BANWELL BYPASS

Environmental Statement

HIF Banwell Bypass and Highways Improvements Project

Environmental Statement Chapter 10 - Material Assets and Waste

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		Checker	Tim Wilkinson	23/06/22
		Approver	Amie Cowle	27/06/22
		Authoriser	Roger Walker	28/06/22

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10 Material Assets and Waste

10.0 Introduction

10.0.1 This chapter provides an assessment of the likely significance of the environmental effects from the use of material assets and the generation, recovery or disposal of waste resulting from the Scheme.

10.0.2 This chapter details the methodology followed for the assessment, summarises the regulatory and policy framework related to material assets and waste, and describes the existing environment in the area surrounding the Scheme. Following this, the design, mitigation and residual effects of the Scheme are discussed, along with the limitations of the assessment.

10.0.3 The assessment has been conducted in accordance with the Design Manual for Roads and Bridges (DMRB) LA 110 Material assets and waste .[1]

10.0.4 DMRB 110 states that material assets and waste comprise:

a) The consumption of materials and products (from primary, recycled or secondary, and renewable sources), the use of materials offering sustainability benefits, and the use of excavated and other arisings that fall within the scope of waste exemption criteria.

b) The production and disposal of waste. [1].

10.0.5 In line with DMRB LA 110 Materials assets and waste methodology, the assessment presented in this chapter reports on the construction phase and first year of operational activities (opening year).

10.0.6 A description of the Scheme is provided within ES Volume 1 - Chapter 2 – Scheme Description.

10.0.7 The effects of the Scheme in terms of geology and soils, and the potential for land contamination, have been addressed in ES Volume 1 - Chapter 9 - Geology and soils and the effects on climate have been addressed in ES Volume 1 - Chapter 14 -

Climate.

a) The effects associated with the transportation of material assets and waste are assessed separately in ES Volume 1 – Chapter 5 - Air Quality, ES Volume 1 - Chapter 11 - Noise and Vibration and ES Volume 1 - Chapter 14 - Climate.

Scheme Overview

10.0.8 The following section provides a brief description and overview of the Banwell Bypass and Highways Improvements Project.

10.0.9 The Scheme comprises the following distinct elements:

a) a bypass of the village of Banwell (referred to as the "Banwell Bypass");

b) a route connecting the A371 at Castle Hill and the A368 at East Street (referred to as the "Southern Link"); and

c) Mitigation and enhancement measures, which broadly consist of the following:

- Environmental mitigation and enhancement measures in connection with the Banwell Bypass and the Southern Link, examples of which include (but are not limited to) flood compensation areas, planting and habitat creation, attenuation basins etc.

- Placemaking improvements within Banwell, comprising mitigation and enhancement measures to the public realm; and

- Traffic mitigation in connection with the Banwell Bypass and the Southern Link, including Improvements to the wider local road network.

10.0.10 Together, these elements comprise the "Scheme". Each element as listed is described in more detail below.

Banwell Bypass

10.0.11 The Banwell Bypass would be located within the administrative area of North Somerset. The village of Banwell is located approximately 8km east of Weston-super-Mare. The Banwell Bypass would primarily consist of:

a) signalisation and capacity improvements to the Summer Lane/ Wells Lane junctions on the A371;

b) a 40mph single carriageway Banwell Bypass, connecting the existing A371 (east of Summer Lane) to A368 (west of Towerhead Farm);

c) a 3 metre wide shared use path provided along the majority of the Banwell Bypass providing a link from Weston-super-Mare to Sandford;

d) Banwell West Junction - a three arm roundabout located east of Knightcott Industrial Estate at the western end of Banwell;

e) Wolvershill Road Junction – a traffic signalised junction, providing access for all users to the west, east, and north. Access to the south would be restricted to public transport and walking, cycling and horse-riders, and limited agricultural access only;

f) Banwell River Bridge – an overbridge across Riverside and the River Banwell. There would not be a direct connection between Riverside and the Banwell Bypass;

g) Moor Road to Riverside Link - a side road connection between Riverside and Moor Road; and

h) Banwell East Junction - A three-arm traffic signalised junction, with dedicated turning lanes from the bypass towards the Southern Link.

Southern Link Road

10.0.12 The Southern Link will provide the new primary route south to Winscombe, as Castle Hill and Dark Lane are proposed to be stopped up. The Southern Link would be a 30mph single carriageway, connecting the A368 (East Street) to the A371 at Castle Hill. The Southern Link would be located within the Mendip Hills AONB. The Southern Link would link into the Banwell Bypass at the Banwell East Junction. A T-junction located along the Southern Link would provide access into the east of Banwell (at East Street).

Mitigation Measures

Environmental mitigation and enhancement measures in connection with the Banwell Bypass and the Southern Link.

10.0.13 The Scheme would include mitigation measures which are provided to offset the impact of the Banwell Bypass proposal. These include (but are not limited to):

a) flood mitigation to ensure that the Banwell Bypass does not increase flood risk for third-party properties;

b) land for essential mitigation, such as ecology and landscape mitigation;

c) sustainable urban drainage systems (e.g. attenuation basins and swales), and additional groundwater mitigation, to prevent adverse water quality impacts (including the Source Protection Zone); and

d) replacement land to mitigate the impact of the scheme on Banwell Football Club.

Placemaking improvements within Banwell

10.0.14 As a result of the Banwell Bypass, there would be a reduction in traffic through Banwell. The reduction in traffic (and resulting reduction in congestion) through the village could result in higher traffic speeds without mitigation.

10.0.15 A reduced 20mph speed limit through Banwell would discourage vehicles from travelling at higher speeds, whilst also discouraging the use of the road as a through route (instead of the Banwell Bypass).

10.0.16 The reduction of traffic through Banwell due to the provision of the Banwell Bypass provides the opportunity to make improvements to the existing road and public spaces within Banwell to enhance the historic and urban setting of the village. These improvements would include, but are not limited to:

a) Alteration to the road and footways including resurfacing, widening, and narrowing (which would encourage drivers to comply with the posted 20mph speed limit);

b) Incorporation of active travel measures;

c) Soft landscaping and ecological improvements; and

d) Street signage improvements.

Improvements to the wider local road network

10.0.17 Improvements to the local road network and junctions including the surrounding villages of Churchill, Sandford and Winscombe are proposed to mitigate increases in traffic as a result of the Banwell Bypass and Southern Link. These mitigation measures would consist of:

a) Lowered speed limits:
   - 20mph: A368 through Churchill, A368 through Sandford, A371 through Winscombe.
   - 30mph: A368 between Churchill and Sandford Villages.

b) Gateway Features when entering and exiting the villages of Sandford, Churchill and Winscombe;

c) Non-physical traffic calming measures through and between villages (e.g. road markings and speed signage);

d) Capacity improvements to the Churchill Junction (A38/ A371);

e) Provision of new/ improvements to existing pedestrian and cycling crossings;

f) Active travel measures along the A368, with improved footway/ cycleway access from Churchill and Langford to Churchill Academy;

g) Improvements to footways, shared pedestrian, and cycleway; and

h) Soft landscaping, native planting, rewilding, and ecological enhancements.

Context

10.0.18 North Somerset Council's (NSC) Housing Infrastructure Fund (HIF) proposal supports potential housing sites (subject to the emerging Local Plan 2038).

10.0.19 A business case was submitted to Homes England to secure funding for a package of infrastructure improvements in February 2019 and a successful funding announcement was made at the end of October 2019.

10.0.20 The Banwell Bypass would provide a highway connection to enable potential housing sites that may be allocated in the emerging Local Plan and alleviate the anticipated impact of

further traffic growth upon the already congested Banwell village.

10.0.21 NSC appointed Alun Griffiths (Contractors) Ltd, with Arup and TACP (the 'AGC Team') as their technical and environmental advisors, to develop a solution including optioneering, design and planning support of the proposed HIF Banwell Bypass and Highways Improvements Project Stage 1 (the "Scheme"). Stage 1 of the project includes: optioneering; preliminary design; Environmental Impact Assessment (EIA); planning permission; Statutory Processes. Stage 2 of the project is the detailed design and construction phase, following planning determination and land acquisition.

Environmental Context

10.0.22 The Scheme crosses the North Somerset Levels which are characterised by flat open landscape of arable land divided by hedgelined ditches and rhynes. These have been inhabited and exploited for thousands of years. Much of the area lies within a designated flood zone.

10.0.23 Banwell lies to the immediate north of the Mendip Hills Area of Outstanding Natural Beauty (AONB). The Southern Link lies within the boundary of the AONB and within a groundwater Source Protection Zone. Whilst the Mendip Hills AONB is not a designated International Dark Sky Reserve (IDSR), it is well known for its dark sky environment.

10.0.24 There are five Scheduled Monuments in the vicinity of the Scheme, the closest of which is a Romano-British villa. There are numerous Grade I, II* and II listed buildings within Banwell and its vicinity. The centre and east of Banwell is designated as a Conservation Area.

