informs the undertaking of the assessment;
- describes the methodology used for the identification and assessment of likely significant material and waste effects in this Environmental Statement (“ES”);
- describes the materials and waste baseline having regard to the existing information;
- describes the measures that have been adopted as part of the DCO Scheme;
- identifies and assesses the likely significant effects that could result from the DCO Scheme during the construction and operation phases;
- considers mitigation of likely significant effects and assesses those residual effects that will result;
- considers the cumulative effects of other developments in combination with the DCO Scheme on materials and waste;
- identifies the limitations encountered in compiling the ES; and
- provides a summary of the residual effects for the mitigated DCO Scheme.

12.1.3 This chapter considers the potential environmental impacts associated with the use and consumption of materials and the production and management of waste during the construction of the DCO Scheme, in accordance with the methodology outlined in Highways England’s (formerly the Highways Agency’s) Interim Advice Note (“IAN”) 153/11 *Guidance on The Environmental Assessment of Material Resources*, taking into account updated assessment guidance, where appropriate, provided in the draft Design Manual for Roads and Bridges (“DMRB”), Volume 11, Section 3 Materials Guidance (HD 212/11)¹.

¹ The DMRB Volume 11 guidance provides environmental assessment advice which reflects both legislative and best practice requirements. It seeks to ensure that information about the environmental effects of a project are collected, assessed and used to inform option choice, design and decision making in a timely and cost

- 12.1.4 During the operation of the DCO Scheme, the use of material resources and the generation of waste is predicted to be negligible. The use of materials and waste generation have therefore been scoped out of this assessment. Paragraph 3.28 of the Scoping Opinion (DCO Document Reference 6.1), provided by the Secretary of State, supports this approach on the basis that potential impacts from any related works and activities are unlikely to be significant. The assessment of any environmental impacts associated with material resource use and waste during any subsequent maintenance or renewal works will be reported by Network Rail's Governance for Railway Investment Projects ("GRIP") 5 Designer and GRIP 6 Contractor in accordance with Network Rail's Project Consenting and Environment Assessments Procedures. In addition, it has been assumed that any rolling stock using the proposed alignment will be maintained at existing railway depots outside the DCO Scheme boundary and in accordance with the rail operating company's existing environmental management systems.
- 12.1.5 The use of materials, including the management of waste, may also give rise to other impacts: for example, on geology and soils, air quality, water quality, noise, traffic and transport (e.g. as a result of storing, processing or transporting waste). However, these impacts would occur as a result of other activities and operations on any DCO Scheme sites that use materials and generate waste. As such, they are not solely associated with materials and waste. To ensure no duplication of assessments, such impacts are covered in the relevant chapters of this ES and are not included within the scope of this Materials and Waste assessment.
- 12.1.6 This chapter should be read in conjunction with Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7); Chapter 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10); Chapter 10 Geology, Hydrogeology, Ground Conditions and Contaminated Land (DCO Document Reference 6.13); Chapter 13 Noise and Vibration (DCO Document Reference 6.16); Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19); and Chapter 17 Water Resources, Drainage and Flood Risk (DCO Document Reference 6.20).

12.2 Legislation and Policy Framework

EU and National Legislation

- 12.2.1 The use and consumption of material resources and the production and management of waste are subject to a complex framework of legislative and policy instruments at European², national and local level. In addition to

effective manner. In the absence of rail specific guidance, the assessment has used Highways England's environmental assessment guidance as it provides a comprehensive and consistent approach to project-based environmental assessment and its reporting. IAN 153/11 and HD 212/11 was superseded by DMRB Volume 11 Sustainability & Environment Appraisal guidance 'LA 110 Material Assets and Waste' in September 2019. However, as IAN 153/11 and HD 212/11 were the extant guidance available during the assessment they informed this assessment.

² The UK left the European Union on the 31 December 2020. The UK government is committed to maintaining environmental standards and international obligations from

- material and waste-specific policies, legislation and guidance, the legislative framework for sustainable development is relevant in assessing the environmental impacts and effects of material resource use and waste.
- 12.2.2 The key legislative and policy instruments influencing the construction of the DCO Scheme and the consideration of the environmental assessment of material resources and waste are identified below.
- 12.2.3 The Climate Change Act 2008 (as amended) (Part 1) established a framework to develop an economically credible emissions reduction path that included committing the UK to ensuring that the net UK carbon account for the year 2050 is at least 100% lower than the 1990 baseline, or net zero.
- 12.2.4 The revised EU Waste Framework Directive 2008/98/EC provides the legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of 'waste'. It also establishes major principles such as an obligation to handle waste in a way that does not have a negative impact on the environment or human health and application of the waste hierarchy. The hierarchy ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place. When waste is created, the Waste Framework Directive gives priority to preparing it for reuse, then recycling, then other recovery, and last of all disposal.
- 12.2.5 The Environmental Permitting (England and Wales) Regulations 2016 (as amended) (Part 2) require site operators to obtain an environmental permit, or exemption from permitting, for certain activities involving the use, treatment, disposal or storing of waste.
- 12.2.6 The Waste (England and Wales) Regulations 2011 (as amended) (Part 8) require any business that transports waste; buys, sells or disposes of waste; or arranges for someone else to buy, sell or dispose of waste to be registered as a waste carrier, broker or dealer (unless qualifying for an exemption from registering). These regulations also require producers of waste to confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their waste transfer note or consignment note. The Regulations further require waste collection authorities to collect waste paper, metal, plastic and glass separately where technically, economically and environmentally appropriate.
- 12.2.7 The Environmental Protection Act 1990 (Section 34) imposes a duty of care on waste holders to ensure that all waste is stored, transported, treated and disposed of safely without harming the environment in accordance with the Waste Duty of Care requirements, including the *Waste Duty of Care: Code of Practice* (Department for the Environment and Rural Affairs ("Defra") and the Environment Agency, 2016).

National Policy

National Policy Statement for National Networks

- 12.2.8 The Planning Act 2008 Section 104(3) requires the Secretary of State to determine the application for the DCO Scheme in accordance with the

1 January 2021, and existing EU environmental laws will continue to operate in UK law. The Withdrawal Agreement transfers these from EU to national legislation.

National Policy Statement for National Networks (“NPSNN”), unless specified factors provide otherwise. The NPSNN advises on carbon emissions, safeguarding mineral resources and waste management in the context of NSIPs. Table 12.1 below identifies those policies of direct relevance to this assessment and the location where they are considered in this ES.

Table 12.1: Summary of relevant NPSNN advice regarding materials and waste

Summary of NPSNN provision	Consideration within the ES
<p>Paragraphs 5.16 to 5.19 advise on carbon emissions. Paragraph 5.19 states <i>“Evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) in both design and construction should be presented. The Secretary of State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high.”</i></p>	<p>The measures to be adopted as part of the DCO Scheme include implementing Design for Resource Efficiency (“DfRE”) construction principles in order to make the best use of materials over the lifecycle of the DCO Scheme’s built assets, to minimise construction-related carbon emissions.</p>
<p>Paragraphs 5.39 to 5.45 advise on waste management. Paragraphs 5.39 to 5.41 introduce government policy which is intended to protect human health and the environment by producing less waste and using waste as a resource where possible. The waste hierarchy is to be applied (prevent; reuse; recycle; recover (for heat); and disposal (to landfill)). Where appropriate, the Environmental Permitting regime is to be followed.</p> <p>Paragraph 5.42 states that: <i>“The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.”</i></p>	<p>The detailed arrangements for managing waste produced during the construction of the DCO Scheme will be documented in a Site Waste Management Plan (“SWMP”) to be prepared and implemented, in a manner to suit the requirements of the DCO Scheme, prior to the start of construction. A Master Construction Environmental Management Plan (“CEMP”) (DCO Document Reference 8.14) has been submitted with the DCO Application setting out how and when the SWMP will be prepared during the design and construction phases.</p> <p>The use of materials and the disposal of waste during the operational phase of the DCO Scheme have been scoped out of the ES as agreed in the Scoping Opinion (DCO Document Reference 6.1) issued by the Secretary of State. (See Table 12.4).</p>
<p>Paragraph 5.169 states that <i>“Applicants should safeguard any mineral resources on the proposed site as far as possible”</i>.</p>	<p>As reported in Section 12.4.18, the DCO Scheme follows the existing railway and highways alignments</p>

Table 12.1: Summary of relevant NPSNN advice regarding materials and waste

Summary of NPSNN provision	Consideration within the ES
	and is not located within an area designated by either North Somerset District Council ("NSDC") or Bristol City Council ("BCC") as a Minerals Safeguarding Area and is therefore unlikely to result in the sterilisation of existing mineral resources. Further consideration of Surface Mining Coal Resource Areas, outside of Minerals Safeguarding Areas, is provided in Chapter 10 - Geology, Hydrogeology, Ground Conditions and Contaminated Land (DCO Document Reference 6.13).

National Planning Policy Framework

- 12.2.9 The National Planning Policy Framework ("NPPF") does not contain specific policies for NSIPs. However, NPPF paragraph 3 notes that applications for NSIPs are to be determined in accordance with the decision-making framework set out in the Planning Act 2008 and relevant National Policy Statements "as well as any other matters that are considered both important and relevant (which may include the National Planning Policy Framework)". The NPPF promotes the sustainable use of minerals, recognising that these are required for development but are also a finite resource. In preparing their local plans, Local Planning Authorities ("LPAs") are advised to, among other things, define Mineral Safeguarding Areas and Minerals Consultation Areas, and to take into secondary and recycled sources. Minerals Planning Authorities ("MPAs") should plan for a steady and adequate supply of aggregates and industrial minerals. The NPPF does not specifically include waste policies, which are covered in the Waste Management Plan for England.
- 12.2.10 The Waste Management Plan for England 2021 (page 7) sets out the obligations for England which have been transposed from the Waste Framework Directive. These obligations include, amongst others, ensuring that by 2020 at least 70% of construction and demolition waste (by weight) is subjected to material recovery.
- 12.2.11 The National Planning Policy for Waste 2014 (paragraph 8) requires LPAs to ensure that the likely impact of proposed non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities. LPAs must also ensure that the handling of waste arising from the construction and operation of development maximises reuse / recovery opportunities, and minimises off-site disposal.

Local Policy

12.2.12 An overview of the local policy framework is provided in Chapter 6 Planning Framework (DCO Document Reference 6.9). This section identifies relevant policies with regards to materials and waste.

12.2.13 The West of England³ Joint Waste Core Strategy (“JWCS”) (adopted 2011) sets out the strategic spatial planning policy for the provision of waste management infrastructure across the plan area. The local planning framework for NSDC and BCC is set out in their respective core strategies and local development plans, which include policies on materials and waste.