10.0.25 The North Somerset and Mendip Bats Special Area of Conservation (SAC), which includes ancient woodland, lies adjacent to the A368 and the eastern junction of the Scheme. The Banwell Ochre Caves and Banwell Caves Sites of Special Scientific Interest (SSSI) are designated for their geology and overlap with the North Somerset and Mendip Bats SAC, providing hibernation sites for Greater Horseshoe bats. The wider area provides habitat for a variety of protected and notable species including dormouse, grass snakes, otter, badger,

kingfisher and several species of bat.

10.0.26 The Scheme is dissected by the River Banwell which flows northwards along Riverside. It is classified as a main river and is the source of the River Banwell Estuary.

10.0.27 There is an extensive Public Right of Way (PRoW) network in and around Banwell which includes well-used bridleways. To the east of Banwell, north of the A368 (Towerhead Road) lies a 7.2 MW photovoltaic power station (Banwell Solar Farm).

Scheme objectives

10.0.28 NSC's overall objectives for the Scheme are to deliver, within cost, quality, and programme targets:

a) Improve the local road network to deal with existing congestion issues.

b) Improve and enhance Banwell's public spaces by reducing traffic severance and improving the public realm.

c) Provide the opportunity to increase active and sustainable travel between local villages and Weston-super-Mare.

d) Deliver infrastructure that enables housing development (subject to Local Plan).

e) Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills Area of Outstanding Natural Beauty (AONB).

f) Innovative and efficient in reducing and offsetting carbon from the design and construction of the infrastructure.

g) Ensure the development provides the opportunity to increase Biodiversity Net Gain by at least 10%.

h) Proactively engage with stakeholders in a way that is both clear and transparent.

10.1 Competent Expert Evidence

10.1.1 The materials and waste lead is a Chartered Geologist who holds a BSc (Hons) degree in Geology from the University of Liverpool (2000) and an MSc in Applied Environmental Geology from Cardiff University (2002). They are a Fellow of the Geological Society of London.

10.2 Legislation and Policy Framework

Legislation

Environmental Protection Act (EPA) 1990 (Duty of Care)

10.2.1 Section 34 of the EPA 1990[2] sets out the extent of the 'Duty of Care' owed by any person who imports, produces, carries, keeps, treats or disposes of controlled waste.

The Waste and Environmental Permitting Etc. (Legislation Functions and Amendment etc) (EU Exit) Regulations 2020

10.2.2 The Waste and Environmental Permitting etc (Legislation Functions and Amendment etc) (EU Exit) Regulations 20202 ensure waste and environmental permitting regimes continue to operate effectively after the EU transition period.

The Waste (England and Wales) Regulations 2011

10.2.3 The Waste (England and Wales) Regulations 2011 (S.I. 2011 No. 988)[3] involve measures taken before a substance, material or product has become a waste that reduce:

a) The quantity of waste, including through re-use of products or the extension of the life span of products.

b) The adverse impacts of generated waste on the environment and human health.

c) The content of harmful substances in materials and products.

10.2.4 The regulations mandate the Waste Hierarchy which requires that where waste is unavoidable, products and materials should, subject to regulatory controls, be used again, for the same or a different purpose (re-use). Otherwise, assets should be recovered from waste through recycling. Value can also be recovered by generating energy from waste but only if none of the above offer an appropriate alternative solution. The waste hierarchy is summarised in Table 10-1.

Table 10-1 The Waste hierarchy

Stages	Includes
Prevention	Using less material in design and manufacture. Keeping products for longer; re-use. Using less hazardous material.

Stages	Includes
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.
Recycling	Turning waste into a new substance or product. Includes composting if it meets quality protocols.
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling operations.
Disposal	Landfill and incineration without energy recovery.

10.2.5 This reduces the amount of material that requires off-site disposal and hence reduces the potential impacts relating to the movement of materials both on to and off site.

Further legislation

10.2.6 The following legislation relating to material assets and waste has been taken into account in this assessment, which enact a wide range of legislation that govern the storage, collection, treatment and disposal of waste, these include:

a) The Controlled Waste (England and Wales) Regulations 2012[4];
b) The Hazardous Waste (England and Wales) Regulations 2005[5];
c) Waste (Circular Economy) Regulations 2020[6];
d) The Environmental Permitting (England and Wales) Regulations 2016[7];
e) Environmental Protection Act 1990[8];
f) Environment Act 1995[9];
g) Finance Act 1996[10];
h) Waste Minimisation Act 1998[11];
i) Waste and Emissions Trading Act 2003[12] ;and
j) Clean Neighbourhoods and Environment Act 2005[13].

Aggregates levy

10.2.7 An aggregates levy encourages a shift in demand from virgin aggregates towards alternative materials such as recycled aggregate. This is a tax on sand, gravel and rock that has either been dug from the ground, dredged from the sea in UK waters or

imported. HM Revenue and Customs should be notified every quarter on how much aggregate has been produced or sold. A tax of £2 per tonne is charged per sand, gravel or rock[14].

National Policy

Waste Management Plan for England (2021)

10.2.8 The Department for Environment, Food and Rural Affairs (Defra) published the Waste Management Plan for England in January 2021[15]. The plan provides an overview of waste management in England. The plan does not introduce new policies or change how waste is managed in England. Its aim is to bring current waste management policies together under one national plan. It fulfils the requirements of the Waste (England and Wales) Regulations 2011 for the waste management plan to be reviewed every six years.

10.2.9 The plan also includes changes to waste management plan requirements which have been made by the Waste (Circular Economy) (Amendment) Regulations 2020 where these could be incorporated in the Plan.

Our waste, our resources: A strategy for England (2018)

10.2.10 In 2018, Defra published 'Our Waste, Our Resources: A Strategy for England'[16] a major policy publication on waste setting out how England will preserve material resources by minimising waste, promoting resource efficiency and moving towards a circular economy in England.

National Planning Policy for Waste (2014)

10.2.11 The National Planning Policy for Waste[17] sets out the national planning policy on waste and provides the planning framework to enable local authorities to put forward, through waste local plans, strategies that identify sites and areas suitable for new or enhanced facilities to meet the waste management needs of their areas. This plan details waste planning policies for England and has been considered in conjunction with the National Planning Policy Framework (NPPF), the Waste management Plan for England and National Policy Statements for Waste Water and Hazardous Waste.

National Planning Policy Framework (NPPF) (2021)

10.2.12 The NPPF[18] sets out the Government's planning policies for England. It does not contain specific materials or waste management policies; however, the framework includes reference to waste management by advocating that waste minimisation forms part of the environmental objective role of achieving sustainable development.

Local Policy

West of England Joint Waste Core Strategy

10.2.13 The Joint Waste Core Strategy[19] is a development plan to set out the vision and objectives for sustainable waste management and sets the planning framework up to 2026 reflecting the waste hierarchy.

10.2.14 The strategy was prepared by the West of England sub-region which includes four unitary authorities: Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire.

10.2.15 Relevant extracts of policies of relevance to the Scheme are outlined below:

Policy 1 – Waste Prevention: 4. the provision of information, appropriate to the planning application, on the following matters:

a) the type and volume of waste that the development will generate (both through the construction and operational phases);
b) on-site waste recycling facilities to be provided (both through the construction and operational phases);
c) the steps to be taken to minimise the use of raw materials (including hazardous materials) in the construction phase through sustainable design and the use of recycled or reprocessed materials;
d) the steps to be taken to reduce, reuse and recycle waste (including hazardous wastes) that is produced through the construction phase;
e) If waste generated during construction is to be disposed of elsewhere the distance it will be transported; and

f) the steps to be taken to ensure the maximum diversion of waste from landfill (through recycling, composting and recovery) once the development is operational.

North Somerset Local Plan

10.2.16 The current suite of North Somerset Local Plan[20] documents is up-to-date and has a plan period to 2026. The North Somerset Council Core Strategy (2017)[21] is the main planning document which guides development choices and decisions in North Somerset. The Core Strategy sets out the broad long-term vision, objectives and strategic planning policies for North Somerset. Policies in relation to waste are in line with the Joint Waste Core Strategy for the West of England[19]. The emerging policies are waste and minerals are outlined below:

10.2.17 Living within environmental limits – CS7: Planning for waste: North Somerset Council supports the prevention and minimisation of waste and the sustainable management of waste, reducing reliance on landfill. That includes reduction, re-use, recycling and composting of waste, and recovery of materials and energy from waste, in line with the Joint Waste Core Strategy for the West of England[19].

10.2.18 Proposals for waste-related development and the location of waste management facilities will be subject to policies in the Joint Waste Core Strategy[19] and detailed development management policies to be established in the Sites and Policies Development Plan Document [22].

10.2.19 Living within environmental limits – CS8: Minerals planning: Provision will be made for North Somerset to contribute towards approximately 40% of the West of England's crushed rock aggregate sub regional apportionment for 2005–2020 rolled forward to 2026 on a pro rata basis, with a deduction to take account of extraction since the start of that period, consistent with national policy, subject to the principles of sustainable development, provided that local testing of that apportionment, through preparation of the Local Development Framework, shows that it is deliverable and environmentally acceptable. Based on the sub regional apportionment for the West of England that was submitted by the South West Regional Aggregates Working Party (SWRAWP) to the Department of Communities and Local Government in September 2010, the Council have

calculated that apportionment for North Somerset to be approximately 36.9 million tonnes.

10.2.20 The council will seek to maintain a land bank for crushed rock of at least 10 years.

10.2.21 The council will seek to protect mineral resources where appropriate, by such means as identification of Mineral Safeguarding Areas. This will be addressed in the Sites and Policies Development Plan Document[22].

10.2.22 Detailed development management policies on minerals development will be established through the Sites and Policies Development Plan Document.

10.2.23 A new North Somerset Local Plan is currently being prepared and will cover the period 2023 to 2038. This emerging Local Plan will include policies in relation to waste and minerals, including:

10.2.24 SP2: Climate Change: Development proposals must demonstrate how they will address climate change mitigation and adaptation, encourage the decarbonisation of energy and transport, and support the delivery of a carbon neutral North Somerset by 2030. In order to reduce the overall environmental impact of development, proposals will be supported where they:

a) Reduce greenhouse gas emissions and store carbon.
b) Deliver a net zero energy standard in new buildings.
c) Minimise energy use and demonstrate that residual energy demand can be met with renewable forms of energy.
d) Maximise the generation of energy from renewable and low carbon sources of energy.
e) Are designed to adapt and be resilient to the impacts of local climate change.
f) Reduce the risk of flooding both now and in the future, taking account of predicted sea level rises and the impact on areas vulnerable to coastal change.
g) Maximise water re-use and the protection of water resources.
h) Prioritise active travel and effective public transport over car use wherever possible.
i) Deliver green infrastructure and enhance biodiversity.
j) Prevent and minimise waste, and encourage re-use, recycling, and resource recovery; and

k) Encourage the reuse of existing buildings and structures.

10.2.25 SP12: Minerals: Mineral resources will be protected through the identification of a Minerals Safeguarding Area for carboniferous limestone as defined on the Policies Map. Existing and recently permitted carboniferous limestone workings will be safeguarded from inappropriate development which could adversely affect mineral production.

10.2.26 The Council will plan for a steady and adequate supply of aggregates, by encouraging provision of recycled aggregate, seeking to maintain a land bank for crushed rock of at least ten years, and allocating areas for mineral working where necessary, having regard to the need to promote deliverability of permitted reserves of crushed rock.

Standards and guidance

10.2.27 The assessment of the environmental effects associated with the use of material assets and the recovery or disposal of waste has been conducted in accordance with DMRB LA 110 and also considered the following:

The Definition of waste: Development Industry Code of Practice, Version 2 (Contaminated Land: Applications in Real Environmental (CL:AIRE))

10.2.28 This Code of Practice (CoP)[23] serves the following purposes:

a) It sets out good practice for the development industry to use when:
   - Assessing on a site specific basis where excavated materials are classified as waste or not.
   - Determining on a site specific basis when treated excavated waste can cease to be waste for a particular use.

b) It describes an auditable system to demonstrate that this CoP has been adhered to.

10.3 Assessment Method

10.3.1 This section sets out the methodologies that have been employed to undertake the material assets and waste

assessment, with reference to published standards, guidelines and best practice.

10.3.2 The assessment of the environmental effects associated with the use of material assets and the recovery or disposal of waste resulting from construction of the Scheme has been undertaken following the methodology outlined in DMRB LA 110. Professional judgement and emerging best practice have also been applied throughout the assessment.

10.3.3 The assessment of cumulative effects of this chapter topic both in-combination with other technical assessments on specific receptors and with other relevant developments have been assessed and are reported in the Cumulative Effects chapter, ES Volume 1 Chapter 15 – Cumulative Effects.

Identification of Baseline

10.3.4 The existing baseline conditions have been identified as the receptors which have the potential to be impacted by the Scheme. This includes the source of materials required for construction of the Scheme, and waste management facilities which may be used for the treatment or disposal of waste. The baseline conditions have been informed by desk-based studies, including (but not limited to) data from:

a) The Environment Agency; and

b) Local Development policies and topic papers.

Assessment of construction impacts

10.3.5 For the purposes of assessing the material assets, an assessment has been undertaken based on the Scheme design. Following the methodology outlined in DMRB LA 110, the assessment of environmental effects associated with the consumption of material assets resulting from construction has considered the Scheme design relating to the following:

a) The types and quantities of materials required for the Scheme.

b) Information on materials that contain secondary or recycled content.

c) Information on any known sustainability credentials of materials to be consumed.

d) The type and volume of materials that would be recovered from off-site sources for use of the Scheme.

e) The cut and fill balance.

f) Details of on-site storage and stockpiling arrangements, and any support logistical details.

10.3.6 Following the methodology outlined in DMRB LA 110, the assessment of environmental effects associated with the production and disposal of waste resulting from construction of the Scheme is a quantitative exercise which identifies the following:

a) "*the amount of waste (by weight) that would be recovered and diverted from landfill either on-site or off-site (i.e. for use on other projects).*

b) types and quantities of waste arising from the Scheme (demolition, excavation arisings and remediation) requiring disposal to landfill.

c) Details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements;

d) and potential for generation of hazardous waste (type and quantity)."

10.3.7 As defined in the CL:AIRE Definition of Waste: Development Industry Code of Practice (in line with the Waste Framework Directive), materials are only considered waste if they are discarded, intended to be discarded or required to be discarded by the holder. Once discarded, this remains the case even when the holder of the waste changes and the subsequent holder has a use for it.

Assessment criteria

10.3.8 DMRB LA 110 defines a specific methodology for assessing the environmental significance of a material resource/ waste or for determining the magnitude of the impact on such resource. The significance of the material assets or waste within the study area is determined on the basis of the descriptions described in Table 3.13 of DMRB LA 110, as reproduced in

10.3.9 Table 10-2.

Table 10-2 Significance category descriptions

Significance	Description
Very large	Material assets a) no criteria: use criteria for large categories. Waste b) >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or c) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
Large	Material assets a) project achieves <70% overall material recovery/ recycling (by weight) of nonhazardous construction and demolition waste (CDW) to substitute use of primary materials; and b) aggregates required to be imported to site comprise <1% re-used/ recycled content; and c) project sterilises ≥1 mineral safeguarding site and/ or peat resource. Waste d) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and e) >50% of project waste for disposal outside of the region.
Moderate	Material assets a) project achieves less than 70% overall material recovery/ recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and b) aggregates required to be imported to site comprise re-used/ recycled content below the relevant regional percentage target. Waste c) >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and d) 1-50% of project waste for disposal outside of the region.
Slight	Material assets

Significance	Description
	a) project achieves 70-99% overall material recovery/ recycling (by weight) of nonhazardous CDW to substitute use of primary materials; and b) aggregates required to be imported to site comprise re-used/ recycled content in line with the relevant regional percentage target. Waste c) ≤1% reduction or alteration in the regional capacity of landfill; and d) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Neutral	Material assets a) project achieves >99% overall material recovery/ recycling (by weight) of nonhazardous CDW to substitute use of primary materials; and b) aggregates required to be imported to site comprise >99% re-used/ recycled content. Waste c) no reduction or alteration in the capacity of waste infrastructure within the region.

10.3.10 Table 10-3 outlines the methodology for determining significance in line with the methodology set out in DMRB LA 110, incorporating professional judgement by the competent expert.

Table 10-3 Significance criteria for material assets and waste

Significance category	Description
Significant (one or more criteria met)	Material assets: a) category description met for moderate or large effect. Waste: b) category description met for moderate, large or very large effect
Not significant	Material assets: a) category description met for neutral or slight effect. Waste:

Significance category	Description
	b) category description met for neutral or slight effect.

10.4 Assessment Assumptions and Limitations

10.4.1 Construction of the Scheme would be carried out in accordance with industry standard good working practice. This would include the environmental measures that would be adopted during the construction phase.

10.4.2 The assessment is based on the Scheme design and takes into account the construction and operation and as such, the assessment is limited to identifying activities that are likely to require significant quantities of materials or are likely to produce significant quantities of waste. For further details on the construction sequence, see Section 2.5 Scheme Development within ES Volume 1 - Chapter 2 - Scheme Description.

10.4.3 The quantities of materials to be used for construction of the Scheme, sources of materials and their mode of transport would be finalised at detailed design. Values have been estimated based on the Scheme design.

10.5 Consultation

10.5.1 The Scoping Report has been issued to the Environmental Liaison Group that has been set up for the Scheme, which comprises a range of key Statutory Consultees. Comments received were that the scope and methodology for the material assets and waste assessment was acceptable.

10.5.2 Consulted data from Environment Agency and other relevant online sources as detailed in Section 10.5.

Consultee	Date	Form of consultation	Main issues
Environment Agency and North Somerset Council	15 June 2022	Meeting/ review of documents	Discussion around requirement for a Materials Management Plan/Site Waste Management Plan, surcharging requirements, material reuse criteria and

			importing waste and environmental permitting.

10.5.3 Consultation with the Environment Agency and North Somerset Council during Environmental Liaison Group meetings have also informed the development of the materials assets and waste assessment.