12.2.14 The policies relevant to this assessment are identified in Table 12.2 below.

Table 12.2: Summary of local policy

Policy No.	Title	Policy Summary
<i>JWCS (Adopted 2011)</i>		
Policy 1	Waste Prevention	<p>“Waste Prevention will be promoted by the provision of information, appropriate to the planning application, on the following matters:</p> <ul style="list-style-type: none"> • the type and volume of waste that the development will generate (both through the construction and operational phases); • on-site waste recycling facilities to be provided (both through the construction and operational phases); <ul style="list-style-type: none"> a) <i>the type and volume of waste that the development will generate (both through the construction and operational phases);</i> b) <i>on-site waste recycling facilities to be provided (both through the construction and operational phases);</i> c) <i>the steps to be taken to minimise the use of raw materials in the construction phase through sustainable design and the use of recycled or reprocessed materials;</i> d) <i>the steps to be taken to reduce, reuse and recycle waste that is produced through the construction phase;</i> e) <i>If waste generated during construction is to be disposed of elsewhere the distance it will be transported;</i> f) <i>the steps to be taken to ensure the maximum diversion of waste from landfill (through recycling,</i>

³ The West of England is a sub-region that includes the four unitary authorities of Bath and North East Somerset Council (“B&NES”), BCC, NSDC and South Gloucestershire Council (“SGC”). Three of these authorities, B&NES, BCC and SGC, formed the new West of England Combined Authority (“WECA”) in February 2017 to deliver economic growth for the region. WECA has no responsibility for waste.

Table 12.2: Summary of local policy

Policy No.	Title	Policy Summary
		<i>composting and recovery) once the development is operational.”</i>
NSDC Core Strategy (Adopted 2017)		
CS1	Addressing climate change and carbon reduction	The Council is committed to reducing carbon emissions and tackling climate change. One of the principles to guide development is the reduction, reuse and recycling of waste with particular emphasis on waste minimisation on development site.
CS2	Delivering sustainable design and construction	Requires new development to demonstrate a commitment to sustainable design and construction.
NSDC Creating Sustainable Buildings and Places in North Somerset: Guidance for energy efficiency, renewable energy and the transition to zero carbon development - Supplementary Planning Document (Adopted 2015)		
Para. 4.14	Material Use	<i>“Buildings should be designed to use materials as effectively as possible, starting with the materials used in construction. Using sustainable materials, such as those with recycled content... and renewable materials... can minimise the negative impact of material use. The distance from which materials are sourced and therefore the impact of their transportation should also be taken into consideration in material choice. Locally sourced materials are the preference in most cases.”</i>
Para. 4.15	Waste Management	<i>“Developers must consider the re-use of materials to create new buildings and should also consider how existing buildings on a site can be retained and adapted for re-use.”</i>
BCC Development Framework Core Strategy (Adopted June 2011)		
BCS13	Climate Change	This policy requires Bristol to take account of the impact of climate change. Development should mitigate its impact on climate change and adapt to the effects of climate change. <i>“Development should mitigate climate change through measures including ... the efficient use of natural resources in new buildings”.</i>
BCS15	Sustainable Design and Construction	This policy aims to ensure that new developments minimise their environmental impact and emissions of CO ₂ . <i>“Sustainable design and construction will be integral to new development in Bristol. In delivering sustainable design and construction, development should address the following key issues:</i>

Table 12.2: Summary of local policy

Policy No.	Title	Policy Summary
		<ul style="list-style-type: none"> • <i>waste and recycling during construction and in operation;</i> • <i>conserving water resources;</i> • <i>the type, life cycle and source of materials to be used;</i> • <i>flexibility and adaptability, allowing future modification of use or layout, facilitating future refurbishment and retrofitting."</i>

Network Rail Policy

Network Rail Environment Policy

12.2.15 Network Rail's (2017) Environment Policy sets out its approach to environmental management which is key to achieving its vision – *A better railway for a better Britain*. Those policies which are directly applicable to the materials and waste assessment are as follows:

- Complying with all relevant legislation and regulatory requirements;
- Taking action to prevent pollution to land, air and water;
- Buying and using natural resources in a responsible and sustainable manner;
- Reducing the amount of material used and waste produced; and
- Becoming more energy efficient and reduce carbon emissions.

Network Rail Energy and Carbon Policy

12.2.16 Network Rail's (2017) Energy and Carbon Policy sets out its approach to achieving its target of reducing carbon emissions. Those policies which are applicable to the materials and waste assessment include:

- Encouraging good energy and carbon management in its supply chain;
- Being transparent, measuring and publishing information on energy use, greenhouse gas emissions and its performance against its regulated targets;
- Encouraging all business units to adopt more stretching aspirational targets than those which it is regulated against to drive activity and foster a low carbon culture; and
- Encouraging low-carbon design and use of whole-life costing techniques to future-proof its development activities.

Network Rail Contract Requirements Environment

12.2.17 Network Rail's (2011) Contract Requirements Environment (NR/L2/ENV/015, Issue 6)⁴ sets out the standards that Network Rail's Designers and Contractors need to meet in order to demonstrate compliance with its environmental commitments. Those requirements which are applicable to the materials and waste assessment include the following.

Carbon Emissions (Designer)

- The Designer shall agree with Network Rail appropriate assessment and recording of predicted carbon dioxide equivalent ("CO₂(e)") emissions over the whole life of the project (construction, operation, decommissioning, and demolition); and
- The design shall use appropriate low CO₂(e) solutions for the whole life of the project (construction, operation, decommissioning, and demolition).

Carbon Emissions (Contractor)

- The Contractor shall minimise CO₂(e) emissions during the works. This shall include, but not be limited to:
 - Continuation of any actions to reduce CO₂(e) emissions initiated at the design phase;
 - Continuing any assessment of CO₂(e) emissions initiated at the design phase; and
 - The use of energy efficient plant where appropriate; and maintenance of plant for energy efficiency.

Materials (Designer)

- The design shall minimise the use of non-sustainable resources. This shall include, but not be limited to:
 - Designing solutions to reduce material consumption;
 - Designing to minimise the requirement for primary materials such as aggregates; and
 - Identifying potential for reuse of products or materials within the project and via National Delivery Service ("NDS").
- The design shall minimise the specification of materials that:
 - Contain substances known to contribute to stratospheric ozone depletion or with the potential to contribute to global warming; and

⁴ Network Rail is currently updating their environmental and social standards. Network Rail's (2018) Environmental & Social Minimum Requirements Design and Construction (NR/L2/ENV/015, Issue 7) will apply to all new projects (and existing ones that have not completed GRIP3 options selection) from 31 March 2019. As the DCO Scheme has already completed GRIP3 it has been assumed, for the purposes of this assessment, that these new standards do not apply to the project and that the NR/L2/ENV/015, Issue 6 requirements will apply.

- Have a hazardous nature or include hazardous materials where viable alternatives exist.
- The design shall specify the use of credibly certified (as defined by the World Wide Fund for Nature Global Forest & Trade Network) sources of timber for permanent and temporary use unless otherwise agreed with Network Rail.

Materials (Contractor)

- The Contractor shall minimise the use of non-sustainable resources. This may include, but not be limited to:
 - Minimising the use of primary materials such as aggregates;
 - Reducing resource use and waste during construction, for example through appropriate prefabrication methods;
 - Appropriate material storage to reduce wastage; and
 - Identify potential for reuse of products or materials within the project and via NDS.
- The Contractor shall minimise the use of materials that:
 - Contain substances known to contribute to stratospheric ozone depletion or with the potential to contribute to global warming; and
 - Have a hazardous nature, using less hazardous materials where viable alternatives exist.
- The Contractor shall use credibly certified (as defined by the World Wide Fund for Nature Global Forest & Trade Network) sources of timber for permanent and temporary use and maintain records of chain of custody certificates unless otherwise agreed with Network Rail.

Waste (Designer)

- The Designer shall assess and document the volume of waste likely to be produced during works by waste type and assess how much of each waste type could be reused, recycled, recovered or disposed of.
- The design shall minimise the waste produced by the work. This shall include, but not be limited to:
 - Contribution to Network Rail's waste management targets;
 - Integrate 'Designing Out Waste' into the design process; and
 - Agree with Network Rail mechanisms to enable actions identified in the design phase to be implemented during the construction phase.
- The design shall maximise opportunities for re-use, recycling and recovery. This shall include, but not be limited to:
 - Assessment of end-of-life options for materials to minimise the need for disposal;
 - Specification of recycled and recyclable materials; and
 - Assessing the opportunity to use the Contaminated Land Applications in Real Environments ("CL:AIRE") Definition of Waste: Development Industry Code of Practice for excavated materials.

Waste (Contractor)

- The Contractor shall comply with waste management legislation, including requiring contractors to implement a SWMP, even though this is no longer a legal requirement.
- The Contractor shall comply with Network Rail Waste Management Standard (NR/L2/ENV/004), Network Rail Track Maintenance, Renewal or Alteration – Used Ballast Handling Standard (NR/L3/ENV/044) and associated business unit waste standards and processes.
- The Contractor shall actively seek ways of reducing the volume of waste produced and the volume sent to landfill.
- The Contractor shall document the volume of waste likely to be produced by waste type and assess how much of each waste type is likely to be reused, recycled, recovered or disposed of.
- The Contractor shall prioritise actions to reduce waste production and disposal to landfill and forecast the resulting improvements. This information shall be updated and reported throughout the project in timescales agreed with Network Rail. Actions shall include, but not be limited to:
 - Delivering any project-level targets;
 - Appropriate ordering, storage and use of materials to minimise production of waste;
 - Continuation of any actions to reduce waste production and disposal initiated in the design phase;
 - Follow the waste management hierarchy of reduce / reuse / recycling / recovery / disposal. Disposal to landfill shall be the last option; and
 - Assessment of the end-of-life options of materials used to minimise the need for later disposal.
- The Contractor shall obtain the waste carrier's registration and contact details prior to their use. The Contractor shall obtain the Environmental Permit or exemption number of waste management/disposal site(s) prior to their use.

Summary of Legislation and Policy

12.2.18 The review of legislation and policy has identified numerous statutory and policy requirements, as well as government advice, relating to waste management and the use of materials, all of which are applicable to the DCO Scheme. These are detailed in Table 12.3.