10.6 Baseline Conditions

Study Area

10.6.1 The first study area is based on the construction footprint and the Site Boundary of the Scheme (including compounds and temporary land take) which includes Banwell Village. This constitutes the area within which construction materials would be consumed (used, re-used and recycled) and waste would be generated, in accordance with ES Volume 3 - Appendix 16.A - Outline CEMP Construction Environmental Management Plan (CEMP).

10.6.2 The second study area covers an area sufficient to identify feasible sources and availability of construction materials typically required for road schemes, and suitable waste infrastructure that could accept arisings of waste generated by the Scheme. The second study area encompasses the South West of England region. This is based on Environment Agency (EA) dataset out against former planning regions and sub-regions, including Somerset, Gloucestershire, Wiltshire, Dorset, Devon, Cornwall and the West of England Unitary Authorities - formerly Bath, Bristol and South Gloucestershire (including North Somerset).

10.6.3 In addition, the second study area for resources availability for construction materials typically required for schemes of this scale and nature has been set at a UK extent.

10.6.4 Following the methodology outlined in DMRB LA 110, it is outside the scope of the assessment to assess the indirect environmental effects associated with the extraction of raw materials from their original source and the manufacture of products which occur off-site. This stage of a material's lifecycle is likely to have already

been subject to an environmental assessment. These effects are therefore not addressed in this chapter.

Current Baseline

10.6.5 In order to provide an assessment of the significance of any new development proposal (in terms of material assets and waste), it is necessary to identify and understand the baseline conditions in and around the study area. This provides a reference level against which any potential changes in material assets and waste can be assessed. The following section outlines information on the existing use of material assets and generation of waste, availability of construction materials, mining and material resources, superficial deposits, waste generation, potentially hazardous waste arisings and waste management facilities.

Material assets

10.6.6 In accordance with schedule 2 of The Waste (England and Wales) Regulations 2011[3], measures would be taken to ensure at least 70% by weight of CDW is subject to material recovery. The baseline targets for alternative aggregates (which comprise both secondary aggregates, which are by-products from industrial and mining operations, and recycled aggregates which are produced from construction waste) are set out in Table 10-4 (reproduced from the Table E/ 1.2 of DMRB LA 110). The relevant target for the Scheme in the South West region is 22%.

Table 10-4 Recycled aggregate targets for England 2005-2020 (national and regional guidelines for aggregate provision, published 2009) [1, 24]

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

Availability of manufactured construction materials

10.6.7 The Scheme would require both primary raw materials, such a stone and soil, and manufactured construction materials such as concrete, asphalt and steel.

10.6.8 In addition, information for the UK has also been provided as a

national comparison (where information is not available for the UK due to the differing governing authorities for England, Wales and Scotland, England has been used to provide the national comparison). This information has been determined through a desk study using readily available resources, including from the Minerals Products Association, International Steel Statistics Bureau, and North Somerset Council.

10.6.9 The baseline in terms of mining and mineral safeguarding is from the following sources:

a) British Geological Survey (BGS) 1:100,000 Mineral Resource map for Somerset.

b) Historical OS plans contained within the Envirocheck report (ES Volume 3 - Appendix 9.A - Preliminary Sources Study Report) (to identify the presence of historical quarries).

10.6.10 Table 10-5 outlines the South West demand, in terms of sales of minerals and mineral products in 2019. The demand for steel in 2019 was 11.2 million tonnes per annum[25].

Table 10-5 Minerals and mineral product sales in the South West, 2019 [26]

Mineral	South West demand (million tonnes)
CONSTRUCTION USES	**152.6**
Aggregates of which: Crushed rock Sand and gravel - land and marine won Recycled and secondary[27]	**30.1** 27.0 3.0 71.0
Cementitious[28]	**15.2**
Ready-mixed concrete[29]	**3.1**
Asphalt	**2.2**
Dimension stone[30]	**1.0**

10.6.11 Table 10-6 outlines the most recent publicly available information on the aggregate sales and reserves in the South West and provides an indication of theoretical capacity, using the SWRAWP (2021) Annual Report: 2020[31]

10.6.12 The main element of aggregates production in the South West is primary crushed rock from quarries in Somerset and West of England, with much smaller contributions from marine dredged sand and gravel from the Bristol Channel, landed at Avonmouth,

and from recycled aggregate (estimated).

10.6.13 Table 10-6 outlines that the South West crushed rock sales was 23.18 Mt in 2020. The 10-year average figure was 21.75 Mt with a three-year average of 24.32 Mt. Total reserves were 843.61 Mt, giving a landbank of 38.8 years based on the average annual production over the 10 year period.

10.6.14 In addition, Table 10-6 shows that the South West sand and gravel sales was 2.73 Mt. The 10-year average was 3.11 Mt with a three-year average of 2.85 Mt. Total reserves were 22.43 Mt, giving a landbank of 7.21 years based on the average annual production over the 10 year period.

Table 10-6 South West summary of sales and reserves (table below is a reproduction)[31]

	2020 Sales (Mt)	Change from 2019	10-year Sales Average (Mt per annum)	3-year Sales Average (Mt per annum)	Change from 2019	Reserves (Mt)	Change from 2019	Landbank in remaining years based on 10-year sales average	Change from 2019
All land won sand and gravel	2.73	↓	3.11	2.85	↓	22.43	↓	7.21	↓
All crushed rock	23.18	↓	21.75	24.32	↑↓	843.61	↑	38.8	↓
Marine sand and gravel	0.68	↓	0.61	0.71	↓				
Total primary aggregates	26.59	↓							
Recycled aggregates (from fixed sites only)	<1.8	↓	(data will emerge in future LAAs)	(data will emerge in future LAAs)					
Secondary aggregates	2.72	↓	(data will emerge in future LAAs)	2.72					

Mineral resources and mining

10.6.15 The Somerset area, which includes North Somerset is a nationally important source of crushed rock aggregates, predominately from the Lower Carboniferous limestones of the Mendips Hills, with a total of 15 million tonnes quarries in 2003, approximately 21% of the total production in England[32]. In 2020, Somerset's contribution to the South West's total output of crushed rock amounted to over 61%[31].

10.6.16 Limestone is an important resource for aggregates, building stone, a soil improver (agricultural lime) and is used to support other specialist industrial processes.

10.6.17 Quarrying has taken place in the Mendip Hills since the 1900s. The major producing units are situated in the Eastern Mendips at Torr Works and Whatley Quarry, both producing around 8 million tonnes of limestone aggregate per year and are rail linked[33].

10.6.18 A review of the BGS Mineral Resource Mapping[34] indicates that mineral sources of high purity limestone, limestone, dolomite and salts are located to the south of the Scheme. In addition, the mapping indicates three inactive limestone quarries (including yet to be worked, worked-out and/ or restored sites) at:

a) Sandford Quarry (approximately 3km east),
b) Shiplate Hill (approximately 4km south west) and
c) Webbington (North) (approximately 4km south) from the Scheme.

10.6.19 Two active limestone quarries are located within 10km from the scheme:

a) Callow Rock (approximately 6.5km south east) and
b) Battscombe (approximately 8km south east).

10.6.20 Stancombe Quarry is located approximately 14km north east from the scheme which produces Carboniferous Limestone, predominately used for road schemes.

10.6.21 The EnviroCheck Report (ES Volume 3 - Appendix 9.A - Preliminary Sources Study Report) records historic surface mineral extraction sites for limestone quarrying: Banwell Quarry and Knightcott Quarry.

10.6.22 Banwell Quarry is located 170m west of the Scheme, recorded as a BGS Site and comprised of opencast limestone extraction. The Envirocheck report indicates this quarry now comprises an infilled feature, and through correspondence with the Environment Agency, it has been confirmed that this feature has since been infilled between 1984 and 1988 and now comprises a historical landfill.

10.6.23 Knightcott Quarry is located 1.3 north west of the Scheme, and was infilled by the 1970s and replaced with residential dwellings.

10.6.24 The quarries were open cast; therefore the risk of unrecorded underground workings is low.

10.6.25 There are no infilled ground features (pit/ quarry) within the Scheme boundary. A total of seven unknown filled ground features (pit/ quarry) have been identified within 500m, and two man made mining cavities associated with the extraction of iron ore have been recorded within 1km of the Scheme through the EnviroCheck. Further detail is found in ES Volume 1 – Chapter 9 – Geology and Soils.

10.6.26 The site is underlain by strata of the Penarth Group, Blue Lias Formation, Charmouth Formation and Mercia Mudstone, alongside made ground and clay. Further detail is found in ES Volume 1 - Chapter 9 - Geology and Soils.

10.6.27 Igneous Silurian rocks in the form of Andesite and Tuff can also be found centrally within the Mendips Hills. Andesite is a good material for road surfacing as it is strong, durable and resistant to polishing with a high polished stone value [33].

10.6.28 A single quarry, Moons Hill Quarry complex, works an igneous rock resource which produces road surfacing aggregates and general construction aggregate[35].

10.6.29 In the past, many minerals have been extracted in Somerset, including clay, gypsum, barytes, iron, lead, salt and coal. Extracted of all these has ceased and there are no plans to recommence extraction[35].

10.6.30 The Scheme lies within an area identified by the Coal Authority as a Surface Coal Resource Area; an area whereby coal resources are capable of being extracted by surface mining

methods [36]. Based on an understanding of the geology of the local area it is considered highly unlikely that coal bearing strata outcrop close to the surface within the vicinity of the study area. Further detail is found in ES Volume 1 - Chapter 9 - Geology and Soils.

10.6.31 There are no Mineral Safeguarding Areas (MSAs) within the first study area. Within the second study area, there is an MSA for Limestone in Backwell and an MSA for Coal in Barrow Gurney, both approximately 14km to the north east [37].

10.6.32 Superficial deposits comprising Tidal Flat Deposits of clays, silts and sands, and bands of peat are recorded from the ground investigation. No superficial deposits are expected to be found beneath the Scheme. Further details are included in ES Volume 1 – Chapter 9 - Geology and Soils.

Waste

10.6.33 The most recent information available relating to current waste generation and operational waste facilities in the South West of England has been gathered to provide the baseline for this assessment. Information on the current waste arisings, and the waste management facilities have been determined through a desk-top study using a number of readily available resources, in particular data from the Environment Agency.

Waste generation

10.6.34 The latest data from the Environment Agency[38] indicates that South West England received 19,604,204 tonnes of waste in 2020. Table 10-7demonstrates the types of waste produced.

Table 10-7 Waste received in 2020 by waste category in South West of England [38]

Waste category	South West England (tonnes)
Hazardous	450,091
Household / industrial / commercial	11,784,744
Inert / construction and demolition	7,369,369
Total	**19,604,204**

10.6.35 With respect to CDW, Table 10-8outlines the latest information for South West England from Environment Agency data. These

figures indicate that 7,094,793 tonnes of waste was received in South West England (as per the site types below) in 2020.

Table 10-8 Inert CDW received in the South West England in 2020[38]

Site located in	Tonnes
West of England (Bath, Bristol, South Gloucestershire and North Somerset)	1,874,378
Cornwall	407,606
Devon	1,570,734
Dorset	776,214
Gloucestershire	811,433
Somerset	558,179
Wiltshire	1,076,250
Total	**7,094,793**

Potential hazardous waste arisings

10.6.36 Potential sources of contamination have been considered within the study areas. One historic landfill is located within the first study area. 'Adjacent to Bow Farm' historic landfill is located within the Scheme area adjacent to the River Banwell, recorded to accept inert and industrial waste. Further detail is found in ES Volume 1 - Chapter 9 - Geology and Soils.

10.6.37 Based on Environment Agency data, 60,499 tonnes of construction and demolition hazardous waste was handled in the South West of England in 2020[38].

10.6.38 See ES Volume 1 - Chapter 9 - Geology and Soils for more information on potential contamination risks.

Waste management infrastructure (off-site)

Landfill

10.6.39 The Environment Agency Waste Data Interrogator uses data on the quantities and types of waste that operators of regulated waste management facilities deal with. Table 10-9 outlines the breakdown of landfill waste in 2020 in the South West.

Table 10-9 Landfill inputs in the South West in 2020[39]

Material type	Quantity (tonnes)
	South West
Hazardous Merchant	50,000
Hazardous Restricted	-
Non-Hazardous with Stable Non-Reactive Hazardous Wastes (SNRHW) cell	415,000
Non-Hazardous4	1,092,000
Non-Hazardous Restricted	-
Inert	1,339,000
Total	2,896,000
Table Notes Data since 2005 has been reclassified into categories used under the PPC permitting of landfills and because of the ban on the co-disposal of waste in landfills in July 2004. From 16 July 2004, hazardous landfills have only been able to accept wastes classified as hazardous under the Hazardous Waste Directive. Some non-hazardous sites can accept some Stable Non Reactive Hazardous Wastes (SNRHW) into a dedicated cell, but this is usually a small part of the overall capacity of the site. The above data do not include waste received by closed landfills for restoration purposes.	

10.6.40 In addition to permitted construction and demolition waste management sites, inert material is also managed on sites that have an Environment Agency environmental permit exemption. These exempt sites generally comprise land restoration activities such as restoring mineral voids, engineering or landscaping schemes and for beneficial improvements to land. They are an important part of the provision of the capacity for managing inert materials. Although small tonnages of waste from other waste streams (e.g., biodegradable waste) may be managed at locations with an exemption, the largest tonnage of exempt activities is likely to involve construction and demolition material.

10.6.41 Data produced by the Environment Agency states that the remaining landfill capacity at the end of 2020 in the South West amounted to 29,620,030m^3 as shown in Table 10-10.

Table 10-10 Remaining landfill capacity in the South West at the end of 2020[40]

Local authority	Site type	Remining capacity (m^3)
Bath, Bristol and South Gloucestershire	L04 - Non Hazardous	97,464
	L05 - Inert Landfill	8,190,506

Local authority	Site type	Remining capacity (m^3)
Cornwall	L04 - Non Hazardous	1,501,933
	L05 - Inert Landfill	213,658
Devon	L02 – Non hazardous Landfill with SNRHW cell	47,921
	L04 - Non Hazardous	649,327
	L05 - Inert Landfill	2,500,102
Dorset	L05 - Inert Landfill	1,489,999
Gloucestershire	L01 - Hazardous Merchant Landfill	1,024,997
	L02 - Non Hazardous Landfill With SNRHW cell	1,468,105
	L04 - Non Hazardous	915,713
	L05 - Inert Landfill	5,224,655
Somerset	L02 - Non Hazardous Landfill With SNRHW cell	1,083,236
	L04 - Non Hazardous	314,000
Wiltshire	L01 - Hazardous Merchant Landfill	284,633
	L02 - Non Hazardous Landfill With SNRHW cell	882,313
	L04 - Non Hazardous	3,700,000
	L05 - Inert Landfill	31,468
Total		**29,620,030**

10.6.42 The Joint Waste Core Strategy refers to an indicative recovery capacity requirement of 800,000 tonnes per annum to be provided within the sub-region by 2020.

10.6.43 North Somerset's existing waste infrastructure includes a waste Transfer Station and an Anaerobic Digestion plant. Capacity of the infrastructure is stretched due to demand, with future plans to include a new depot and waste transfer station in Weston-super-Mare[41].

10.7 Predicted Environmental Effects

10.7.1 There is potential for the following effects from material resources and waste arising to occur during construction of the Scheme:

a) Effects from on-site generated materials (e.g., soils) and waste arisings have on the existing capacity of landfill.

b) Effects from the use of primary (i.e., non-recycled) material resources used for construction.

10.7.2 Standard good practice mitigation measures are being embedded into the design and construction of the Scheme which are set out below.

Embedded Mitigation

10.7.3 Embedded mitigation involves project design principles adopted to avoid or prevent adverse environmental effects. Embedded mitigation relating to material assets and waste includes minimising imported fill and maximising reuse of site won materials (e.g., topsoil).

10.7.4 The following mitigation measures would be implemented during detailed design and construction phases:

a) Design for re-use, recovery and materials optimisation.

b) Confirmation of types and quantities of materials, alongside information on materials that contain secondary and recycled content would be developed following detailed design.

c) Opportunities to re-use material resources would be sought.

d) Opportunities to support the circular economy would be considered.

10.7.5 ES Volume 3 - Appendix 16.A - Outline CEMP contains measures to ensure that contamination material is addressed during construction and unacceptable risks are mitigated. Further details are provided in ES Volume 1 - Chapter 9 - Geology and Soils.

10.7.6 The following waste management measures are documented in ES Volume 3 - Appendix 16.A – Outline CEMP to minimise the likelihood of any localised impacts of waste on the surrounding environment:

a) Damping down of surfaces during spells of dry weather and brushing or water spraying of heavily used site entrances or tracks.

b) Off-site prefabrication where possible.

c) Burning of waste or unwanted material is not allowed.

d) Hazardous waste including fuels, chemicals, cleaning agents or solvent products to be kept in sealed containers and stored appropriately.

e) All contaminated materials encountered on site to be dealt with through further ground investigations and specific risk assessments (as per ES Volume 1 - Chapter 9 - Geology and soils).

f) Waste arisings requiring removal from the site would be transported using licensed carriers and records would be kept detailing the types of waste arisings moved.

Construction compounds

10.7.7 The location of the construction compounds have been determined to prevent pollution, reduce waste and to encourage ease of use, taking into account environmental considerations including the potential for leakage and contamination. Storage of any suspected contaminated material prior to treatment or disposal off-site would be in a designated, bunded area on an impermeable surface, in line with the requirements set out in the ES Volume 3 - Appendix 16.A – Outline CEMP. The location of the construction compounds is shown in ES Volume 2 - Figure 2.1 - Banwell Bypass General Arrangement Drawings.

10.7.8 There would be four construction compounds including one main compound. The main compound would be located at the western end of the project, adjacent to the A371 – Knightcott Road (Chainage (Ch) 00+000. This is where the majority of staff would be located during the construction phase.