Table 12.3: Applicable statutory, policy and advisory requirements

Applicable statutory, policy and advisory requirements	Reference(s)
<p>The DCO Scheme should implement DfRE principles to make the best use of materials over the lifecycle of the DCO Scheme's built assets, in order to minimise construction related carbon emissions.</p>	<ul style="list-style-type: none"> • National Policy Statement for National Networks (Paragraphs 5.16 to 5.19); • NSDC Core Strategy (Policy CS1 and Policy CS2); • BCC Development Framework Core Strategy (Policy BCS 13 and BCS 15); • Network Rail's Contract Requirements Environment (Carbon Emissions and Materials).
<p>Undertaking carbon calculation during design and construction, and identifying and implementing opportunities, where possible, to minimise capital (embodied) CO₂(e) emissions during the construction of the DCO Scheme.</p>	<ul style="list-style-type: none"> • National Policy Statement for National Networks (Paragraphs 5.16 to 5.19); • NSDC Core Strategy (Policy CS1 and Policy CS2); • BCC Development Framework Core Strategy (Policy BCS13 and Policy BCS15); • Network Rail Contract Requirements Environment (Carbon Emissions).
<p>Carry out a responsible sourcing assessment covering the key material elements used to construct the DCO Scheme, implementing measures that promote the use of responsibly sourced materials; the use of products with lower embodied carbon emissions; the use of salvaged, recycled or secondary materials; and minimising the use of hazardous materials.</p>	<ul style="list-style-type: none"> • NSDC Core Strategy (Policy CS1 and Policy CS2); • BCC Development Framework Core Strategy (Policy BCS 13 and Policy BCS 15); • NSDC Creating Sustainable Buildings and Places in North Somerset: Supplementary Planning Document (Paragraph 4.14); • Network Rail's Contract Requirements Environment (Carbon Emissions and Materials).
<p>Contribute to national planning policy by not causing unacceptable impacts on existing waste management facilities and on sites and areas allocated for waste management; and through maximising the reuse/ recovery of construction, demolition and excavation ("CD&E") waste, and minimising off-site disposal.</p>	<ul style="list-style-type: none"> • National Planning Policy for Waste 2014 (Paragraph 8)

Table 12.3: Applicable statutory, policy and advisory requirements

Applicable statutory, policy and advisory requirements	Reference(s)
<p>Undertake a waste audit (which may take the form of a SWMP) demonstrating how waste is to be managed in a sustainable manner as part of the DCO Scheme, exploring how the use of raw materials can be minimised and how waste created can be reused, with priority given to the reuse of materials on site. The SWMP will target that <i>“At least 70% of non-hazardous construction, demolition and excavation waste be diverted from landfill”</i> in order to reflect the Government’s policy and industry good practice.</p>	<ul style="list-style-type: none"> • Waste Plan for England 2021 (Page 7); • National Policy Statement for National Networks (Paragraphs 5.39 to 5.45); • West of England Joint Waste Core Strategy (Policy 1); • NSDC Core Strategy (Policy CS2); • BCC Development Framework Core Strategy (Policy BCS 15); • NSDC Creating Sustainable Buildings and Places in North Somerset: Supplementary Planning Document (Paragraph 4.15); • Network Rail’s Contract Requirements Environment (Waste).
<p>Take all reasonable steps to apply the following waste management hierarchy when transferring waste during the construction of the DCO Scheme: (a) prevention; (b) preparing for reuse; (c) recycling; (d) recovery; (e) disposal.</p>	<ul style="list-style-type: none"> • Waste (England and Wales) Regulations 2011 (as amended) (Part 5 Regulation 12); • National Policy Statement for National Networks (Paragraphs 5.39 to 5.45); • West of England Joint Waste Core Strategy (Policy 1) • NSDC Core Strategy (Policy CS2); • BCC Development Framework Core Strategy (Policy BCS 15); • NSDC Creating Sustainable Buildings and Places in North Somerset: Supplementary Planning Document (Paragraph 4.15);
<p>The Principal Contractor when making arrangements for the collection of waste paper, metal, plastic or glass, should make provision for separate collection in accordance with requirements of waste collector.</p>	<ul style="list-style-type: none"> • The Waste (England and Wales) Regulations 2011 (as amended) (Part 5 Regulation 14).
<p>Consider the need to register as a waste carrier, broker or dealer if transporting waste; when buying, selling or disposing of waste or arranging for someone else to buy, sell or dispose of waste.</p>	<ul style="list-style-type: none"> • The Waste (England and Wales) Regulations 2011 (as amended) (Part 8).

Table 12.3: Applicable statutory, policy and advisory requirements

Applicable statutory, policy and advisory requirements	Reference(s)
Review the need to apply for an environmental permit or exemption from permitting if using waste, treating waste, disposing of waste, storing waste, discharging waste water.	<ul style="list-style-type: none"> • Environmental Permitting Regulations 2016 (as amended) (Part 2).
All waste generated by the DCO Scheme should be classified, stored, transported, treated and disposed of safely in accordance with the legal requirements.	<ul style="list-style-type: none"> • The Environmental Protection Act 1990 (as amended) (Part 2 Section 34); • The Hazardous Waste (England and Wales) Regulations 2005 (as amended) (Part 1 Regulation 4) • Network Rail Contract Requirements Environment (Waste)

12.3 Methodology

Guidance and Best Practice

12.3.1 The approach to the assessment of the DCO Scheme on materials and waste is based on the following guidance and best practice from government and professional bodies.

Guidance

1. Highways Agency (2011) IAN 153/11 Guidance on The Environmental Assessment of Material Resources ("IAN 153/11");
2. Highways Agency (2012) draft guidance DMRB Volume 11, Section 3, Part 6 HD 212/11 Materials ("HD 212/11");
3. Network Rail (2016) Infrastructure Projects GW&C Region Sustainable Development Strategy;
4. Waste and Resources Action Programme ("WRAP") (2013) Resource Efficiency Benchmarks for Construction Schemes;
5. Environment Agency (2015), Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste; and
6. Defra (2016), Waste Duty of Care Code of Practice, pursuant to Section 34(9) of the Environmental Protection Act 1990.

Best Practice

1. WRAP, Design for Resource Efficient Construction Principles (including WRAP, Designing out Waste: A Design Team Guide for Civil Engineering);
2. British Standard Institution, Publicly Available Specification ("PAS") 2080:2016 Carbon Management in Infrastructure;

3. Rail Safety Standards Board, Rail Carbon Tool;
 4. British Standard Institution, British Standard 8902:2009 Responsible Sourcing Sector Certification Schemes For Construction Products – Specification;
 5. Buildings Research Establishment (“BRE”), BRE Environmental and Sustainability Standard (“BES”) 6001 The Framework Standard for Responsible Sourcing;
 6. CL:AIRE, The Definition of Waste: Development Industry Code of Practice;
 7. Guidance for Pollution Prevention (“GPP”) Series, which provides environmental good practice guidance for the whole UK; and
 8. WRAP SWMP Templates.
- 12.3.2 The assessment primarily focuses on the potential environmental impacts arising from the construction, operation and decommissioning of the DCO Scheme in the form of:
1. Embodied carbon emissions associated with material extraction, manufacturing and any pre-distribution transportation;
 2. The depletion of natural resources (primary aggregates have been chosen to act as a surrogate for indicating the DCO Scheme’s use of natural resources);
 3. The generation and management of construction waste on-site; potential impact on the available waste management infrastructure; and
 4. The potential of the alignment of the DCO Scheme proposals with the legislative and policy framework for sustainable development, material resources and waste.

Consultations

- 12.3.3 A summary of consultations undertaken to date is presented in Table 12.4. Further information on the consultation process is presented in Chapter 5 Approach to the Environmental Statement (DCO Document Reference 6.8). Responses to consultation exercises undertaken in 2015 and 2017 are available on the MetroWest project website at the following address <http://travelwest.info/project/metrowest-phase-1>, and the Consultation Report and its Appendices (DCO Document Reference 5.1).

Table 12.4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
<i>Scoping Opinion Responses (August 2015)</i>		
Planning Inspectorate	Para 2.50. The environmental effects of all wastes to be processed and removed from the site should be addressed. The ES will need to identify and describe the control	The control processes and procedures for storing and transporting waste off site are described in the ES Appendix 4.2 Master CEMP

Table 12.4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	processes and mitigation procedures for storing and transporting waste off site. All waste types should be quantified and classified.	(DCO Document Reference 8.14). The key waste types are quantified and classified in Sections 12.6.17 – 12.6.21, where possible, in accordance with the current level of design information.
	Para. 2.62. The applicant's assessment should outline the measures considered to ensure ease of disassembly and reuse/recycling of materials during future maintenance works.	The design of the DCO Scheme will have regard to designing for resource efficient construction principles as described in the ES Appendix 4.2 Master CEMP (DCO Document Reference 8.14). These principles include advice on designing for the future / design for deconstruction and flexibility, i.e. through considering the potential future uses of the Scheme's assets and designing in flexibility and adaptability; selecting materials and components to match the intended use and durability; making the assets easy to maintain and refurbish; and through avoiding any materials that might cause problems for future recycling (e.g. hazardous materials).
	Para. 2.63. Decommissioning. The ES needs to include a high level environmental assessment of the decommissioning phase. Decommissioning works are taken into account in the design and use of materials, so that structures can be taken down with a minimum of disruption.	The decommissioning phase impacts on materials and waste have been scoped out for the reasons explained in Section 12.3.19 – Section 12.3.24.
	Para. 3.28. The Secretary of State agreed that "the use of	Noted.

Table 12.4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	material resources and the generation of waste during operation” can be scoped out of the assessment.	
	Paragraph 3.29 states that insufficient data were provided to scope out cumulative effects of the Project in combination with other works required for MetroWest Phase 1 on materials and waste.	The cumulative impact assessment is provided in Section 12.8 and in Chapter 18 In-Combination and Cumulative Effects Assessment (DCO Document Reference 6.21) and Appendices 18.1 and 18.2 (DCO Document Reference 6.25).
	Para 3.68. A detailed assessment should be undertaken where detailed information about the types and quantities of materials and waste is available (e.g. a detailed bill of quantities).	There was limited information at the time of assessment on the anticipated types and quantities of materials required during construction due to the DCO Scheme being at an early stage in its design. The use of resource efficiency benchmarking data for completed buildings and infrastructure projects has therefore been used in the absence of this information to undertake a worst case assessment.
	Para 3.69. The Secretary of State supports the proposed preparation of a SWMP, which should be appended to the ES. Paragraph 5.42 of the NPSNN also explains the information on waste management that should be included in the ES.	A SWMP will be prepared and implemented, in a manner to suit the requirements of the DCO Scheme, prior to starting on site. The SWMP will be a live document which is updated at varying points within the lifecycle of the DCO Scheme. The Master CEMP in the ES Appendix 4.2 (DCO Document Reference 8.14) sets out how the SWMP will be prepared during the design and construction phases.