10.7.9 To reduce the distance between the River Banwell and Riverside Road crossing structure and where material would be processed, River Banwell Bridge compound would be provided for the bridge construction, located in the fields on the west side of the new alignment that crosses the River Banwell Ch 1900. This compound will provide hard standing areas for craneage, storage and deliveries, together with the temporary works equipment required for the bridge construction.

10.7.10 Satellite compounds for the Banwell Bypass construction, providing welfare facilities for staff are located at the following locations:

a) Wolvershill Road Satellite compound - located at the junction with Wolvershill Road (Ch 750); and

b) Eastern Satellite compound - adjacent to the A368 Towerhead Road (Ch 050)

Materials

10.7.11 The management of material resources will be governed by the production of a MMP, in accordance with best practice requirements and the controls for material management and storage. This approach for managing materials is consistent with the waste hierarchy defined in the Waste (England and Wales) Regulations 2011.

10.7.12 Material imported to site will either be imported in line with the CLAIRE Code of Practice or the Waste and Resource Action Programme (WRAP) protocol.

10.7.13 Any material imported for surcharging will be reused within the Scheme, with none exported offsite.

Waste

10.7.14 A SWMP will be prepared in accordance with best practice guidance (WRAP). The SWMP outlines the proposals for the identification, segregation, handling and storage of wastes identified as arising from the Scheme.

10.7.15 The WRAP and Environment Agency Quality Protocol: Aggregates from inert waste would be followed with respect to the production and use of aggregates from inert waste.

10.7.16 It may be necessary to remove some unsuitable and excess materials deemed as waste from site which would result in impacts on waste management infrastructure and the local road network. When applying the waste hierarchy, measures would be implemented to ensure the options that deliver compliance with the Waste (England and Wales) Regulations 2011 to ensure the best environmental outcome.

10.7.17 The handling of materials should be in accordance with the CL:AIRE Definition of Waste: development Industry Code of Practice. Where practicable, the following approaches would be implemented to minimise the quantities of waste requiring disposal:

a) Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme.

b) Implementation of just-in-time material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste.

c) Attention to material quantity requirements to avoid over-ordering and generation of waste materials due to surplus.

d) During site clearance and construction re-use of materials wherever feasible e.g., re-use of excavated soil for earthwork embankments and landscaping.

e) The materials would be sorted or processed and where necessary, treated. Where materials excavated on-site are initially unable to meet the re-use criteria, they would either be treated to make them suitable for use or, as a last resort, disposed off-site as waste.

f) Segregation of waste at source where practical.

g) The Scheme would be designed to maximise the earthworks balance.

h) Re-use of materials within construction for example. Re-use of pavement planning in subbase in footpaths.

i) Re-use and recycling off-site where re-use on-site is not practical.

j) Majority of material storage locations would be located outside flood plain areas, except for key aspects such as topsoiling storage and the construction compound for the River Banwell bridge.

10.7.18 The potential effects from material assets and waste are outlined below in relation to construction and operation.

Construction impacts

Material asset impacts

10.7.19 Material assets include both primary raw materials, such as aggregates and minerals, and secondary manufactured products. Many material assets would originate off-site and some, such as excavated soils and rock, would arise on-site.

10.7.20 Road schemes require both primary raw materials and secondary manufactured products. The production, sourcing, transport, handling, storage and use of these materials, as well as the disposal of any surplus (where necessary), have the potential to adversely affect the environment.

10.7.21 The consumption of materials has the potential to result in direct and indirect impacts on the environment. For material asset use, the potential environmental impacts are associated with the sourcing of primary raw materials, the sourcing of secondary products and their subsequent use during construction. There are also potential environmental impacts associated with the site won material, such as the requirement to store and possibly process any materials during construction.

10.7.22 The manufactured construction materials would be sourced from established suppliers who regularly provide materials for similar sized projects. The suppliers have not yet been determined but the Contractor would ensure that they are suppliers with adequate resources to meet the quantitative needs of the Scheme, without having a negative influence on their resources. Where appropriate resources are available, materials would be provided from local sources, although the Contractor would work to ensure a balance with the value for money principle.

10.7.23 The types of materials required for the construction phase of the Scheme are listed in Table 10-11, these would be refined during detailed design.

Table 10-11 Material assets required

Scheme activity	Detail of likely material assets required for the Scheme	Quantities of material assets required or dimension and length	Additional information on material assets
Earthworks	General fill materials for embankment construction	155,756m^3	It is estimated that 57,796 m^3 of site won material will be suitable for reuse. The estimated import of general fill will be 97,960 m^3
	Landscape fill	8,500 m^3	It is estimated that all 8,500 m^3 of landscape fill be reused on site
Installation of pavement	Mainline and side roads and Central reserve (including sub-base, base, binder course and surface course)	24,414m^3	

Scheme activity	Detail of likely material assets required for the Scheme	Quantities of material assets required or dimension and length		Additional information on material assets
	Other concrete pavement, footpaths or maintenance access	3,464.2m^3		
Installation of manufactured products	Steel restraint systems	Single sided steel RRS	1,360m	
		Parapets N1 1.4m high	200m	
		Terminals	10no.	Assume 12m long
	Drainage	150 to 450mm diameter uPVC drain	2,533m	
		225mm filter drain	4,000m	
		Aggregate for drains	11,106 tonnes	
		Connection to existing drain and culvert	25no.	
		Connection to existing chamber	25no.	
		Precast concrete chamber 1200 to 1350mm diameter with D400 manhole cover and frame depth to invert 3 to 6 metres	140no.	
		Headwall - R20B 10 2450 750mm diameter	20 no.	
	Traffic signs (varying in size from 0.5m^2 to 25m^2)	50 no.		
	Traffic signals	34 no.		
	Precast concrete kerbs	4,769m		Assume 125x255mm
	Precast concrete drainage kerbs	3,755m		Assume 125x255mm

Scheme activity	Detail of likely material assets required for the Scheme	Quantities of material assets required or dimension and length	Additional information on material assets
	Precast concrete edgings	9,325m	Assume 125x150mm
	Timber post and rail fencing	10,575m	4 rail fencing, 1.4m high. Post every 1.8m
	Stock fencing (Steel wire)	2,239m	
	Road lighting columns	134 no.	Assume 8m aluminium
Structures	Pre-cast concrete	2,705 tonnes	
	General C40/ 50 concrete	11,548 m3	
	General C32/ 40 concrete	34 m3	
	Blinding concrete	45.5 m3	
	Precast concrete piles	305 tonnes	
	Reinforcement steel	419 tonnes	

10.7.24 The section below denotes the likely effects on material reuse, aggregates and sterilisation of resources from the Scheme, in line with DMRB LA 101.

Material reuse

10.7.25 The Scheme has been designed to maximise the reuse of site won material to reduce the quantity of imported construction materials, alongside reducing the quantities of waste taken off-site.

10.7.26 The Scheme involves at least 90% earthworks material recovery rate with material won on-site from excavations is likely to be re-used on site as general fill for embankments and topsoil.

10.7.27 The preliminary scheme cut, fill and surplus quantities which arise from the earthwork figures are outlined in Table 10-12.

Table 10-12 Preliminary scheme design earthworks estimates

Scheme section	Cut (m^3)	Fill (m^3)
Mainline, western roundabout, WCH route, NMR riverside, swale 1-6, western junction, moor road, wolvershill road (Sections 0 – 6 Mainline)	30,388	141,824
Southern link, Southern link junction, southern link north side road, eastern junction (Section 6 -8)	10,523	10,312
Attenuation Basins	10,273	3,617
Floodplain compensation areas	16,488	3
Sub total	**67,672**	**155,756**
Landscape fill		8,500
Unsuitable material (removal from site)	155	-
Running total	**67,517**	**164,256**
Total	**96,739 deficit**	

10.7.28 As shown in Table 10-12, more fill will be required than can be obtained from cuts. At this stage it is assumed that 155m^3 of cut will be unsuitable for use and may need to be removed from site as waste. It is assumed that all landscape fill would be reused on site.

10.7.29 The contractor would seek to re-use as much material as possible, with an aim for 70-99% overall material reuse. This would be detailed within the MMP.

10.7.30 Therefore, the assessment of effects on material reuse is considered *slight* and *not significant*.

Aggregates required

10.7.31 Aggregates required to be imported to site will be obtained from recycled aggregated sources as far as possible. With any shortfall in volumes sourced from Stancombe Quarry. As shown in Table 10-12, there is a deficit of an estimated 96,739 m^3 for the earthworks balance, which will need to be imported.

10.7.32 Within the SWRAWP (2021). Annual Report: 2020[31], the landbank for crushed rock was 843.61million tonnes (351,504,167m^3 based on a rock density of 2400kg/ m^3), equivalent to crushed rock aggregate reserves being able to meet project demand for 37.97 years.

10.7.33 The import of 96,739 m^3 is approximately 0.03% of the crushed rock aggregate reserves available in the South West of England. Material would be imported to site in line with the recycled content target for the South West of a minimum of 22% by the contractor, as defined in ES Volume 3 - Appendix 16.A – Outline CEMP.

10.7.34 Therefore, the assessment of effects on aggregates is considered *slight* and *not significant*.

Sterilisation of resources

10.7.35 As outlined in paragraph 10.6.30 there are no MSAs within the Site Boundary.

10.7.36 Earthworks embankments will be constructed from recycled aggregate sources as far as possible, with any shortfall in volumes sourced from Stancombe Quarry.

10.7.37 Therefore, the assessment of effects on mining and material resources is considered *neutral* and *not significant*.

Waste impacts

10.7.38 The estimated main types and quantities of waste generated during construction of the Scheme and the potential recovery rates are shown in Table 10-13.

Table 10-13 Estimated waste arisings

Scheme activity	Likely waste from the Scheme	Quantity (tonnes)	Quantity (m^3)	Potential management routes	Recovery rate (%)	Non recoverable waste to landfill	Recyclable/ Recoverable waste
Site remediation, preparation or earthworks	Contaminated soil		155	Contaminated unacceptable U2 material to tip or treatment hub	0%		
	Vegetation/ hedgerow removal arising from site clearance		1600 m	All assumed to keep and re-use on-site, or undertake off-site composting	100%		
	Tree felling	313		All assumed to keep and translocate on-site, or undertake off-site composting	100%		313 t/549m^3 (assumed density 570 kg/m^3)
Demolition	Asphalt from removal of existing road, some of which may contain coal tars	4304		Off-site recycling or disposal depending on coal tar content	95%	215 t/197 m^3 (assumed density 1090 kg/ m^3)	4089 t /3751 m^3 (assumed density 1090 kg/m^3)
	Materials from demolition of buildings	168		Segregated during demolition to allow for off-site	75%	42 t/23 m^3 (assumed density 1800	126 t/70 m^3 (assumed density 1800

Scheme activity	Likely waste from the Scheme	Quantity (tonnes)	Quantity (m^3)	Potential management routes	Recovery rate (%)	Non recoverable waste to landfill	Recyclable/ Recoverable waste
				recycling or disposal		kg/ m^3)	kg/m^3)
Construction	Concrete (ready mixed)	558		Off-site recycling or disposal	95%	28 t/ 11.6 m^3 (assumed density 2400kg/ m^3)	530 t/221 m^3 (assumed density 2400kg/m^3)
	Concrete (products) e.g. precast concrete kerb (includes existing kerbs removed but not re-used)	357		Off-site recycling or disposal	95%	18 t/7 m^3 (assumed density 2400kg/ m^3)	339 t/141 m^3 (assumed density 2400kg/m^3)
	Steel	0.7		Off-site recycling or disposal	100%		0.7 t/0.1 m^3 (assumed density 7800kg/m^3)
	Asphalt and bituminous material	1,908		Off-site recycling or disposal	95%	95t/ 87.5 m^3 (assumed density 1090 kg/ m^3)	1,813t/ 1663m^3 (assumed density 1090 kg/ m^3)
	Aggregates	963		Off-site recycling or disposal	95%	48 t /22m^3 (assumed density 2200 kg/ m^3)	915 t/ 416 m^3 (assumed density 2200 kg/ m^3)
	Plastic	0.1		Assumed landfill		0.096 t/0.1 m^3 (assumed	

Scheme activity	Likely waste from the Scheme	Quantity (tonnes)	Quantity (m^3)	Potential management routes	Recovery rate (%)	Non recoverable waste to landfill	Recyclable/ Recoverable waste
						density 940 kg/ m^3)	
	Mixed metals	4		Assumed landfill		4.15 t/ 0.5 m^3 (assumed density 7800 kg/m3)	
	Timber/ plywood e.g., from work and shutting to cast concrete	6		Off-site recycling or disposal	90%	0.6 t /1.2 m^3 (assumed density 520 kg/ m^3)	5.4 t/10.38 m^3 (assumed density 520 kg/m^3)
Waste from the compounds	General office waste/ construction worker waste	Domestic waste is considered to be minimal		Off-site recycling or disposal	85%		
	Packaging from materials delivered to site	Packaging is considered to be minimal		Taken back by suppliers for re-use or recycling, sorted and taken off-site for recycling or disposal	85%		
Total						**451t/ 350m^3**	**7,817t/ 6,272m^3**

10.7.39 Measures would be implemented to ensure waste is handled in accordance with the Waste (England and Wales) Regulations 2011 to ensure the best environmental outcome. The Scheme would re-use as much material as possible on-site, if suitable for re-use. Testing would be undertaken during construction to confirm the materials meet the specification requirements, which would be developed in line with the CL:AIRE Definition of Waste; Development Industry Code of Practice. This would ensure excavated material can be used directly within the development, subject to being suitable for use or following site treatment. Any material that does not meet this specification would be disposed of appropriately.

10.7.40 Some site won materials would not be required for re-use on site and, where this is the case, efforts would be made to reduce the need to export this to local waste management facilities.

10.7.41 Potential wastes from the Scheme, such as contaminated materials likely to be present within the 'Adjacent to Bow Farm' historic landfill, are detailed in Table 10-13.

10.7.42 Should hazardous waste be encountered during construction, this would be handled at storage compounds, prior to transfer to external waste management sites. Non-hazardous materials would be segregated and appropriately re-distributed to alternative projects or re-distributed to waste management facilities.

10.7.43 Should any asbestos be found on-site during construction, demolition and excavation works, the contractor would treat this as hazardous waste and assess the risk of those materials to ensure that a management system is in place that responds correctly and appropriately to the materials present.

10.7.44 Construction of the Scheme is expected to generate 451t/ 350 m^3 of waste arisings.

10.7.45 The remaining landfill capacity in the South West for all non-hazardous and hazardous waste as determined by the Environment Agency is 29,620,030m^3 [40]. Based on a worst-case scenario, whereby all estimate waste arisings generated by the Scheme would be disposed of at the landfill, this would utilise approximately 0.001% of the landfill capacity. In practice, a larger proportion of waste produced by the Scheme would likely be

reprocessed or recycled rather than being disposed of in a landfill, therefore, further reducing the quantities of waste produced.

10.7.46 The Scheme accounts for a less than 1% reduction or alteration in the regional capacity of waste management infrastructure, and there is adequate disposal capacity in the South West (although in practice, a large amount of this waste would be reprocessed or recycled).

10.7.47 The location of waste management facilities for construction and demolition waste within the second study area are shown in Figure 10.1. This figure includes the different types of waste infrastructure facilities, with data gathered from the Environment Agency[42].

10.7.48 Overall, there would be a limited amount of waste that would be removed from site and therefore it is unlikely that waste would be disposed of outside the region. Therefore, the assessment of effects on waste management infrastructure is *slight* and *not significant.*

Operational impacts

10.7.49 Roads are subject to a periodic maintenance regime, and DMRB CD 226 design for new pavement construction[43] highlights that all new roads are built to a 40-year design life. DMRB 110 states:

"The environmental assessment for material assets and waste shall report on the construction phase and first year of operational activities (opening year)."

10.7.50 Significant effects are considered unlikely during the operation of the Scheme, from both the use of material assets and the recovery or disposal of waste. As such, operational impacts have been scoped out of the assessment, in accordance with the WSP EIA Combined Scoping and Screening Report (ES Volume 3 – Appendix 1.A - Glossary and Appendix) and NSC Local Planning Authority Scoping Opinion Report (ES Volume 3 - Appendix 1.B - WSP EIA Combined Scoping and Screening Report).

10.8 Proposed Mitigation and Enhancement Measures

Proposed Mitigation

10.8.1 All required mitigation in relation to material assets and waste has been embedded into the design of the Scheme. Therefore, it is considered that no further mitigation is required to mitigate effects from the construction of the Scheme on the environment.

Enhancement

10.8.2 No enhancement measures have been included in the Scheme related to material assets and waste.

10.9 Residual Environmental Effects (following mitigation)

10.9.1 This section assesses the residual effects of the material assets used and waste generated during the construction of the Scheme. In accordance with the applied methodology, the assessment of effects has been undertaken based on a reasonably worst-case scenario, but it is reasonable to assume could occur, rather than an extreme scenario that is on balance unlikely.

Construction effects

10.9.2 Construction impacts have been discussed in Section 10.7, with mitigation embedded into the Scheme design. Therefore, there are considered to be no predicted significant effects from construction of the Scheme. Table 10-14 summaries the construction effects.

Table 10-14 Construction Effects

Construction Effect		Impact on Construction Effects
Material asset impacts	**Material reuse**	Slight and not significant
	Aggregates	Slight and not significant

Construction Effect		Impact on Construction Effects
	Sterilisation of resources	Neutral and not significant
Waste impacts		Slight and not significant

Operation effects

10.9.3 As discussed in paragraph 10.10.49, operational impacts have been scoped out of the assessment in accordance with the NSC Local Planning Authority Scoping Opinion Report (Appendix 1.B).

Potential effects due to climate change

10.9.4 Climate change impacts which have the potential to impact on receptors in combination with the impacts of the proposed development have been considered. The impacts with potential to impact on receptors include an increase in frequency of extreme weather events, in particular flood events.