Table 12.4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	Paragraph 3.70. The proposed approach to assessing waste impacts should be discussed with the Environment Agency and the Council, to establish an appropriate methodology and evaluation criteria and ensure all types of waste are considered.	The assessment follows DMRB Volume 11 as it provides a comprehensive and consistent approach to project-based environmental assessment and its reporting for this topic. No additional consultation was deemed necessary.
	Paragraph 3.71. The interrelationship between the chapter on waste and other chapters should be clearly explained in the ES and cross-referenced as appropriate.	The technical chapters cross refer to other chapters in the ES as appropriate.
Public Health England	The Environmental Impact Assessment ("EIA") should demonstrate compliance with the waste hierarchy. The EIA should consider the implications and wider environmental and public health impacts of different waste disposal options, and disposal route(s) and transport method(s) and how potential impacts on public health will be mitigated.	The assessment methodology includes consideration of the waste hierarchy as explained in Section 12.3.33. Appendix 10.2 Land Contamination Summary Report (DCO Document Reference 6.25) discusses the risk of contaminated along the scheme and the source-pathway-receptor model to assess risks to health.

Informal micro-consultation on DCO Scheme boundary (22 June to 3 August 2015)

No material comments were received during the micro-consultations.

Formal Stage 2 Consultation (23 October to 4 December 2017)

No material comments were received from the S42 and S47 consultees.

Definition of the Study Area

- 12.3.4 The study areas selected address two principal topics: (1) the use and consumption of material resources required for the DCO Scheme; and (2) the production and management of waste arising as a result of undertaking these works.
- 12.3.5 The study areas for this topic are defined geographically in Section 12.3.7 below based on a current understanding of the likely receptors associated

with the use and consumption of materials and the production and management of waste.

- 12.3.6 Responsibility for the procurement of materials and final disposal of wastes will lie with the contractor(s) appointed to construct the DCO Scheme.

Key Receptors

- 12.3.7 The key receptors for the materials and waste topic are:

- The global climate system as the ultimate receptor of any new greenhouse gas (“GHG”) (embodied carbon) emissions generated from the proposed construction works;
- The primary aggregate workings within the South West Aggregates Working Party (“SWAWP”) area, specifically the Cornwall, Devon, Gloucestershire, Somerset, West of England, Dorset and Wiltshire Mineral Planning Areas (“MPA”)⁵, which are assumed to be the primary source of the aggregates used in the proposed works;
- The waste management infrastructure within Network Rail’s NDS and the West of England sub-region which are likely to be used to manage the majority of waste generated through the proposed works; and
- The European, national, regional and local policy framework for sustainable development, material resources and waste.

Defining the Baseline

- 12.3.8 The following baseline data have been gathered from desk-based reviews of existing information, analysis and review of stakeholder information.

- Description of the current study area, including information about current material requirements and details of the types and quantities of wastes generated (where available);
- The key legislative and policy instruments influencing the consideration of the environmental assessment of material resources and waste;
- The sensitivity of the global climate system to continued GHG emissions;
- An assessment of the regional available land-bank for sand and gravel, and crushed rock (chosen to act as a proxy indicator of regional natural resources), facilitated by a review of the SWAWP Annual Report 2016; and
- A strategic assessment of the waste management infrastructure available to transfer, treat and dispose of the waste anticipated to be generated by the DCO Scheme, via a review of the GOV.UK South West England Waste Management Data Tables 2018 and a review of Network Rail’s NDS facilities.

⁵ Cornwall includes Isles of Scilly; Devon includes Plymouth / Torbay / Dartmoor National Park / part Exmoor National Park; Dorset includes Bournemouth and Poole; Somerset includes part Exmoor National Park; West of England includes Bath and North East Somerset / Bristol City / South Gloucestershire/ North Somerset; Wiltshire includes Swindon.

Assessment of Construction Impacts

- 12.3.9 IAN 153/11 advises that one of the key principles underpinning the assessment methodology set out in DMRB Vol 11 Section 2 is that of proportionality - allocating effort according to the potential for significant effects. *"This to a degree involves some judgement but won't be based on a structured method as required under Simple and Detailed levels of assessment. On the basis of the principle of proportionality, the following is required of the Scoping Assessment:*
- *For projects with an estimated cost under £300,000 (excluding VAT but including the cost of labour, plant and materials, overheads and profit) it will be up to the project to decide if further assessment is necessary based upon the possibility of effects. This will involve identifying the major materials and wastes associated with the project and judging whether they have the potential to generate significant environmental effects.*
 - *For projects with an estimated cost greater than £300,000 it is assumed that the potential does exist for impacts and effects to take place. Therefore, an assessment of materials should be undertaken to at least the Simple level of assessment."*
- 12.3.10 As the construction cost estimate for the combined rail and highways works is greater than the £300,000 scoping threshold set out in IAN 153/11, it is assumed that the potential exists for environmental impacts and effects to occur from the use and consumption of materials and the production and management of waste during the construction of the DCO Scheme.
- 12.3.11 Following the advice in IAN 153/11, it was considered that the DCO Scheme be first assessed at the simple level of assessment in the ES (i.e. unless potentially significant impacts / effects were foreseen and detailed information about the types and quantities of materials and waste was available at the time of assessment, where the assessment would be carried forward to the detailed level of assessment)⁶.

⁶ IAN 153/111 and HD 212/11 both advise that where a scheme is at the outline design stage and quantifiable information on material resource use and waste generation is not available, it should still be possible to undertake a "Simple level" assessment, based on the information available, to provide an indication of the relative magnitude of materials use and forecast waste generation from the scheme. Although where potentially significant impacts/effects are foreseen and detailed information about the types and quantities of materials and waste is available, the assessment should be carried forward to the "detailed level" of assessment. The "Simple" and "Detailed" assessment stages should therefore be regarded as consequential (rather than sequential) in that the results of one assessment level would determine what, if any, further assessment work is required. Which level of assessment to apply at any stage in the design process will be informed by the scoping results, the project planning stage and the level of information available, and the likely environmental impacts and effects.

- 12.3.12 The simple assessment is typically undertaken at options identification and the preliminary design stage where it is not usually possible to quantify precisely the material requirements and forecast waste generation (i.e. where environmental assessments are undertaken and the method of construction has not yet been determined).
- 12.3.13 IAN 153/11 summarises the aim of Simple Assessment as an assessment to *"assemble data and information that is readily available to address potential effects identified at the Scoping level, to reach an understanding of the likely environmental effects to inform the final design or to reach an understanding of the likely environmental effects that identifies the need for Detailed Assessment."*
- 12.3.14 The assessment will primarily focus on the environmental impacts and effects arising from construction in the form of embodied carbon emissions associated with the production of materials; the depletion of natural resources; the generation, management of waste on site; potential impact on the available regional waste management infrastructure; and the alignment of the DCO Scheme proposals with the legislative and policy framework for sustainable development, material resources and waste.
- 12.3.15 For the purposes of assessing the effects associated with materials use and waste the simple assessment is a largely qualitative exercise which aims to identify the following:
- Baseline data for the DCO Scheme;
 - Information about design, construction methods and techniques (where available);
 - The materials required for the DCO Scheme and where information is available, the quantities and provenance;
 - The anticipated waste arising from the DCO Scheme, and where information is available, the quantities and type (e.g. inert, non-hazardous, hazardous) and any additional information about wastes forecast to be produced;
 - The alignment of the DCO Scheme proposals with the regulatory and policy context, and stated Scheme objectives;
 - The results of any consultation (i.e. with the Environment Agency and LPAs) (if required);
 - The impacts / effects that will arise from the issues identified and whether these are likely to be significant; and
 - A conclusion about whether this level of assessment is sufficient to understand the impacts / effects of the DCO Scheme or whether detailed assessment is necessary, and the identification of any mitigation measures.
- 12.3.16 The assessment follows the methodology outlined in the draft DMRB Volume 11, Section 3, Part 6 Materials guidance (HD 212/11) (supplemented by professional judgement where required) to determine the value and/or sensitivity of the identified receptors; the magnitude of impact; and the significance of effect associated with the use and consumption of materials and the production and management of waste.

Assessment of Operational Impacts

- 12.3.17 During the operation of the DCO Scheme, the use of material resources and the generation of waste is likely to be negligible. Operational materials use and waste have therefore been scoped out of this assessment. Paragraph 3.28 of the Scoping Opinion (DCO Document Reference 6.1), provided by the Secretary of State, supports this approach on the basis that potential impacts from any related works/activities are unlikely to be significant.
- 12.3.18 The assessment of any environmental impacts associated with material resource use and waste during any subsequent maintenance or renewal works will be reported by Network Rail's GRIP 5 Designer and GRIP 6 Contractor in accordance with Network Rail's Project Consenting and Environment Assessments Procedures. In addition, it has been assumed that any rolling stock, using the proposed alignment, will be maintained at existing railway depots outside the DCO Scheme boundary and in accordance with the rail operating company's existing environmental management systems.

Assessment of Decommissioning Impacts

- 12.3.19 Chapter 4 - Description of the Proposed Works (DCO Document Reference 6.7) explains that consideration has been given to likely significant effects arising during the decommissioning phase. However, owing to the nature and life span of the proposed development, the regulated process of any closure in the future, which would be overseen by the Office of Rail and Road, and there being no reasonably foreseeable decommissioning proposals such that likely impacts could be identified and assessed, these effects are not considered further in this chapter.

Assessment of Cumulative Effects

- 12.3.20 The assessment of cumulative effects assesses the impact of the DCO Scheme in combination with other committed developments. These include other DCO projects within approximately 10 km and projects within approximately 0.5 km of the Portishead Branch Line, as discussed with the local planning authorities NSDC and BCC.
- 12.3.21 In addition, the assessment of cumulative effects will also consider other works being undertaken by Network Rail under their permitted development rights. This includes other works required for MetroWest Phase 1, namely improvements at Parson Street Junction (including Liberty Lane Sidings), Parson Street Station, the Bedminster Down Relief Line, and Bathampton Turnback. These works are within Network Rail's operational boundary and will be implemented using their general permitted development rights. Further environmental assessments of these works will be undertaken by Network Rail under their GRIP management procedures.
- 12.3.22 Severn Beach / Avonmouth Signalling works are also part of MetroWest Phase 1, but these works have been completed and so are not included in this cumulative effects assessment, as they are considered as part of the baseline.

Use of Significance Criteria

Introduction

- 12.3.23 Environmental impacts are defined as an environmental change resulting from the DCO Scheme, while the effect is the consequence of that change on the receptor. Various descriptors are used to characterise impacts:
- Direct, indirect, secondary, cumulative;
 - Adverse or beneficial;
 - Geographical extent;
 - Size of the change;
 - Duration and frequency: short, medium and long term; permanent or sporadic;
 - Likelihood of occurrence; and
 - Uncertainty.
- 12.3.24 Determination of the significance of an environmental effect is derived as a measure of the magnitude and nature of the impact and an understanding of the importance/sensitivity of the affected resource/receptor.
- 12.3.25 For materials and waste there are currently no accepted methodologies for defining impacts and determining the threshold of significance for rail projects. As definitive rail guidelines for defining the impact are not available the assessment has been carried out based on the methodology provided in the 2012 draft DMRB Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Materials guidance (HD 212/11), as it provides a comprehensive and consistent approach to project-based environmental assessment and its reporting.

Embodied Carbon Methodology

- 12.3.26 The assessment for embodied carbon emissions has been based on quantifying the magnitude of change associated with the material requirements of the DCO Scheme in absolute terms. The magnitude of the environmental impact has been assigned, where possible, through the use of a proxy in the shape of the embodied carbon emissions, associated materials and construction products (HD 212/11).
- 12.3.27 The carbon assessment boundary used in this assessment is based on the 'Product Stage', as defined in PAS 2080:2016 *Carbon Management in Infrastructure* as the total carbon dioxide equivalent emissions associated with:
- Raw material extraction, precursor product processing, and final product manufacture, and the energy use and waste management within these processes; and
 - Transportation of materials and goods within the supply chain, up to the point of the final factory gate.
- 12.3.28 As per the HD 212/11 requirements, the assessment does not include the carbon emissions associated with the boundary of PAS 2080:2016 'Construction Process Stage' due to issues around the availability of data

and the complexity in modelling the fuel and electricity consumption associated with this Construction Process Stage. This stage is defined by the total carbon dioxide equivalent emissions associated with:

- Transportation of products / materials and construction equipment from the point of production (or point of storage in the case of plant and machinery) to the construction site;
- Environmental conditions required to keep materials in a required state;
- Processing waste materials (due to spillage or damage during transportation) and the provision of new material;
- Construction-site works activities including:
 - temporary works, ground works, and landscaping;
 - materials storage and any energy, or otherwise, needed to maintain necessary environmental conditions;
 - transport of materials and equipment within the site;
 - installation of materials and products;
 - emissions associated with site water demand;
 - waste management activities (transport, processing, final disposal) associated with waste arising from the construction-site; and
 - production, transportation, and waste management of materials and products lost during works.

12.3.29 There is currently no accepted methodology for determining the sensitivity of the global climate system to new GHG emissions. However, given the Institute of Environmental Management and Assessment's ("IEMA") principle that all new GHG emissions might be considered significant, it is therefore proposed to report the estimated embodied carbon content through contextualising the magnitude of impact against national carbon budgets (i.e. in order to provide an additional sense of scale). This approach is consistent with the latest good practice guidance promoted by IEMA (IEMA, 2017) on assessing GHG emissions and evaluating their significance.

Depletion of Natural Resources Methodology

12.3.30 The assessment for natural resources has been based on quantifying the magnitude of change associated with the use of primary aggregates on the DCO Scheme, which has been chosen to act as a proxy indicator of the DCO Scheme's consumption and use of natural resources.

12.3.31 The value and/or sensitivity of the regional natural resource (sand and gravel, and crushed rock) has been described using the terminology provided in Table 12.5.

Table 12.5: Value and/or sensitivity of the receptor (scale based on professional judgement)

Value	Description
Very High	There are no supplies of mineral resources within the study area
High	There are limited supplies of mineral resources within the study area
Medium	There are adequate supplies of mineral resources within the study area
Low	There are good supplies of mineral resources within the study area

12.3.32 The magnitude of the impact for natural resources has been assessed against the scale provided in Table 12.6.

Table 12.6: Magnitude of the impact (scale based on professional judgement)

Magnitude	Description
Major	Considerable impact (by weight or volume) of more than local significance in relation to the use of minerals resources
Moderate	Measurable impact (by weight or volume) of more than local significance in relation to the use of minerals resources
Minor	Impact (by weight or volume) of less than local significance in relation to the use of minerals resources
Negligible	Negligible impact (by weight or volume) of no measurable local significance in relation to the use of minerals resources

12.3.33 Table 12.7 has then been used to determine the significance level of the environmental effect based on the value/sensitivity of the receptor and the magnitude of the impact.

Table 12.7: Significance of effect

		Value/Sensitivity of the Receptor			
		Very High	High	Medium	Low
Magnitude of Impact	Major	Very Large	Very Large / Large	Large / Moderate	Moderate / Slight
	Moderate	Very Large / Large	Large / Moderate	Moderate	Slight
	Minor	Large / Moderate	Moderate / Slight	Slight	Slight / Neutral
	Negligible	Slight	Slight	Slight / Neutral	Neutral

Waste Assessment Methodology

12.3.34 Assessing the scale and significance of the impacts associated with the production and management of waste has been based on a combination of the waste management methods identified and the effects that the forecast waste arisings from the DCO Scheme will have on the available waste management infrastructure in accordance with DMRB HD 212/11. In this way, the assessment reflects both the relative quantities of waste produced and the position within the waste hierarchy (prevention, prepare for reuse, recycling, recovery and disposal) of the chosen waste management methods likely to be employed by the DCO Scheme.

12.3.35 The value/sensitivity of the receptor has been assigned using the terminology described in Table 12.8.

Table 12.8: Value and/or sensitivity of the receptor

Value	Description
Very High	There is no available waste management capacity for any waste arising from the DCO Scheme
High	There is limited waste management capacity in relation to the forecast waste arisings from the DCO Scheme
Medium	There is adequate waste management capacity for the majority of wastes arising from the DCO Scheme
Low	There is adequate available waste management capacity for all wastes arising from the DCO Scheme

(Source: DMRB HD 212/11)

12.3.36 The magnitude of the impact has been assessed against the scale provided in Table 12.9.

Table 12.9: Magnitude of the impact

Magnitude	Description
Major	Waste is predominantly disposed of to landfill or to incineration without energy recovery with little or no prior segregation
Moderate	Wastes are predominantly disposed of to incineration with energy recovery
Minor	Wastes are predominantly segregated and sent for recycling or further segregation at a materials recovery facility
Negligible	Wastes are predominantly reused on site or at an appropriately licensed or registered exempt site elsewhere

(Source: DMRB HD 212/11)

12.3.37 Table 12.10 has then been used to determine the significance level of the environmental effect based on the value/sensitivity of the receptor and the magnitude of the impact.

Table 12.10: Significance of effect

		Value/Sensitivity of the Receptor			
		Very High	High	Medium	Low
Magnitude of Impact	Major	Very Large	Very Large/ Large	Large/ Moderate	Moderate/ Slight
	Moderate	Very Large/ Large	Large/ Moderate	Moderate	Slight
	Minor	Large/ Moderate	Moderate/ Slight	Slight	Slight/ Neutral
	Negligible	Slight	Slight	Slight/ Neutral	Neutral

(Source: DMRB HD 212/11)

12.3.38 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (“the EIA Regulations 2017”) require an ES to include a description of the likely significant effects of the development on the environment but neither it, nor IAN 153/11 nor HD 212/11, give advice as to what level of significance is considered significant for the purposes of EIA. In the absence of this information, the assessment has used the ‘Descriptors of the Significance of Effect Categories’ provided in DMRB Volume 11, Section 2, Part 5 ‘Assessment and Management of Environmental Effects’ (HA 205/08)⁷, which are reproduced in Table 12.11 below to frame discussions of significance.

Table 12.11: Descriptors of the significance of effect categories

Significance Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.

⁷ HA 205/08 was superseded by DMRB Volume 11 Sustainability & Environment Appraisal guidance ‘LA 104 Environmental assessment and monitoring’ in September 2019. However, as HA 205/08 was the extant guidance available during the assessment it has informed this assessment.

Table 12.11: Descriptors of the significance of effect categories

Significance Category	Typical Descriptors of Effect
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

(Source: HA 205/08)

12.3.39 For the purposes of this assessment, significance of effect categories of Large and Very Large for the depletion of natural resources and waste management (as shown in Table 12.7 and Table 12.10 above), are likely to be considered 'significant' in the context of the EIA Regulations 2017 and guidance provided in HA 205/08.

12.3.40 It has not been possible, for the reasons discussed above, to derive a measure of the significance of effect from the DCO Scheme's embodied carbon emissions using the standard EIA terminology described above. The magnitude of impact has instead been contextualised against national carbon budgets in order to provide an additional sense of scale.

12.4 Baseline, Future Conditions and Value of Resource

Existing Material Resource Use and Waste Generation

12.4.1 The railway between Portishead and Pill is not in operational use (disused section) and therefore any existing use of materials or waste generation is negligible.

12.4.2 The use of material resources and the generation of waste during the routine maintenance activities associated with the operation of the existing Portbury Freight Line is also likely to be negligible, as is any use of material resources and waste associated with the maintenance of the existing highway network.

12.4.3 The baseline condition of the Portishead Branch Line (including Stations, Railway Line and Structures), Portbury Freight Line and Highways Network is detailed in Chapter 4- Description of the Proposed Works (DCO Document Reference 6.7).

Material Resources

Climate Change

- 12.4.4 The Intergovernmental Panel on Climate Change ("IPCC", 2018a) (FAQ 1.1) states that *"climate change represents an urgent and potentially irreversible threat to human societies and the planet. In recognition of this, the overwhelming majority of countries around the world adopted the Paris Agreement in December 2015, the central aim of which includes pursuing efforts to limit the increase in the global average temperature to well below 2°C above pre-industrial levels (the level defined as dangerous climate change impacts) and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels"*.
- 12.4.5 The IPCC (2018b) (Section C.2) states that *"limiting global warming to 1.5°C, above pre-industrial levels, with no or limited overshoot, would require rapid and far-reaching transitions in energy, land, urban and infrastructure, and industrial systems. Global net human-caused emissions of carbon dioxide (CO₂) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO₂ from the air"*.
- 12.4.6 GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from constructing the DCO Scheme might be considered to be significant. Notwithstanding, the adoption of the HD 212/11 methodology, as described above, precludes the need to assign a value or sensitivity to the global climate system for the purposes of this assessment.

Natural Resources (Primary Aggregates)

- 12.4.7 'Primary aggregate' is defined by the British Geological Society as *"aggregate produced from naturally occurring mineral deposits and used for the first time"*.
- 12.4.8 The Department for Environment Food & Rural Affairs (Defra, 2011) identifies *"primary aggregates as being at risk of future scarcity for the UK construction and civil engineering sector"*. In the UK aggregate minerals such as sand, gravel and crushed rock are not physically scarce. However, Defra (2011) states that there is considerable concern regarding security of domestic supply due to the local geopolitical context.
- 12.4.9 Whilst there is no danger of physically running out of such resources, Defra (2011) suggests that competition for land (frequently with environmental designations such as National Parks) and negative public perceptions towards mineral development have made it increasingly difficult for aggregate companies to secure permits to exploit these resources. Notwithstanding, both secondary and recycled aggregates can be used as alternatives to primary aggregate and have a number of benefits, including the reuse of waste materials and reducing the impact of primary extraction.
- 12.4.10 The NPPF requires MPAs to maintain a minimum landbank of seven years for sand and gravel and a minimum landbank of ten years for crushed rock. This is used to determine whether there is a shortage or surplus of supply in a given minerals planning area.

- 12.4.11 The SWAWP Annual Report 2016 provides the following summary of land won primary aggregates production and permitted reserves in the study area.
- Sand and gravel: sales of land won sand and gravel within the South West totalled 2.98 million tonnes ("Mt") in 2016. Dorset continues to be the main producer, accounting for approximately 47% of sales. Permitted reserves in the region at the end of 2016 were 26.72 Mt. Based on the average of 10 years of sales (2007 to 2016), this represents a landbank of 7.84 years.
 - Crushed rock: sales of crushed rock aggregates (limestone, igneous rock and sandstone) within the South West totalled 23.26 Mt in 2015. Somerset continues to be the main producer with almost 58% of sales. Permitted reserves in the region in 2016 amounted to approximately 866 Mt at active and inactive sites. This represented a landbank of approximately 39 years when based on the average of three years of sales (2014 to 2016) and over 43 years when based on the average of 10 years of sales (2007 to 2016).
- 12.4.12 This report also confirms that the West of England MPA (including Bath and North East Somerset, Bristol City, South Gloucestershire, North Somerset and Wiltshire including Swindon) is a significant producer of crushed rock in the South West, being the next highest producer after Somerset.
- 12.4.13 Permitted reserves at quarries in South Gloucestershire and North Somerset generate between them a significant landbank of over 38 years (based on the 10 year sales average of 3.41 Mt). The West of England is a significant net exporter of crushed rock, exporting approximately 46% of crushed rock aggregate produced at quarries within the sub-region. It is also estimated that the West of England accounted for 680,000 t (34%) of the 2 Mt of recycled aggregates sold from fixed recycling sites in 2016.
- 12.4.14 These data suggest that there is likely to be an adequate supply of sand and gravel in the study area and substantial reserves of crushed rock. Landbanks are affected by planning permissions granted and the rate of working at existing sites. The figures provided represent the most recently available.
- 12.4.15 The baseline review has identified that there is likely to be adequate reserves of sand and gravel and substantial reserves of crushed rock in the study area. Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided (i.e. new planning permissions granted and through the working of existing reserves). For the purposes of assessment this is likely to equate to the study area having a Medium sensitivity to the depletion of primary aggregates (i.e. the study area has an adequate supply of mineral resources).
- 12.4.16 The NPPF advises that LPAs define Minerals Safeguarding Areas and adopt appropriate policies in order that known locations of specific minerals resources of local and national importance are not needlessly sterilised by non-mineral development; and that Minerals Consultation Areas are defined based on these Minerals Safeguarding Areas.
- 12.4.17 The DCO Scheme is following the existing railway alignment and is not located within an area designated by NSDC or BCC as a 'Minerals

Safeguarding Area' or 'Preferred Area for Minerals Working' and is therefore unlikely to result in the sterilisation of existing mineral resources.

Waste Management

Existing Regional Waste Management Practices

12.4.18 The existing waste management practices in the West of England sub-region have been determined through a review of information provided in the JWCS.

Construction, demolition and excavation waste

12.4.19 Approximately 2.3 Mt of construction, demolition and excavation waste is produced within the West of England per annum. This waste stream is largely made up of inert waste. The majority of this material (~60%) is recycled or re-used, with the remainder being disposed of to landfill, or used for various engineering and restoration schemes at exempt sites, predominantly within the West of England.

Commercial and industrial waste

12.4.20 Commercial and industrial waste generated within the plan area is estimated to be 900,000 tonnes per year. An estimated 34% of this waste is recycled and composted and there are a number of commercial transfer stations and recycling operations throughout the West of England. The majority of waste remaining is sent to landfill for disposal, with most going to facilities in the neighbouring counties of Gloucestershire, Wiltshire, and Somerset.

Hazardous waste

12.4.21 Approximately 85,000 tonnes of hazardous waste were generated in the West of England in 2007/8. Hazardous waste treatment and disposal facilities are highly specialised and generally operate at a regional and often national scale. There are no hazardous waste landfill facilities within the plan area.

Available Waste Management Infrastructure

12.4.22 The available waste management infrastructure in the West of England sub-region has been ascertained through an outline review of GOV.UK's (2018) Waste Management in South West Data Tables. These data, the most recently available, suggest that the West of England sub-region had the following waste management facilities and capacities at the end of 2018:

- Non-hazardous landfill (463,000 m³);
- Inert landfill (8,667,000 m³);
- Hazardous waste incineration (9,000 tonnes per annum ("t/annum")); and
- Municipal and/or Industrial and Commercial waste incineration (400,000 t/annum).

12.4.23 These data also suggest that the West of England sub region had the following types of commercial waste management facilities at the end of 2018:

- Hazardous waste transfer;
- Household waste, industrial, commercial waste transfer;

- Clinical waste transfer;
 - Non-biodegradable waste transfer;
 - Material recovery facilities;
 - Physical treatment;
 - Physico-chemical treatment;
 - Chemical treatment;
 - Composting;
 - Biological treatment;
 - Vehicle depollution; and
 - Metal recycling.
- 12.4.24 Furthermore, reference to the North Somerset Council Annual Monitoring Report 2018 suggests that North Somerset had the following capacity as of the 31 March 2018:
- Recycling / composting: 268,200 t/annum;
 - Other recovery: 20,000 t/annum; and
 - Inert landfill: Durnford Quarry 382,500 tonnes per annum for 20 years (2012-2032).
- 12.4.25 Network Rail's NDS logistics function also handles more than 1.5 Mt of redundant track materials nationally per annum (e.g. track, sleepers, switches, crossings and ballast), of which the clear majority (90-95%) is reused, recycled and recovered through a network of local depots and National Track Materials Recycling Centres ("NTMRC") in Westbury (Wiltshire), Crewe (Cheshire), Doncaster (South Yorkshire), Eastleigh (Hampshire) and March (Cambridgeshire). Redundant track materials are therefore not usually managed outside the National Delivery Service.
- 12.4.26 Whitemoor Yard, in Cambridgeshire, is the largest of the NTMRCs, and the only Network Rail facility known to process dirty (or hazardous) ballast materials. The facilities at Whitemoor Yard comprise: used track material processing; sleeper storage and crushing; switches and crossings processing; ballast washing and decontamination; ballast processing and storage; and wagon maintenance.
- 12.4.27 These data suggest that there is unlikely to be any specific constraints to the DCO Scheme with regards to inert and non-hazardous waste infrastructure in the West of England sub-region. However, there appears to be limited disposal infrastructure for hazardous waste within the region. The closest hazardous waste landfill facilities are located in Gloucestershire (Wingmoor Farm East Landfill, near Cheltenham) and Wiltshire (Parkgate Farm Landfill, Purton near Swindon). As previously discussed, the closest Network Rail facility accepting hazardous ballast materials is located in Cambridgeshire.
- 12.4.28 The baseline review suggests that there is likely to be adequate waste management capacity for the majority of wastes arising from the construction of the DCO Scheme, with the possible exception of any hazardous waste streams. For the purposes of assessment this is likely to equate to the available waste management infrastructure having a Medium sensitivity to any waste generated as a result of constructing the DCO Scheme (i.e. there is adequate waste management capacity for the majority of wastes arising during the construction of the DCO Scheme).

12.5 Measures Adopted as Part of the DCO Scheme

- 12.5.1 A number of measures have been included as part of the project design in order to minimise certain environmental effects. These include:
- careful designing of the project to ensure key receptors are avoided where possible;
 - construction adopting best practices techniques, which are introduced in the Construction Strategy (DCO Document Reference 5.4), ES Appendix 4.1 Code of Construction Practice ("CoCP") (DCO Document Reference 8.15) and presented in more detail in the Master CEMP (DCO Document Reference 8.14); and
 - compliance with regulatory and legislative regimes as required by law.
- 12.5.2 Detailed design and construction of the DCO Scheme will also comply with Network Rail's own environmental policies which are identified earlier in Section 12.2.

12.6 Assessment of Effects

Construction Phase

- 12.6.1 Based on the Network Rail MetroWest Phase 1 Construction Strategy provided in the DCO application (DCO Document Reference 5.4) and WRAP (2013) SMARTWaste benchmarking data for railway and highway projects, the key materials used and wastes expected to be generated during the construction of the DCO Scheme are detailed in Table 12.12.

Table 12.12: Material use and waste arisings during construction (track, stations, and highways)

Materials use	Waste arisings
<ul style="list-style-type: none"> • Plastic reptile fencing • Plastic (HDPE/MDPE) pipes and chambers • Glass reinforced plastic chambers • Concrete and brick headwalls • Type 1 sub-base / formation / bulk fill • Granular backfill • Top and bottom ballast • Sand blanket material • Geotextile matting, geo-composite separator, terram lining • Concrete sleepers and rails • Long welded rail • Metal rail fastenings • Steel for use in structures, fencing, piles, soil nails etc • Functional supply points, location cases, comms cabinets • Global System for Mobile communications masts • Signals, mileposts etc • Concrete / glass reinforced plastic lineside cable troughing 	<ul style="list-style-type: none"> • Vegetation removal (non-hazardous) • Drainage ditch materials (hazardous or non-hazardous) • Clean ballast, dirty ballast, contaminated ballast and formation materials (hazardous or non-hazardous) • Existing bullhead steel track (non-hazardous) • Timber sleepers (hazardous or non-hazardous) • Existing drainage assets (non-hazardous) • Asphalt (hazardous or non-hazardous) • Vegetation and scrub (non-hazardous) • Bricks and binders (inert) • Canteen/office/ad hoc waste (non-hazardous) • Concrete (inert)

Table 12.12: Material use and waste arisings during construction (track, stations, and highways)

Materials use	Waste arisings
<ul style="list-style-type: none"> • Telecoms and signals cabling • Asphalt • Glass panels • Bricks, blockwork, tiles, cladding for architectural finishes • Concrete • Precast retaining walls • Precast concrete sections • Floor coverings • Furniture • Insulation • Oil and fuels • Plastics • Timber 	<ul style="list-style-type: none"> • Electrical equipment (hazardous or non-hazardous) • Asbestos containing materials (hazardous) • Insulation materials (non-hazardous) • Aqueous liquids (non-hazardous) • Metals (non-hazardous) • Mixed (non-hazardous) • Packaging (non-hazardous) • Plastics (non-hazardous) • Timber (non-hazardous)

12.6.2 IAN 153/11 suggests that significant environmental impacts are likely to arise from those materials which are consumed in the largest quantities or are high in embodied carbon; wastes which arise in the largest quantities, which have hazardous properties or comprise a large proportion of the value of the project.

12.6.3 At this stage of the design of the DCO Scheme the precise quantities of materials have not been specified. IAN 153/11 advises that information that is readily available should be assembled. An outline estimate of embodied carbon emissions, aggregates consumption and waste arisings has been calculated using the construction cost estimate, along with WRAP (2013) resource efficiency benchmarking data for completed infrastructure projects. These figures are summarised below and have been used to ascertain the indicative magnitude of impact from constructing the DCO Scheme in line with the assessment criteria provided in Section 12.3.

12.6.4 Table 12.18 summarises the potential impacts, mitigation and residual impacts associated with the construction of the DCO Scheme.

Embodied Carbon Emissions

12.6.5 An outline estimate of embodied carbon emissions has been calculated using the WRAP resource efficiency (embodied carbon) benchmarks for completed new build and refurbishment infrastructure projects. These figures are summarised in Table 12.13 and provide an indicative worse case assessment of the magnitude of impact arisings from embodied carbon emissions during the construction of the DCO Scheme.

Table 12.13: Estimated embodied carbon impact of constructing the DCO Scheme

WRAP embodied carbon emissions benchmark and project type (50th percentile, median)	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total embodied carbon emissions (t)
42 tonnes of carbon dioxide equivalent ("tCO ₂ e") / £100 k (new build and refurbishment infrastructure projects)	22 (High)	27,300

12.6.6 The environmental impact from the embodied carbon emissions associated with the construction of the DCO Scheme has been assessed as having a **likely, long-term, permanent, indirect, adverse, cumulative effect** on the global climate system. This is a result of the DCO Scheme having the potential to generate new GHG emissions as a result of the consumption and use of construction materials and products.

12.6.7 The Government has a legally binding framework to cut GHG emissions by at least 100% by 2050. Emission reductions will be delivered through a system of five year carbon budgets that set a trajectory to 2050:

- 1st carbon budget (2008 to 2012) of 3,018 million tonnes of carbon dioxide equivalent ("MtCO₂e");
- 2nd carbon budget (2013 to 2017) of 2,782 MtCO₂e;
- 3rd carbon budget (2018 to 2022) of 2,544 MtCO₂e;
- 4th carbon budget (2023 to 2027) of 1,950 MtCO₂e;
- 5th carbon budget (2028 to 2032) of 1,765 MtCO₂e; and
- 6th carbon budget (2033-37) of 965 MtCO₂e.

12.6.8 However, compared to the UK's 4th carbon budget (2023 to 2027) (the period in which construction is likely to be undertaken) of 1,950 MtCO₂e, the DCO Scheme's estimated embodied carbon emissions represent a very small proportion (<0.002%) of the UK's 5-year Carbon Budget. Furthermore, the embodied carbon emissions associated with the DCO Scheme's use of material resources will be largely regulated through the UK Emissions Trading Scheme ("UK ETS") (a UK wide emissions cap and trade scheme with a decreasing 'cap' or limit over time) and other policy tools as part of the UK Climate Change Act 2008 target of reducing GHG emissions by at least 100% of 1990 levels by 2050 (this includes reducing emissions from the devolved administrations (Scotland, Wales and Northern Ireland)). This means that, overall, most of the DCO Scheme's embodied carbon emissions are unlikely to contribute to an increase in UK-wide carbon emissions.

12.6.9 GHG emissions not regulated by the UK ETS, predominantly from construction, will be managed through other policy tools as part of the Climate Change Act target of at least an 100% reduction in emissions by 2050, including but not limited to for example:

- The Energy Savings Opportunity Scheme (“ESOS”);
- The Climate Change Levy (or associated Climate Change Agreements (“CCA”);
- The UK GHG reporting for the business and industrial process sectors; and
- The annual emissions reporting under the Companies Act 2006 (Strategic Report and Directors’ Reports) Regulations 2013.

12.6.10 The residual embodied carbon emissions cannot be absolutely predicted and will ultimately depend on the Principal Contractor’s design and procurement decisions, particularly those involving the selection of construction materials, products and concrete additives.

12.6.11 The precise embodied carbon footprint will therefore not be known until the Principal Contractor has completed the construction of the DCO Scheme and reported a construction stage carbon footprint. Notwithstanding, any changes to final embodied carbon footprint are unlikely to result in a variation in the order of magnitude of the DCO Scheme’s estimated embodied carbon emissions relative to the UK’s 5-year Carbon Budget.

12.6.12 Notwithstanding, the impact of the DCO Scheme on aggregate levels of emissions is likely to be very small, and any impact of the DCO Scheme will not, in isolation, affect the ability of the UK Government to meet its carbon reduction plan targets.

Depletion of Natural Resources

12.6.13 The precise quantities and sources of primary aggregates required during the construction of the DCO Scheme were unknown at the time of assessment.

12.6.14 A scheme of this magnitude is likely to require appreciable quantities of aggregates for use in infrastructure construction, earthworks, foundations, utilities, structures and buildings (e.g. Portishead Station); and the Construction Strategy (DCO Document Reference 5.4) estimates that some 16,500 tonnes of Type 1 formation and 18,000 tonnes of ballast materials are likely to be required for the track enabling works between Portishead and Portbury Junction.

12.6.15 An outline estimate of aggregates use has been calculated using the WRAP resource efficiency (materials used) benchmarks for a completed new building and infrastructure projects. These figures are summarised in Table 12.14 and provide a worst case indicative assessment of the magnitude of impact arising from the depletion of natural resources during the construction of the DCO Scheme, taking account of the likely wider use of construction aggregates on the DCO Scheme.

Table 12.14: Estimated use of primary aggregates

WRAP aggregates weight /construction value (50th percentile, median value)	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total aggregates use (t)
504 tonnes ("t") / £100 k (new build and refurbishment infrastructure projects)	10 (Medium)	327,600

12.6.16 The environmental impact of the use of primary aggregates during the construction of the DCO Scheme has been assessed as having a **likely, short-term, permanent, direct, slight adverse, cumulative effect** on the regional natural resources. This assessment is based on the following determining factors:

- Minor impact (by weight or volume) of more than local significance in relation to the use of primary aggregates;
- The South West has adequate reserves of primary aggregates (i.e. Medium sensitivity of the resource/receptor); and
- Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided (i.e. new planning permissions granted and through the working of existing reserves).

Construction, Demolition and Excavation Waste

12.6.17 The Construction Strategy (DCO Document Reference 5.4) for the DCO Scheme has identified that approximately 22,500 tonnes of ballast is expected to be cut as part of the track formation works on the disused line between Portishead and Portbury Junction. These materials are likely to include a combination of clean and contaminated ballast and general spoil materials.

12.6.18 Track bed sampling has demonstrated elevated levels of some contaminants in the ballast, predominantly lead and zinc, at discrete locations along the disused section of the railway and along the freight line between Portbury Dock Junction and the Ashton Junction. Further testing will be undertaken to assign an appropriate waste classification (hazardous or non-hazardous), and determine which controls apply to the storage, treatment and movement of the waste to prevent harm to people and the environment.

12.6.19 As there are only outline designs for the DCO Scheme it is difficult to provide an entirely accurate estimate of the amount of waste which will be produced for the new build construction works. Notwithstanding, waste arising estimates have been calculated where possible based on the DCO Scheme parameters, along with WRAP (2013) resource efficiency benchmarks on the amount of waste produced during completed new build and refurbishment infrastructure projects.

12.6.20 These figures are summarised in Table 12.15 and can be used to provide an indication of the likely magnitude of impact associated with the generation of additional construction, demolition⁸ and excavation waste streams during the construction of the DCO Scheme.

Table 12.15: Estimated demolition and new build construction waste

WRAP construction waste benchmark (50th percentile, median)	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total waste arisings (t)
20.1 t /£100 k (new build and refurbishment infrastructure projects)	137 (High)	13,065

12.6.21 Table 12.16 provides a summary of the estimated distribution of waste products likely to arise during construction. These figures are derived from WRAP benchmarking data for completed railway and highway projects.

Table 12.16: Estimated waste composition of railway and highways schemes

Waste Product (European waste catalogue number)	Railways (%)	Highways (%)
Asphalt (17 03 02)	3.44	4.47
Binders (17 01 01)	0.17	0.004
Bricks (17 01 02)	0.19	0.92
Canteen/office/ad hoc waste (20 03 01)	1.16	2.15
Concrete (17 01 01)	12.17	8.30
Electrical equipment (20 01 36)	0.01	0.00
Furniture (20 03 07)	0.00003	0.002
Gypsum (17 08 02)	0.04	0.01
Hazardous (17 09 03*)	1.09	0.00
Inert (17 01 07)	13.78	26.43
Insulation (17 06 04)	0.33	0.03
Liquids (16 10 02)	0.002	1.24
Metal (17 04 07)	0.69	0.26
Mixed (17 09 04)	8.76	16.15
Oils (13 01 13*)	0.00	0.003
Other	22.63	0.64
Packaging (15 01 06)	0.45	0.88

⁸ The construction strategy for the DCO has identified that localised demolition works are likely to be required at Pill Station and Avon Road Underbridge. Any waste quantities associated with these activities are also captured in the estimates below.

Table 12.16: Estimated waste composition of railway and highways schemes

Waste Product (European waste catalogue number)	Railways (%)	Highways (%)
Plastics (17 02 03)	0.03	0.25
Soils (17 05 04)	32.82	34.96
Tiles and Ceramics (17 01 03)	0.001	0.0004
Timber (17 02 01)	2.25	3.30
Total	100%	100%

12.6.22 The environmental impact of waste from the construction of the DCO Scheme has been assessed as having a **short-term, temporary, direct, slight adverse, cumulative effect** on the available regional waste infrastructure. This assessment is based on the following determining factors:

- Construction, demolition and excavation wastes are likely to be predominately reused on site or segregated and sent for off site reuse, recycling or recovery within Network Rail’s National Delivery Service and the West of England sub-region (i.e. minor magnitude of impact);
- There is likely to be adequate capacity, within Network Rail’s National Delivery Service and West of England sub-region, to manage the majority of the estimated 36,000 tonnes of construction, demolition and excavation wastes that are likely to arise during the construction of the DCO Scheme (i.e. medium sensitivity of the resource/receptor); and
- Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided.

Operational Phase

12.6.23 The operational impacts on materials and waste have been scoped out for the reasons explained in Section 12.1.4.

12.7 Mitigation and Residual Effects

12.7.1 No likely significant effects have been identified and therefore no further mitigation measures are proposed. The residual significance of effect therefore remains as described in the preceding sections.

12.8 Cumulative Effects

Other Projects along the Portishead Branch Line

12.8.1 A summary of other projects along the Portishead Branch Line and an assessment of the cumulative impacts is provided in Chapter 18 of the ES (DCO Document Reference 6.21) and Appendices 18.1 and 18.2 (DCO Document Reference 6.25).

- 12.8.2 Constructing the DCO Scheme is likely to generate concurrent or sequential cumulative environmental impacts and effects with regards to the generation of embodied carbon emissions, the depletion of natural resources and the generation of waste as a result of constructing the DCO Scheme before, at the same time, or after, the other projects along the Portishead Branch Line.
- 12.8.3 The majority of these projects have not quantified their embodied carbon emissions, use of natural resources and waste generation so it is therefore not possible to determine the significance of any cumulative effect. However, given the nature and the scale of the other projects identified along the alignment, the relative scale of materials use and waste generation are considered low compared with the DCO Scheme.
- 12.8.4 Based on HA 205/08 and professional judgement, the likely residual cumulative effects of the DCO Scheme with the other committed projects is considered to be 'Minor', i.e. effects that are locally significant but are within the ability of the resource / receptor to absorb such effects. These effects are therefore not considered to be a key decision-making issue.

Other Works for MetroWest Phase 1

- 12.8.5 Other elements of MetroWest Phase 1, namely Liberty Lane Freight Depot and Parson Street Junction remodelling, Parson Street Station improvements, the Bedminster Down Relief Line and Bathampton Turnback comprise small scale works, confined within the existing railway land. These works are to be undertaken by Network Rail under their permitted development rights and do not form part of the application for the DCO Scheme .
- 12.8.6 The management and control process used by Network Rail for delivering projects that enhance or renew the operational railway is called GRIP. The GRIP process provides assurance that a project can successfully progress to the next stage and requires the preparation of reports for each GRIP stage. Environmental studies are undertaken as part of the GRIP process to identify potential issues and capture the need for mitigation during design and construction. The environmental reports are carried forward from options and feasibility design (GRIP 3 and 4), into the detailed design phase (GRIP 5) and construction (GRIP 6). In this way, environmental issues and mitigation measures are identified at an early stage and addressed through the design and construction phases. Consequently, while permitted development works do not require statutory environmental impact assessment, the GRIP process provides an internal, non-statutory environmental impact assessment process.
- 12.8.7 Given the small scale nature of these works and the distances between these elements and the Portishead Branch Line, it is considered that there are no significant cumulative effects during the construction of these elements on materials and waste.

12.9 Limitations Encountered in Compiling the ES

- 12.9.1 There was limited information at the time of assessment on the anticipated types and quantities of materials required during construction due to the ongoing development of the DCO Scheme design. It was therefore not

possible to quantify precisely the embodied carbon emissions, use of primary aggregates and waste likely to arise during the construction of the DCO Scheme.

12.9.2 The use of resource efficiency benchmarking data for completed infrastructure projects has therefore been used in the absence of this information to undertake a worst case assessment. The construction cost estimate which forms the basis of the embodied carbon emissions, aggregates consumption and waste forecasting, will inevitably be subject to some minor changes as the DCO Scheme evolves through the constructability process and as a result of ongoing consultation and economic appraisal to ensure delivery and viability. However, as the assessment has been undertaken on a worst case scenario basis such changes are unlikely to be materially significant as to affect the robustness of the assessment.

12.9.3 There is also limited additional information available at this stage regarding:

- The Principal Contractor's design and procurement decisions, particularly those involving the selection of construction materials, products and concrete additives etc.;
- The materials arising on site that likely to be recycled and reused within the DCO Scheme to replace materials sourced from off site;
- The geographical sources of imported materials; whether they are from virgin or from recycled or secondary sources, incorporate recycled or secondary content, are from sources with existing recognised responsible sourcing certification, etc.;
- Whether any imported materials from recycled or secondary sources are regulated under the Environmental Permitting Regulations 2016 (as amended);
- The reuse on site of materials generated from construction, demolition or excavation activities; and the chosen waste management methods / locations (recycling, recovery, disposal) for those surplus materials and wastes that cannot be reused on site;
- Whether waste be stored on site prior to reuse or removal from site; or whether waste be treated or processed on site prior to reuse or removal from site;
- The chosen waste management methods (recycling, recovery, disposal) and precise geographical locations for managing each waste stream that cannot be re-used on site.

12.9.4 Notwithstanding, the above limitations are not untypical of materials and waste assessments undertaken during the design stage, and the information presented in this chapter is considered robust and of an appropriate level of detail in line with the simple assessment methodology promoted by the IAN 153/11 and draft HD 212/11 guidance.

12.10 Summary

- 12.10.1 This chapter has assessed the environmental impacts of material resource use and waste generation during the construction of the DCO Scheme.
- 12.10.2 The construction of the DCO Scheme will require the use and consumption of material resources and hence will result in potential impacts on the environment through the depletion of natural resources and the embodied carbon associated with extraction, manufacturing and any pre-distribution transportation.
- 12.10.3 The construction phases of the DCO Scheme will also result in surplus materials and waste, leading to potential impacts on the available waste management infrastructure (i.e. through the permanent use of landfill void space and/or the short-term use of waste treatment capacity).
- 12.10.4 The environmental impact from the embodied carbon emissions associated with the construction of the DCO Scheme has been qualitatively assessed as having a likely, **long-term, permanent, indirect, adverse, cumulative effect** on the global climate system. This is a result of the DCO Scheme generating new GHG emissions as a result of the consumption and use of construction materials and products.
- 12.10.5 The environmental impact the use of primary aggregates during the construction of the DCO Scheme has been assessed at this stage as having a likely, **short-term, permanent, direct, slight adverse, cumulative effect** on the regional natural resources.
- 12.10.6 The environmental impact of waste from the construction of the DCO Scheme has been assessed at this stage as having a likely, **short-term, temporary, direct, slight adverse, cumulative effect** on the available regional waste infrastructure.
- 12.10.7 It is the conclusion of this ES that the simple assessment level is sufficient to understand the effects the DCO Scheme and that further detailed assessment is unnecessary. No likely significant effects have been identified, and therefore no further mitigation measures are proposed. Notwithstanding, the adoption of those best practices techniques detailed in the Master CEMP (DCO Document Reference 8.14), and compliance with all applicable legislative and policy requirements, will ensure that any residual environmental effects are minimised during the construction of the DCO Scheme.

Table 12.17: Summary of the assessment of the DCO Scheme on materials and waste

Aspect and control measures embedded in the DCO Scheme	Receptors	Impact	Environmental Mitigation	Residual Effects
<p>Increased use and consumption of material resources. CoCP and Master CEMP to require the contractor to:</p> <ul style="list-style-type: none"> • Comply with all applicable legislative and policy requirements; • Undertake a carbon assessment to calculate, assess, analyse, report and reduce the capital carbon footprint of the DCO Scheme where practicable; • Carry out a responsible sourcing assessment implementing measures that promote using products with lower embodied carbon emissions where practicable in constructing the DCO Scheme. 	<p>Global climate system Value: N/A</p>	<p>Potential impact from new embodied carbon emissions associated with material extraction, manufacturing and any pre-distribution transportation on the national carbon budgets. Magnitude: N/A</p>	<p>N/A</p>	<p>Magnitude: Not applicable Significance of Effect: Not applicable Significance for EIA legislation: Cannot be determined</p>
<p>Increased depletion of natural resources. CoCP and Master CEMP to require the contractor to:</p> <ul style="list-style-type: none"> • Comply with all applicable legislative and policy requirements; and • Carry out a responsible sourcing assessment implementing measures that promote: using responsibly sourced materials and using salvaged, recycled or secondary materials where practicable in constructing the DCO Scheme. 	<p>Natural resources Value: Medium</p>	<p>Potential impact from the depletion of regional primary aggregate resources. Magnitude: Minor</p>	<p>N/A</p>	<p>Magnitude: Minor Significance of Effect: Slight adverse Significant for EIA legislation: Not significant</p>

Table 12.17: Summary of the assessment of the DCO Scheme on materials and waste

Aspect and control measures embedded in the DCO Scheme	Receptors	Impact	Environmental Mitigation	Residual Effects
<p>Increased generation and disposal of waste. CoCP and Master CEMP to require the contractor to:</p> <ul style="list-style-type: none"> • Comply with all applicable legislative and policy requirements; • Carry out a responsible sourcing assessment implementing measures that promote minimising the use of hazardous materials in constructing the DCO Scheme; • Implement a SWMP to facilitate the prevention, reuse, recycling and recovery of CD&E waste generated during the construction of the DCO Scheme; • Obtain and comply with the conditions of any applicable consents and licences in relation to transporting, buying, selling, storing, treating, using or disposing of construction waste generated by the DCO Scheme; and • Prepare pollution prevention and incident response plans, which should include, amongst other aspects, the actions to be taken to prevent pollution occurring and minimise the pollution caused by an incident during the construction of the DCO Scheme. 	<p>Waste management infrastructure</p> <p>Value: Medium</p>	<p>Potential impact from the permanent depletion and/or temporary use of available waste management capacity.</p> <p>Magnitude: Minor</p>	<p>N/A.</p>	<p>Magnitude: Minor</p> <p>Significance of Effect: Slight adverse</p> <p>Significant for EIA legislation: Not significant</p>

12.11 References

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12.12 Abbreviations

B&NES	Bath and North East Somerset Council
BCC	Bristol City Council
BES	British Environmental Standard
BRE	Buildings Research Establishment
CCA	Climate Change Agreements
CD&E	Construction, demolition, and excavation
CEMP	Construction Environmental Management Plan
CL:AIRE	Contaminated Land Applications in Real Environments
CO ₂ (e)	Carbon dioxide equivalent
CoCP	Code of Construction Practice
DCO	Development Consent Order
Defra	Department for the Environment and Rural Affairs
DfRE	Design for Resource Efficiency
DMRB	Design Manual for Roads and Bridges
EIA	Environmental impact assessment
ES	Environmental Statement
ESOS	Energy Saving Opportunities Scheme
ETS	Emissions Trading Scheme
EU	European Union
GHG	Greenhouse Gases
GPP	Guidance for Pollution Prevention
GRIP	Governance for Railway Investment Projects (Network Rail)
IAN	Interim Advice Note
IEMA	Institute of Environmental Management and Assessment
IPCC	Intergovernmental Panel on Climate Change
JWCS	Joint Waste Core Strategy
LAA	Local Aggregate Assessment
LPA	Local Planning Authority
MPA	Minerals Planning Authority
Mt	Million tonnes
MtCO ₂ e	Million tonnes of carbon dioxide equivalent
NDS Framework	National Delivery Service NPPF National Planning Policy
NPSNN	National Policy Statement for National Networks
NSDC	North Somerset District Council

NSIP	Nationally significant infrastructure project
NTMRC	National Track Materials Recycling Centre
PAS	Publicly Available Specification
SGS	South Gloucestershire Council
SWAWP	South West Aggregates Working Party
SWMP	Site Waste Management Plan
t	Tonnes
t/annum	Tonnes per annum (per year)
tCO _{2e}	Tonnes of carbon dioxide equivalent
WECA	West of England Combined Authority
WRAP	Waste and Resources Action Programme

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