10.9.5 An increase in frequency of extreme flood events could pose a risk to materials used during construction. For example, extreme flood events could impact excavated soils, turning valuable stockpile into waste but this is considered unlikely. Stockpiles on site will be managed in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[44] which will ensure that soil stripping takes place in dry conditions. The stockpiles will also be monitored during wet conditions to prevent loss of materials in the event of onsite flooding.

10.9.6 An increase in frequency of extreme flood events could result in a reduction in accessibility to primary material sources and/ or a loss and reduction in the quality of available primary material sources required during operation. These extreme flood events may also reduce availability of waste products to be re-used or recycled on site. The materials and waste will be managed on site in accordance with the SWMP, thereby reducing any effects caused by extreme flood events.

10.10 Monitoring

10.10.1 In line with the methodology in DMRB LA 110, the assessment provides a framework for assessing and managing the effects associated with the use of material assets and the recovery or disposal of waste by promoting:

a) Reduction in overall impacts and improvements in the efficiency of resource use.

b) Prevention and/ or reduction of adverse effects associated with the generation and management of waste.

10.10.2 Procedures would be adopted by the contractor during construction to control the use of materials and further reduce the impact. This would be controlled and monitored through updates to the CEMP and the MMP. The contractor would ensure environmental permitting requirements are met and solutions are developed to reduce conflict and delays.

10.10.3 Materials would be responsibly sourced (i.e., must have a certified provenance, traceability and sustainability) in order to reduce the impact on the highways network and material assets. Responsible sourcing is defined in BS890232 Responsible sourcing sector certification schemes for construction projects – Specification as:

"the management of sustainable development in the provision or procurement of a product."

10.10.4 Sustainable development is further defined as:

"an enduring, balanced approach to economic activity, environmental responsibility and social progress."

10.10.5 In order to comply with responsible sourcing principles, the contractor would, for example:

a) Refer to standard BES 6001 – Responsible Sourcing of Construction Products.

b) Ensure suppliers are certified by the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC).

10.10.6 The CEMP would set out monitoring to be undertaken during the construction stage to ensure that the mitigation measures embedded in the Scheme design are secured and implemented.

Summary and Conclusions

10.10.7 This chapter has considered the potential environmental effects associated with the use of material assets and waste, following the methodology in DMRB LA 110. The Scheme is compliant with all relevant legislation and policy for material assets and waste.

Construction assessment

10.10.8 In summary, there are considered to be no predicted significant effects from construction of the Scheme.

Operational assessment

10.10.9 As discussed in paragraph 10.10.49, operational impacts have been scoped out of the assessment in accordance with the NSC Local Planning Authority Scoping Opinion Report (Appendix 1.B).

References

10.13.1 [1] DMRB LA 110 Revision 0 Sustainability and Environment. Appraisal. Material assets and waste (2019)

10.13.2 [2] Environmental Protection Act (EPA) 1990 (Duty of Care)

10.13.3 [3] The Waste (England and Wales) Regulations 2011 (S.I. 2011 No. 988)

10.13.4 [4] The Controlled Waste (England and Wales) Regulations 2012

10.13.5 [5] The Hazardous Waste (England and Wales) Regulations 2005

10.13.6 [6] Waste (Circular Economy) Regulations 2020

10.13.7 [7] The Environmental Permitting (England and Wales) Regulations 2016

10.13.8 [8] Environmental Protection Act 1990

10.13.9 [9] Environment Act 1995

10.13.10 [10] Finance Act 1996

10.13.11 [11] Waste Minimisation Act 1998

10.13.12 [12] Waste and Emissions Trading Act 2003

10.13.13 [13] Clean Neighbourhoods and Environment Act 2005

10.13.14 [14] Environmental taxes, reliefs and schemes for businesses. [Online]. Available: https://www.gov.uk/gerr-taxes-and-reliefs/aggregates-levy

10.13.15 [15] Department for Environment Food & Rural Affairs, Waste Management Plan for England (2021)

10.13.16 [16] Department for Environment Food & Rural Affairs, Our waste, our resources: A strategy for England (2018)

10.13.17 [17] Department for Communities and Local Government, National Planning Policy for Waste (2014)

10.13.18 [18] Ministry of Housing, Communities and Local Government.

National Planning Policy Framework (2021)

10.13.19 [19] West of England Partnership (2011). West of England Joint Waste Core Strategy

10.13.20 [20] North Somerset Council. North Somerset Local Plan (2012)

10.13.21 [21] North Somerset Council. Core Strategy (2017)

10.13.22 [22] North Somerset Council. Sites and Policies Development Plan Document (2016)

10.13.23 [23] CL:AIRE. The Definition of waste: Development Industry Code of Practice, Version 2, no. 60. (2011)

10.13.24 [24] Ministry of Housing, Communities & Local Government (Gov.UK). Communities and Local Government. ISBN 978-1-4098-1589-1, 'National and regional guidelines for aggregates provision in England 2005-2020' (2009)

10.13.25 [25] International Steel Statistics Bureau (2021). 2019 UK Steel raw steel production

10.13.26 [26] MPA, 2020. Profile of the UK Mineral Products Industry; 2020 Edition. Mineral Products Essential for the Economy and Out Quality of Life. https://www.mineralproducts.org/MPA/media/root/Publications/2021/Profile_of_the_UK_Mineral_Products_Industry_2020_Spread.pdf

10.13.27 [27] Data for Recycled and secondary aggregates is only available for the UK in 2018.

10.13.28 [28] Data for Cementitious minerals is available for Great Britain only.

10.13.29 [29] Converted using 2.38 tonnes per cubic metre of ready-mixed concrete.

10.13.30 [30] Data for Dimension stone is only available for Great Britain in 2014.

10.13.31 [31] South West Aggregates Working Party (2021). Annual Report: 2020. Available online at: https://assets.publishing.service.gov.uk/government/uploads/sy

stem/uploads/attachment_data/file/201196/SWRAWP_Report_10_Final_WEB.pdf

10.13.32 [32] Benham, A J, Harrison, D J, Bloodworth, A J , Hobbs, S F, Cameron, D G, Spencer, N A, Evans, D J, Lott, G K, and Highley, D E (2005). Mineral Resource Information in Support of National, Regional and Local Planning: Somerset (comprising Somerset, North Somerset, Bath and North East Somerset, the City of Bristol, and part of Exmoor National Park). British Geological Survey - Commissioned Report, CR/04/214N. Available online at: http://nora.nerc.ac.uk/id/eprint/509793/1/CR04214N.pdf

10.13.33 [33] Somerset County Council with Exmoor National Park Authority. 'Somerset Local Aggregate Assessment'. Fifth Edition. Incorporating data from 2007 - 2016. Minerals and Waste Development Framework (2016)

10.13.34 [34] Benham, A J, Harrison, D J, Cameron, D G, Hobbs, S F, Evans, D J, Lott, G K, Bloodworth, A J, Ellison, R A and Highley, D E. (2005). 'Mineral Resources of the South West of England Region'. Mineral Resource Information in Support of National, Regional and Local Planning: Somerset (comprising Somerset, North Somerset, Bath and North East Somerset, the City of Bristol, and part of Exmoor National Park). British Geological Survey Commissioned Report, CR/04/214N. Available online at: https://www2.bgs.ac.uk/mineralsuk/download/england/somersetMap.pdf

10.13.35 [35] Somerset County Council. Somerset Minerals Plan: Development Plan Document up to 2030 (2015)

10.13.36 [36] The Coal Authority (2021). The Coal Authority Interactive Map Viewer. Available online at: http://mapapps2.bgs.ac.uk/coalauthority/home.html

10.13.37 [37] North Somerset Council (2022). Policies Map. Available online at: http://map.n-somerset.gov.uk/PoliciesMap.html

10.13.38 [38] Environment Agency (2021). Waste Data Interrogator 2020 – Wastes Received. Version 1. Available online at: https://environment.data.gov.uk/portalstg/home/item.html?id=f11654b533574f4cbedd4f15b2691f5f

10.13.39 [39] Environment Agency (2021). Waste Management Information

2020 – South West Planning Region

10.13.40 [40] Environment Agency (2021). Remaining Landfill Capacity 2020. Version 1. Available online at: https://environment.data.gov.uk/portalstg/home/item.html?id=dc5ca7a937d34844b7e37e8bb8e6a360

10.13.41 [41] North Somerset Council (2021). Our Recycling Centres. Available online at: https://www.n-somerset.gov.uk/my-services/bins-recycling/recycling-centres/our-recycling-centres

10.13.42 [42] North Somerset Council (2021), Draft Recycling and Waste Strategy. Available online at: https://n-somerset.inconsult.uk/gf2.ti/-/1273090/105018757.1/PDF/-/30337_Final___Recycling_and_waste_strategy_ACC.pdf

10.13.43 [43] DMRB CD 226 Revision 0.1.0 Pavement Design. Design for new pavement construction (2021)

10.13.44 [44] Department for Environment, Food and Rural Affairs (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf