A66 Northern Trans-Pennine Project
TR010062

2.7 Environmental Management Plan Annex B2 Outline Site Waste Management Plan

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2.7 ENVIRONMENTAL MANAGEMENT PLAN ANNEX B2 OUTLINE SITE WASTE MANAGEMENT PLAN

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B2 Outline Site Waste Management Plan

B2.1 Introduction

B2.1.1 This outline Site Waste Management Plan (SWMP) has been developed on behalf of National Highways for the A66 Northern Trans-Pennine project (the Project).

B2.1.2 In line with the environmental aspirations of the Project and the requirements specified in Environmental Statement (ES) Volume 2 (Main Report) Chapter 12: Material Assets and Waste (Application Document 3.2), this document constitutes the outline SWMP at the preliminary design stage.

B2.1.3 A SWMP is used to plan, implement, monitor and review resource efficiency and waste management on a construction site. At outline (preliminary design) stage the SWMP is used to record how waste is prevented, minimised, re-used, recycled and disposed of on a construction site.

B2.1.4 The outline SWMP will be refined by the Principal Contractor(s) (PC(s)) as the Project progresses. The SWMP will be a live document, reviewed and updated regularly throughout the Project. The responsibilities of the PC(s) are outlined in Section B2.7. There is an overarching Environmental Management Plan (EMP) and this will include separate plans for the different PC(s). The SWMP will be certified as part of the EMP and any SWMP produced by the PC(s) will be based on and in alignment with that certified document.

B2.2 The Project

B2.2.1 The Project is being progressed by National Highways. The design has been developed, assumptions tested and validated, and the Environmental Impact Assessment (EIA) process followed, in order to support an application for a Development Consent Order (DCO).

B2.2.2 The Project comprises the improvement of the A66 between the M6 at Penrith and the A1(M) at Scotch Corner, as shown in Figure 2.1: The Project (Overview), comprising of the following eight individual schemes:

- M6 Junction 40 to Kemplay Bank
- Penrith to Temple Sowerby
- Temple Sowerby to Appleby
- Appleby to Brough
- Bowes Bypass
- Cross Lanes to Rokeby
- Stephen Bank to Carkin Moor
- A1(M) Junction 53 Scotch Corner

B2.2.3 The PC(s) for the A66 NTP project are responsible for carrying forward the commitments set out in this outline SWMP.

B2.3 Context

B2.3.1 The outline SWMP is an important tool to improve the environmental performance of a project. It will be used throughout the design process, to promote 'designing out waste' and the development of a waste strategy through the demolition, excavation and construction phases. It will also be used to monitor waste arisings and optimise the strategy going forward.

B2.3.2 The principal objective of sustainable resource and waste management is to use material resources more efficiently and to reduce the amount of waste requiring final disposal by landfill. Where waste is generated, it should be managed in accordance with the waste hierarchy as displayed in Plate 1: Waste hierarchy.

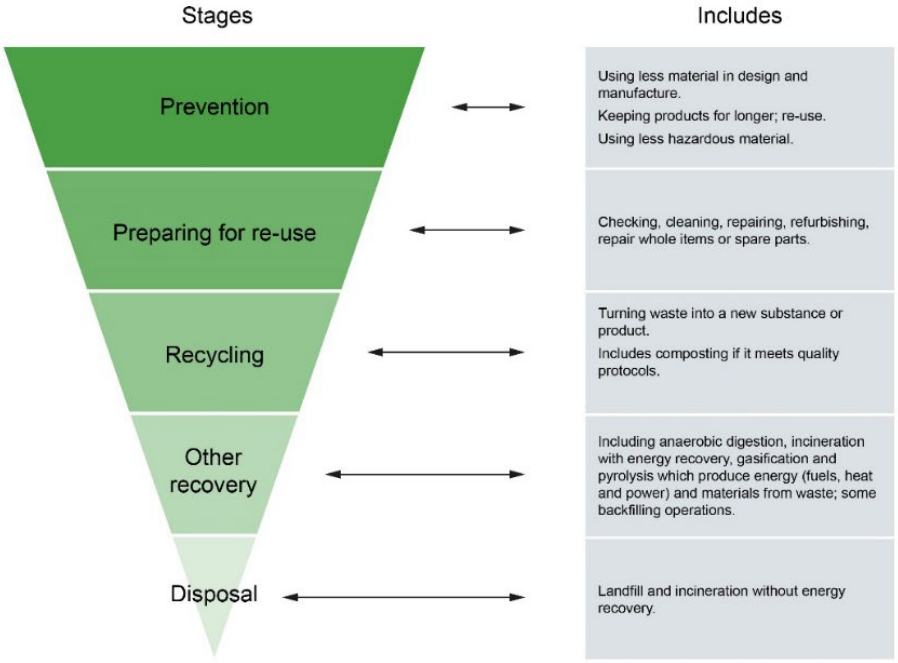

Plate 1: Waste hierarchy

Development Consent Order

B2.3.3 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under sections 14(1)(h) and 22(1)(a) of the Planning Act 2008 (PA 2008). As a result, a DCO is required to authorise the construction and operation of the Project. A draft version of the EMP, of which this outline SWMP forms part, is submitted with the DCO application.

Environmental Statement

B2.3.4 The outline SWMP includes the requirements outlined in the ES (Application Documents 3.2, 3.3 and 3.4). The Material Assets and Waste Assessment identifies the likely significant effects of the Project, following the methodology set out in the Design Manual for Roads and Bridges (DMRB) LA 110 Material Assets and Waste (DMRB LA 110)

(Highways England (now National Highways), 2019)[1] and any other relevant guidance. The relevant mitigation measures to reduce the material assets and waste impacts from the Project have been included in the outline SWMP and, where applicable, in the Register of Environmental Actions and Commitments (REAC) included in the EMP (Application Document Number 2.7).

Environmental Management Plan (EMP)

B2.3.5 The EMP for the Project includes materials and waste commitments that will need to be delivered through the SWMP (including commitments D-MAW-01 and MW-MAW-02 as set out in the Register of Environmental Actions and Commitments in the EMP). The EMP captures information and data on site arisings recovered or diverted from landfill and waste and specify management requirements for construction materials, site arisings and waste. The EMP will be reviewed and monitored to meet the requirements of Section 4 of DMRB LA 110.

Materials Management Plan (MMP)

B2.3.6 The MMP will be prepared by the PC(s) pre-construction and will include the proposals for the handling of waste material following the protocols within the *Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DOW COP)* (Contaminated Land: Applications in Real Environments, 2011)[2].

B2.3.7 An essay plan of what will need to be included within the MMP and key project commitments is also included in the DCO application as annex B8 of the EMP (Application Document Number 2.7).

B2.4 Scope

B2.4.1 This outline SWMP for the Project identifies the key waste streams that are likely to be produced from the Project and appropriate waste management and minimisation options, with an aim to encourage resource efficiency and sustainable waste management. The outline SWMP is also used to record how waste is prevented, minimised, re-used, recycled and disposed of during design and on a construction site.

B2.4.2 This outline SWMP has also been developed to provide:

- The management and recording of material resources used and waste arising from Construction, Demolition and Excavation (CD&E) activities
- Evidence that the Project meets regulatory requirements
- Reduction of waste management costs
- Recording of design and construction decisions that demonstrate good

[1]Highways England (now National Highways) (2019) Design Manual for Roads and Bridges LA 110 Material Assets and Waste
[2] Contaminated Land: Applications in Real Environments (2011) The Definition of Waste: Development Industry Code of Practice

and best practice in material resource use and waste minimisation and management
The outline SWMP has been developed in draft format, based on the information available at the time of writing. This is intended to aid future updates and further development of the SWMP as further data becomes available.

B2.4.3 The outline SWMP will be refined by the PC(s) as the Project progresses. The SWMP is a live document, reviewed and updated regularly during the course of the Project.

B2.5 Summary of regulatory framework

B2.5.1 The Project will need to comply with a range of environmental and waste legislation. A summary of the regulatory framework is provided below.

Environmental Protection Act 1990 (as amended)

B2.5.2 The Environmental Protection Act 1990 (as amended) establishes legal responsibilities for the duty of care for waste, contaminated land and statutory nuisance. The Project will generate wastes from demolition, earthworks and construction activities and the preferred contractor will have a duty of care for its safe keeping, transport and subsequent recovery.

Environment Act 2021

B2.5.3 The Environment Act 2021 makes provision for targets plans and policies in relation to resource efficiency and waste. The Act will drive the UK to an increased circular economy, encouraging people to recycle more, simplifying household recycling, requiring businesses to use sustainable packaging and restricting the export of plastic waste to developing countries. These changes will be enforced by a new public body, the Office for Environmental Protection (OEP) which will hold the government and public authorities to account. The Act repeals the Environment Act 1995 section 93 to 95. In relation to the Project and construction waste there is currently limited legislative requirements.

Waste Framework Directive

B2.5.4 The United Kingdom left the European Union (EU) on 31 January 2020 however existing EU environmental laws will continue to operate in UK law including the Waste Framework Directive. The Waste Framework Directive, as it has been incorporated into UK to take the necessary measures to ensure that waste is recovered or disposed of without endangering human health or causing harm to the environment and includes permitting, registration and inspection requirements. The Directive as incorporated into UK Law also requires the UK to take appropriate measures to encourage firstly, the prevention of waste production and its harmfulness, and secondly the recovery of waste by means of recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials, or the use of waste as a source of energy. The requirement of the Directive includes a target for

the construction industry to re-use, recycle and recover 70% of construction and demolition waste.

B2.5.5 The principles of the European Commission Circular Economy (CE) Package shall also be applied where relevant during assessment and reporting. Despite the UK leaving the EU, the government has implemented the CE measures. The Hazardous Waste (England and Wales) Regulations 2005 (as amended) establish the legislation defined in the Waste Framework Directive (Council Directive 2008/98/EC).

B2.6 Policy and targets

National Highways

Sustainable Development Strategy

B2.6.1 National Highways *Sustainable Development Strategy* (Highways England (now National Highways), 2017)[3] sets out ambitions for the management and utilisation of manufactured capital and high demand resources as part of future road investment, outlined below:

"We will push towards a 'circular' approach to our management of resources: minimising our demand for primary resources extracted from the ground and maximise the reuse of the resources already in use on the network. Reutilising them in as high a value function as possible.

We will be innovative: working with our suppliers to find new ways to deliver a more resilient and adaptable network - seeking efficiency and value for money.

We will work to achieve security of supply: working with others to improve the stability and predictability of demand for high-sustainability performance products and services. Enabling suppliers to invest in innovative approaches and secure long-term partnerships with wider supply networks, their staff and wider communities." (Sustainable Development Strategy, p4)

Contract requirements

B2.6.2 The outline SWMP will be developed as the design and construction process proceeds, in compliance with, or reference to, the following policies, documents and strategies:

- National Highways *Sustainable Development Policy*
- The ES and the EMP
- Work undertaken as part of NEC contracts or similar
- National Highways standards relating to materials and waste.

Targets

B2.6.3 The ES identifies the following waste-related targets for the Project based on National Highways requirements in DMRB LA 110:

[3] Highways England (now National Highways) (2017) Sustainable Development Strategy, available at: [redacted]

- At least 70% (by weight) of all Construction and Demolition Waste (CDW) will be subjected to material recovery in accordance with the Waste Framework Directive. In addition, the Project will aim to achieve at least 90% (by weight) material recovery of non-hazardous CDW.
- Aggregates imported to site will comprise a re-used/recycled content of at least 31%.

B2.7 Responsibilities

National Highways

B2.7.1 National Highways will have a number of responsibilities including:

- Awarding the Project contract(s) to the PC(s)
- Establishing environmental / waste related contract clauses
- Monitoring the implementation of the SWMP

Principal Contractor(s)

B2.7.2 The Project will be constructed by a number of PC(s). There is an EMP and this will include separate plans for the different PC(s). The SWMP will be certified as part of the EMP and any SWMP produced by the PC(s) will be based on and in alignment with that certified document.

B2.7.3 The outline SWMP will be refined by the PC(s) as works progresses. Once work commences onsite the collection of waste data, including actual waste arisings and waste management methods, will be recorded in a SWMP template by the PC(s). The PC(s) will provide a SWMP template (usually in the form of a spreadsheet) to determine waste management and recovery options and record actual waste related actions and movements during the demolition, excavation and construction phases of project. Example templates for collection of waste data, including actual waste arisings and waste management methods are provided in Appendix A to Appendix C.

B2.7.4 The updated SWMP will contain the:

- Forecast of construction waste listed by waste type, waste code, source and estimated weight from the detailed design stage.
- Calculation of construction waste itemised by waste type, waste code and source.
- Final destination for all wastes entered as well as the offsite destination, e.g. re-use, recycling, recovery or disposal.
- Appropriate data in the SWMP to estimate the re-use of site-won materials.
- Appropriate data in the SWMP to estimate the recycling and re-use of demolition materials as recycled aggregate to demonstrate compliance with the Project target for aggregates imported to site to comprise a re-used/recycled content of at least 31%.
- Appropriate data in the SWMP to calculate offsite re-use of inert excavated materials to demonstrate compliance with the Project target to achieve at least 90% (by weight) material recovery of non-hazardous CDW.

- Appropriate Duty of Care documentation (waste carrier registration, receiving site environmental permit details, waste transfer documentation).

B2.7.5 The Project Manager (or individual with the delegated duties) will undertake duties such as environmental co-ordination, instructing site staff, monitoring, supervising, collating and recording information for inclusion in the SWMP. The onsite Safety, Health, Environment and Quality (SHEQ) team or equivalent will monitor the effectiveness and accuracy of the documentation during site visits and scheduled audits.

B2.7.6 The PC(s) will nominate a designated Materials and Waste Manager at all stages of the development including design. The Materials and Waste Manager will have sufficient authority and clear responsibilities.

Site Induction and Toolbox Talks

B2.7.7 The PC(s) will provide general information on waste and specific information relating to the SWMP in site inductions and Toolbox Talks. This training will include information on the segregation strategy and recovery targets in place at the site.

B2.7.8 Toolbox talks will be carried out on waste issues every two months, as a minimum, and all relevant staff and sub-contractors will be expected to attend. The SWMP will also be communicated to relevant parties during the site induction process and where relevant, during the daily briefing process. Any changes to the SWMP will be communicated at Toolbox Talks.

Environmental Training for Key Staff

B2.7.9 The PC(s) will implement a programme of environmental training for key staff at the site, including required training in relation to waste and materials management, waste licensing etc. This will enable them to train other operatives through Toolbox Talks and gather feedback from site personnel.

Method Statements

B2.7.10 The following outline Method Statements have been developed:

- C1 Working in and Near SAC Method Statement
- C2 Working in Watercourses Method Statement
- C3 Scheduled Monuments Method Statement
- C4 Piling Method Statement

B2.7.11 The outline Method Statements are included in Annex C of the EMP. These Method Statements will be developed further by the PC(s) for site works in accordance with the SWMP.

Materials Management Plan

B2.7.12 The full MMP will be prepared by the PC(s) pre-construction and will include the proposals for the handling of waste material following the protocols within the DOW COP.

Sub-Contractors

B2.7.13 The PC(s) will establish agreements with sub-contractors for the management of waste. These agreements will be contractually binding and will include minimum standards and targets for diversion from landfill.

Compliance

B2.7.14 All those who produce or handle wastes from demolition, earthworks and construction activities have a duty of care for its safe keeping, transport and subsequent recovery. The PC(s) must demonstrate how they will comply with all regulations, National Highways requirements and good practice guidance.

Waste Management Facilities

B2.7.15 The PC(s) will identify waste management facilities for the management of all waste streams arising from the site whilst achieving compliance with all relevant legislation. The waste management facilities, where feasible, will be as close to the Project as possible, in line with the proximity principle for waste treatment and disposal. The proximity principle is the requirement to treat and/or dispose of wastes in reasonable proximity to their point of generation.

B2.8 Waste Management Contractors

B2.8.1 The PC(s) will engage with waste management contractors to identify opportunities for recycling materials generated by the Project. The PC(s) will review the evidence of the waste management contractors registration and environmental permitting prior to waste departing the Project. The PC(s) will verify the waste management contractor through the Defra website. The PC(s) will also store documentation provided by the waste management contractors such as waste transfer notes.

B2.9 Waste forecast

CD&E waste

B2.9.1 The potential CD&E waste types that could arise during the construction phase are summarised in Table 1: Potential waste sources during construction phase.

Table 1: Potential waste sources during construction phase

Construction phase	Potential wastes produced	Classification of waste
Construction	Construction materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc.	Inert; and/or, Non-hazardous; and/or, Hazardous.
	Made ground, soil and sub-soils.	Non-hazardous, and Hazardous if it contains sufficiently high levels of heavy metals.
	Waste products arising from the presence of construction staff onsite	Inert; Non-hazardous and potentially Hazardous.

Construction phase	Potential wastes produced	Classification of waste
	e.g. effluent from portable toilets, food waste and packaging, as well as waste from surplus materials and spillages.	
Demolition	Demolition activities will generate a range of waste streams which will include building materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc. Demolition activities will also generate a range of potentially hazardous waste streams which will include but not limited to: • Made ground, soil and sub-soils. • Asphalt and bituminous products. • Existing structures containing asbestos.	Inert; and/or, Non-hazardous; and/or, Hazardous. Non-hazardous, and Hazardous which will include but not be limited to: • Made ground, soil and sub-soils if it contains sufficiently high levels of heavy metals. • Asphalt if it contains coal tar. • Asbestos if it is confirmed in existing structures.
Excavation	Made ground, soil and sub-soils.	Inert; and/or, Non-hazardous; and/or, potentially Hazardous if it contains sufficiently high levels of heavy metals.

B2.9.2 The types of CD&E waste arisings likely to be generated by the Project are displayed in Table 2: Types of CD&E waste arisings generated by the Project.

Table 2: Types of CD&E waste arisings generated by the Project

Activity	Waste arisings	Additional information
Site preparation and earthworks	Vegetation strip and tree removal. Existing highways infrastructure such as kerbs, lighting, highways signs, safety barriers, etc.	Re-use onsite. Recycling offsite in local projects. Local recycling facilities. Disposal at an inert/non-hazardous or hazardous landfill site.
Demolition	Existing infrastructure such as farmhouse and road demolition including supports, rails, voids.	Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert/non-hazardous or hazardous landfill site.
Construction	Surface planings.	Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert or non-hazardous site.
	Site won material (hazardous).	Any hazardous material will be taken to a permitted waste management facility.

B2.9.3 The forecast of the total quantity of CD&E waste likely to be generated by the Project has been estimated and is displayed in Table 3:

Estimated CD&E construction waste quantities. The quantity of CD&E waste that will be diverted from landfill via re-use, recycling and recovery is based on a landfill diversion rate of 90%. A review of industry landfill diversion rates (92%) and also the target identified in DMRB LA 110 to divert at least 90% (by weight) material recovery of non-hazardous CDW demonstrates this to be an achievable diversion rate for the Project.

Table 3: Estimated CD&E construction waste quantities

Activity	Total quantity (tonnes)	Quantity diverted (tonnes)	Quantity for offsite disposal (tonnes)
Demolition waste	20,287	1,315,305	146,145
Excavation waste	1,461,450	952,830	105,870
Construction waste	26,146	23,532	2,615
Total waste	1,507,883	1,357,095	150,788
Proportion	100%	90%	10%

Demolition waste

B2.9.4 Demolition waste will be generated through the clearance of buildings and existing infrastructure, including services, roads, and drains which will need to be removed prior to construction. These are likely to consist of hard and inert materials, soils, rock and stones, wood (including vegetation), asphalt, brick, concrete, and miscellaneous metals.

B2.9.5 Sir Robert McAlpine (SRM) has provided Construction Information (Sir Robert McAlpine, 2021)[4] by undertaking a remote desk based estimate of the buildings and structures to be demolished as part of the Project to enable the new A66 and associated road infrastructure to be constructed.

B2.9.6 The estimated quantities of existing road surface which will be cleared as part of the Project have been included in the Earthworks estimates.

B2.9.7 The estimated waste arisings from demolition are set out in Table 4: Demolition waste estimate.

Table 4: Demolition waste estimate

Scheme	Building	Mass (tonnes)	Volume (m^3)
M6 Junction 40 to Kemplay Bank	N/A	0	0
Penrith to Temple Sowerby	High Barn Farm	1,448	657
	Lightwater Cottages	476	216
	Sub-total	**1,924**	**872**
Temple Sowerby to Appleby	John Dodd's Barn	446	213
	Dunelm Farm	196	90
	Winthorn House	233	118
	Green Barn Buildings	166	75
	Sub-total	**1,041**	**496**

[4] Sir Robert McAlpine (2021) Construction Information [accessed 10 January 2022]

Scheme	Building	Mass (tonnes)	Volume (m^3)
Appleby to Brough	New Hall Farm Underpass	60	25
	Sandford Retaining Wall	3,000	1,667
	Moor Beck Bridge	50	28
	Ministry of Defence (MOD) Tank Park	3,664	1,646
	MOD Compound	3,018	4,832
	Toddy Gill Bridge	20	10
	Sub-total	**9,812**	**8,207**
Bowes Bypass	Clint Lane Bridge	2,441	1,242
	Eastbound Off-slip	1,041	473
	Old Railway Station Farm Building	1,662	786
	Old Railway Station Ruins	30	17
	Low Broats Farm	1,896	847
	Sub-total	**7,070**	**3,365**
Cross Lanes to Rokeby	N/A	0	0
Stephen Bank to Carkin Moor	Slurry Tank	440	190
Sub-total		440	190
A1(M) Junction 53 Scotch Corner		0	0
Total		**20,287**	**13,131**

B2.9.8 Appendix 11.2: Demolition Waste Estimates of the ES (Application Document Number 3.4) contains the assumptions used to estimate the demolition waste arising from the Project.

Excavation waste

B2.9.9 The Project comprises eight individual schemes that will likely be delivered in four packages, at different times and across a large geographic area. Each scheme will have a cut/fill balance resulting in materials and waste generation. Wherever practical, the design has sought to achieve a balance of cut and fill at individual scheme, package and project level, taking into account the complexity of the phasing of delivery.

B2.9.10 The Earthworks Volume estimations set out in Table 5: Topsoil estimate have been calculated based on the current preliminary design in volume (cubic metres) and have therefore been converted to mass (tonnes) using the Environment Agency conversion factor of 1.5 tonnes per cubic metre used for inert materials.

B2.9.11 Where cut and fill balance at scheme level is not possible the intention is for excess materials to be utilised within other schemes as part of the Project, with the aim of achieving an overall balance, where possible. This will depend on the scheduling and timing of the construction of each scheme and the nature of the materials available.

B2.9.12 Based on the current cut and fill assessments for each project, it is unlikely that imported material will be brought into any part of the Project.

B2.9.13 Cut and fill balances have been reviewed for each of the schemes with the majority having sufficient permanent or temporary land to retain material arisings in dedicated and functional landscape bunds. However, it is likely that excess material from two schemes - M6 Junction 40 to Kemplay Bank and Temple Sowerby to Appleby schemes - will be transported to the Penrith to Temple Sowerby scheme for final placement in landscaping areas. A worst-case scenario, however, is that due to timing or suitability of material, some material will need to be exported off site.

B2.9.14 Once the final detailed design is complete, the assumed earthworks movements set out in the ES and in this SWMP will be reviewed and updated to ensure that the final design will not lead to new or different significant effects, and that the mitigation set out remains appropriate.

B2.9.15 Dependent on construction phasing, there may be a requirement to form borrow pits on the M6 Junction 40 to Kemplay Bank and Penrith to Temple Sowerby schemes to enable early embankment works to progress, but this material deficit will be replenished as part of the main cut and fill activities. Due to the nature of constructing a wider road, there is also additional topsoil on most schemes, thus is also unlikely that any additional topsoil will be required, with the Bowes Bypass, Cross Lanes to Rokeby and Stephen Bank to Carkin Moor schemes experiencing significant volumes of topsoil due to the geological topography.

B2.9.16 Appendix 11.3: Excavation Waste Estimates of the ES (Application Document Number 3.4) contains the assumptions and estimations used to estimate the excavation waste arising from the Project.

B2.9.17 Due to the nature of constructing a wider road, there is also additional topsoil on most schemes, thus is also unlikely that any additional topsoil will be required, with the Bowes Bypass, Cross Lanes to Rokeby and Stephen Bank to Carkin Moor schemes experiencing significant volumes of topsoil due to the geological topography. There is an assumption in this assessment that no topsoil will be disposed offsite as waste as the material will either be re-used on the Project, sold as a commercial commodity or donated to community projects.

B2.9.18 The topsoil estimations are set out in Table 5: Topsoil estimate: Topsoil estimate have been provided in volume (cubic metres) and have therefore been converted to mass (tonnes) using the Environment Agency conversion factor of 1.5 tonnes per cubic metre used for inert materials.

Table 5: Topsoil estimate

Scheme	Excavated Total Topsoil (m^3)	Placed Total Topsoil Fill (m^3)	Topsoil (Surplus) (m^3)	Excavated Total Topsoil (tonnes)	Placed Total Topsoil Fill (tonnes)	Topsoil (Surplus) (tonnes)
M6 Junction 40 to Kemplay Bank	44,100	11,800	32,300	66,150	17,700	48,450
Penrith to Temple Sowerby	146,000	39,300	106,700	219,000	58,950	160,050
Temple Sowerby to Appleby	350,500	96,800	253,700	525,750	145,200	380,550
Appleby to Brough	233,500	48,300	185,200	350,250	72,450	277,800
Bowes Bypass	78,900	13,200	65,700	118,350	19,800	98,549
Cross Lanes to Rokeby	156,600	46,800	109,800	234,900	70,200	164,700
Stephen Bank to Carkin Moor	216,500	37,600	178,900	324,750	56,400	268,350
A1(M) Junction 53 Scotch Corner	0	0	0	0	0	0
Project wide	1,226,100	293,800	932,300	1,839,150	440,700	1,398,450

B2.9.19 Materials will be generated by the removal of the existing carriageway to enable reconstruction, widening or full removal. The quantities of existing carriageway which will be cleared from the Project have been estimated, and these have been included in the Earthworks estimates. To enable the material to be recycled, the asphalt will be planed off, generating non-hazardous waste as well as hazardous waste. Pavement layers can be crushed or planed at the end of their lives and be recycled in new asphalt production. Table 6: Carriageway removal estimates provides an estimate of the breakdown for each scheme relating to the removal of existing carriageway.

Table 6: Carriageway removal estimates

Scheme	Mass (tonnes)	Volume (m3)	Mass (tonnes)	Volume (m3)	Mass (tonnes)	Volume (m3)
	Sub-total		Non hazardous		Hazardous	
M6 Junction 40 to Kemplay Bank	4,938	11,024	4,445	9,924	493	1,100
Penrith to Temple Sowerby	7,409	16,540	6,669	14,890	739	1,650
Temple Sowerby to Appleby	4,322	9,650	3,892	8,690	430	960
Appleby to Brough	6,808	15,200	6,128	13,680	681	1,520
Bowes Bypass	3,964	8,850	3,570	7,970	394	880

Scheme	Mass (tonnes)	Volume (m3)	Mass (tonnes)	Volume (m3)	Mass (tonnes)	Volume (m3)
	Sub-total		Non hazardous		Hazardous	
Cross Lanes to Rokeby	3,449	7,700	3,104	6,930	345	770
Stephen Bank to Carkin Moor	2,764	6,170	2,486	5,550	278	620
A1(M) Junction 53 Scotch Corner	0	0	0	0	0	0
Total	33,654	75,134	30,294	67,634	3,359	7,500

Construction waste

B2.9.20 Construction waste has been estimated using information provided by the Integrated Delivery Team (IDT) and Waste Benchmarking Data developed by Building Research Establishment (BRE) on behalf of the Waste Resources Action Programme (Waste Resources Action Programme and the Building Research Establishment, 2012)[5] for the Project.

B2.9.21 The estimated construction waste is summarised in Table 7: Estimated construction waste. The quantity of construction waste that will be diverted from landfill via re-use, recycling and recovery is based on a landfill diversion rate of 90%. This rate has been selected based on a review of industry landfill diversion rates (92%).

Table 7: Estimated construction waste

Scheme	Mass (tonnes)	Quantity diverted (tonnes)	Quantity for offsite disposal (tonnes)
M6 Junction 40 to Kemplay Bank	1,160	1,044	116
Penrith to Temple Sowerby	3,789	3,410	379
Temple Sowerby to Appleby	6,254	5,629	625
Appleby to Brough	5,889	5,300	589
Bowes Bypass	2,125	1,912	212
Cross Lanes to Rokeby	3,068	2,762	307
Stephen Bank to Carkin Moor	3,594	3,234	359
A1(M) Junction 53 Scotch Corner	268	241	27
Routewide Total	26,146	23,532	2,615

B2.9.22 The potential construction waste types and the associated classification (inert, non-hazardous and hazardous that could arise during the construction phase are summarised in Table 1: Potential waste sources during construction phase.

B2.9.23 Construction waste has been estimated based on the preliminary design (as shown in the indicative General Arrangement drawings, Application

[5] Waste Resources Action Programme and the Building Research Establishment (2012) SMARTWaste Data and Reporting

Document Number 2.5) and the works as secured through the DCO Works Plans (Application Document Number 5.16), utilising Waste Benchmarking Data developed by Building Research Establishment (BRE) on behalf of the Waste Resources Action Programme (Waste Resources Action Programme and the Building Research Establishment, 2012)6 for the Project.

B2.9.24 Appendix 11.4: Construction Waste Estimates of the ES (Application Document Number 3.4) contains the assumptions and estimations used to estimate the construction waste arising from the Project.

B2.9.25 Table 9: Re-use good practice for the construction phase demonstrates good practices which will be investigated to re-use materials during the construction phase.

B2.9.26 Table 10: Recycling good practice for the construction demonstrates construction site waste management good practices which will be investigated to optimise the amount of materials recovered during the construction process.

B2.9.27 Table 11: Construction waste tonnage based recovery targets displays the construction waste recovery targets identified for the proposed project.

B2.9.28 The PC(s) will update the construction waste forecast in the SWMP and it will contain the:

- Forecast of construction waste listed by waste type, waste code, source and estimated weight from the detailed design stage.
- Calculation of construction waste itemised by waste type, waste code and source.
- Final destination for all wastes entered as well as the offsite destination, e.g. re-use, recycling, recovery or disposal.
- Appropriate data in the SWMP to estimate the re-use of site-won materials.
- Appropriate data in the SWMP to calculate offsite re-use of inert excavated materials to demonstrate compliance with the Project target to achieve at least 90% (by weight) material recovery of non-hazardous CDW.

B2.10 Designing out waste

B2.10.1 During construction the PC(s) will take into consideration the upper tiers of the waste hierarchy as required by DMRB LA 110 and displayed in Plate 1: Waste hierarchy with a view to minimising the overall volume of waste arisings via designing out waste and maximising efficient use of materials, ultimately to prevent and minimise waste sent to landfill.

B2.10.2 A key objective for the preliminary design phase has been to design out waste generation where possible. The ES and SWMP include evidence of the adoption of the measures including designing for re-use and recovery, materials optimisation, offsite construction, future

[6] Waste Resources Action Programme and the Building Research Establishment (2012) SMARTWaste Data and Reporting

(deconstruction and flexibility), and waste efficient procurement. The current examples of Designing out Waste on the Project are provided below.

Design for re-use and recovery

Demolition

B2.10.3 Prior to demolition of each structure or building, a pre-demolition audit will be carried out to quantify materials and investigate opportunities for re-use and recycling. There will crushing / screening of demolition arisings for use as recycled aggregate and fill materials which is likely to require a registered waste exemption or an environmental permit.

B2.10.4 Where possible it is likely unsuitable material will be mechanically and / or chemically stabilised such as lime stabilisation and used within landscape areas on the Project. These activities will comply with the DOW COP and any other requirements and will be set outby the PC(s) in the MMP.

Excavation

B2.10.5 Site levels and grading of the Project have been designed to achieve a cut and fill balance where practicable, in order to help minimise excavation quantities. Each scheme has been designed to incorporate all the excavated materials arising where possible. Cut and fill balances have been reviewed for each of the schemes with the majority having sufficient permanent or temporary land to retain material arisings in dedicated landscape bunds.

B2.10.6 Where possible it is likely unsuitable material will be mechanically and/or chemically stabilised such as lime stabilisation and used within landscape areas on the Project. These activities will comply with the DOW COP and any other requirements and will be set out in the MMP.

Construction

B2.10.7 The paving of large sections of the existing A66 highway will be re-used saving materials and reducing waste.

B2.10.8 On the M6 Junction 40 to Kemplay Bank scheme:

- All existing pedestrian and cycle connections will be retained on the Penrith South Bridge western side alongside Skirsgill Business Park
- The Kemplay Bank roundabout was redesigned to retain the existing overbridge
- The existing exit from the fire station linked with the current traffic signals will be maintained throughout construction and remain in place once the works are complete
- The existing underpass from Carleton Avenue to the Police and Fire site (to the south of the A66) is to be retained and extended accordingly, to accommodate the widened A66
- The design option selected for M6 Junction 40 utilises the existing structures, minimising the amount of new construction and removing need for demolition

- This scheme will follow the existing horizontal road alignment (other than the underpass)

B2.10.9 On the Penrith to Temple Sowerby scheme there will be full dualling of the existing single carriageway. This scheme will predominantly involve online widening using the existing carriageway to form one side of the new dual carriageway.

B2.10.10 The Appleby to Brough scheme comprises the upgrading of an 8km section of carriageway from single to dual carriageway between Coupland Beck and Brough.

B2.10.11 Approximately 3km of carriageway will be re-surfaced on the Bowes Bypass scheme.

B2.10.12 Approximately 3km of carriageway will be re-surfaced on the Cross Lanes to Rokeby scheme.

B2.10.13 National Highways is committed to sourcing construction materials with a high recycled content and supporting a circular economy. The Project aims to achieve the target that aggregates imported onsite will have re-used/recycled content target of at least 31%. If the PC(s) cannot achieve the target of at least 31% of aggregates imported onsite will have a re-used/recycled content they will need to undertake a whole life sustainability assessment of alternative options to demonstrate a sustainable alternative approach.

B2.10.14 At present it is assumed that all existing aggregate based material will be incorporated into fill materials on the Project, subject to suitability and any hazardous content. Aggregate based materials will be sourced from local quarries, but based on supply and demand, however the closest quarry to each scheme may not be able to provide all material requirements.

B2.10.15 For the key aggregate materials, it should be assumed most of the road box construction is made from a quarried Type 1 aggregate. There are instances where crushed secondary aggregates can be used, with demolition waste arisings a good source of aggregate for both concrete and road construction where available. Recycled aggregate can be used for highway construction where it can be categorised or classified as a suitable fill material under the specification for Highway Works guidance notes. These stipulate the type of material, grading requirements and other associated testing requirements that must be met to produce a Type 1 aggregate. The PC(s) will identify local Materials Recover Facilities (MRFS) and neighbouring construction projects that could potentially supply secondary aggregate.

B2.10.16 For road construction capping works as much material as practicable should be constructed from recycled materials. Based on preliminary design it is estimated that approximately 5% could utilise recycled materials.

B2.10.17 For asphalt base as much material as practicable should be constructed from recycled materials. Based on preliminary design it would be estimated that approximately 15% could utilise recycled materials.

B2.10.18 For surfacing course as much material as practicable should be constructed from recycled materials. Based on preliminary design it would be estimated that approximately 7.5% could utilise recycled materials.

B2.10.19 For concrete as much material as practicable should be constructed from recycled materials, it is common for 20% of the material by volume to be recycled material, which can be increased beyond 40% depending on the mix, workability and strength gain requirements.

B2.10.20 Also for concrete it is estimated that 40% of the cement could be offset with Ground Granulated Blast-furnace Slag (GGBS) and based on a 420 kg/m^3 cement content, this equates to a global offset of raw material of 7% for each cubic metre of concrete delivered to site. The PC(s) will identify an appropriate source and supplier of GGBS at the Detailed Design Stage is undertaken when quantities are known.

B2.10.21 Haul roads and compounds will utilise recycled aggregates from either demolition materials onsite or potentially offsite from other local construction projects where regulatory compliance can be achieved.

B2.10.22 The majority of the steel sourced for bridge beams or ground support solutions is made from over 90% recycled steel.

B2.10.23 In relation to drainage products, there are now many drainage products on the market that incorporate over 60% recycled content, most notably with plastic drainage products and kerbs. The PC(s) will aim to use products that have over 60% recycled content wherever possible.

B2.10.24 Pavement layers can be crushed or planed at the end of their lives and be recycled in new asphalt production. An example is Foambase which uses waste pavement materials as aggregate within the asphalt mix. Foambase is a specific product from OCL Regeneration that recycle asphalt waste containing coal tar from road maintenance schemes. This reduces the use of virgin aggregates in the production process and also diverts hazardous waste from landfill. It is a cold lay material so also offers similar benefits to warm mix asphalts in the carbon dioxide emissions. The material could be used to form new layers for road base or farm tracks, car parks, side roads, compounds, etc. The PC(s) will aim to recycle pavement layers wherever possible.

B2.10.25 Asphalt waste containing coal tar is classified as a hazardous waste where the level of coal tar is greater than 0.1%. Coal tar is still classified as a hazardous waste when it is treated using a cold recycling bound mixture.
The PCs will achieve regulatory compliance for the treatment of coal tar and then use in construction which needs an environmental permit unless the requirements of Environment Agency Regulatory Position Statement 075 (Environment Agency, 2014)[7] are followed.

B2.10.26 The temporary works will include compound hard standings, haul roads, turning circles, laydown areas, access and egress bell-mouth areas

[7] Environment Agency (2014) Regulatory Position Statement 075 The movement and use of treated asphalt waste containing coal tar

along with crane and piling rig platforms. All these temporary works areas could be constructed using recycled aggregates from either demolition materials onsite or potentially offsite from other local construction projects where regulatory compliance can be achieved.

Design for materials optimisation

B2.10.27 Design for materials optimisation features the simplification and standardisation of materials and component selection with the aim of making the design more buildable. The standardisation of materials and component choices will enhance the buildability as well as potentially decreasing the level of rework. The PC(s) will investigate the opportunity to introduce the standardisation of selected materials to ensure waste inherent in the design is further reduced through detailed design. Standardisation will be applied to precast concrete components such as central reservations, pavers, kerbs, blocks as well as drainage such as gullies, pipes and chambers. The design of the overbridge structures will also consider the use of standardisation across the Project. The structural form of the substructure can be standardised but each bridge will be subject to different size foundations depending on the specific ground conditions and topography. In addition, for local road bridges crossing the A66 the span length and skew angle could potentially be standardised for multiple bridges.

B2.10.28 Retaining walls can also be standardised across the Project. The precise height of each retaining wall across the route will be determined during detailed design, the walls will then be classified into one of a number of groups allowing standard design to be applied. This allows for efficiency in materials ordering and use on site.

B2.10.29 Site accommodation within the main construction compounds can also be standardised across the route, allowing for efficiency in ordering required materials and equipment, and also providing clarity for workers who are then familiar with the site layout whichever compound they access (including operation and location of waste separation facilities).

Design for offsite construction

B2.10.30 The PC(s) will investigate the potential for offsite construction of certain elements of the Project. Offsite construction can drive improvements in the products or processes employed in construction, ranging from innovative products such as asphalt surfaces on a 'carpet roll' to be used onsite through to precast components manufactured offsite.
At this stage it would be envisaged to manufacture offsite bridge beams, culverts and short span bridges, parapets, prefabricated concrete units (headwalls and drainage rings), retaining walls, central reserve barriers and steel segments (if selected to be used). Offsite construction will be maximised where possible.

Design for the future (deconstruction and flexibility)

B2.10.31 The PC(s) will investigate and identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstruction of elements can be maximised at the end of first life.

B2.10.32 Opportunities for modular retaining walls that rely on shear interlock between blocks can be deconstructed at the end of their life will be investigated by the PC(s). The backfill behind these retaining walls can be removed leaving the blocks available to be lifted back out in sequence and transported offsite for future re-use. The blocks themselves can be re-used in the same application. The proprietary concrete blocks can be manufactured from superior high strength materials, making them 100% recyclable at the end of their 120 year design life.

B2.10.33 All concrete elements of the Project have the ability to be crushed and graded to form recycled crushed aggregates when they are decommissioned. These aggregates can be used in new concrete batching or as earthworks layers, depending on the specification of the future scheme. The precast concrete barriers in the central reserve can also be deconstructed at the end of their service if required.

B2.10.34 Temporary site accommodation within the construction compounds will also be designed for deconstruction and re-use.

Design for waste efficient procurement

B2.10.35 The project team including the National Highways, the designers, PC(s), sub-contractors and waste management contractors will liaise to identify further opportunities to minimise waste. The PC(s) will identify and specify materials that can be acquired responsibly in accordance with DMRB LA 110. The PCs will develop contractual requirements that promote resource efficiency such as achieving the target of 90% of CD&E waste that will be diverted from landfill via re-use, recycling and recovery.

B2.11 Demolition phase

B2.11.1 Although much of the area surrounding the existing A66 is undeveloped land, there are buildings and existing infrastructure, including services, roads, and drains which will need to be removed prior to construction. These are likely to consist of hard and inert materials, soils, rock and stones, wood (including vegetation), asphalt, brick, concrete, and miscellaneous metals.

B2.11.2 The Project will generate material from demolition and the PC(s) will aim to reuse as much material as possible as part of the construction, or be considered for use in other construction projects to minimise their classification as waste as far as practicable. The PC(s) will work with National Highways, Local Planning Authorities, the Environment Agency and other relevant organisations to identify other local projects. The Project will consider the Demolition Protocol (Institute of Civil Engineers, 2008)[8], a resource efficiency model that shows how the production of

[8] Institute of Civil Engineers (2008) The Demolition Protocol

demolition material can be linked to its specification as a high-value material both onsite and in other construction projects.

B2.11.3 The PC(s) will maximise opportunities to re-use existing foundations, structures, pavements, floor slabs and services onsite. Where this is not appropriate the PC(s) will consider crushing demolition materials for recycling as aggregates onsite. If onsite recycling is not feasible, the PC(s) will identify opportunities for recycling the demolition materials offsite in any National Highways, or other suitable local projects, through a recycling contractor or on other external projects.

B2.11.4 The re-use and recycling of demolition waste is likely to require a registered waste exemption or an environmental permit, which the PC(s) will be responsible for obtaining and managing. These will be listed in the consents and licences register in the EMP.

B2.11.5 The Environment Agency Quality protocols: converting waste into non-waste products (Quality protocols) (Environment Agency, 2020d)[9] will be used to identify when a waste-derived material can be regarded as a non-waste product and no longer subject to waste controls. The Quality protocols could potentially be applied to optimise the amount of demolition materials that can be re-used across the Project, and the requirement to comply with these protocols is set out in the EMP.

B2.11.6 There is potential that some of the existing structures could contain asbestos. The PC(s) will develop an Asbestos Management Plan to identify potential sources of asbestos and it will be managed on the Project. Any contaminated materials will need to be segregated separately from 'clean' demolition materials to avoid cross contamination before they are sent for appropriate and permitted treatment/recovery/disposal.

B2.12 Excavation phase

B2.12.1 The approach to earthworks will enable materials excavated onsite to be re-used at areas of the site where materials are required as far as practicable. This will minimise the amount of material required from offsite. In addition, it may also be possible to identify other construction projects located close to the Project that can re-use the materials.

The approach to earthworks will, however, be influenced by the construction phasing and there may be limitations on how materials can be re-used between schemes.

B2.12.2 The DOW COP will be applied to optimise the amount of excavated materials that can be re-used and recycled across the Project. The requirement to comply with the DOW COP will be set out in the MMP.

B2.12.3 Peat could potentially be excavated as part of the earthworks. Investigations will be made to avoid wherever possible, protect or

[9] Environment Agency (2020d) Quality protocols: converting waste into non-waste products, available at: https://www.gov.uk/government/collections/quality-protocols-end-of-waste-frameworks-for-waste-derived-products [accessed 23 August 2021]

recover the peat offsite. The locations of peat across the Project are included in the ES Volume 2 (Main Report) section 9.7 of Chapter 9: Geology and Soils (Application Document 3.2).

B2.12.4 Early identification of, and communication with, other developments and processors will be undertaken by the PC(s) to identify further opportunities to recover excavated materials.

Materials Management Plan

B2.12.5 The MMP, an essay plan of which is included in Annex B2 of the EMP, Application Document Number 2.7), will be developed further by the PC(s).

B2.12.6 The PC(s) will include the proposals for the handling of waste material following the protocols within the DOW COP.

B2.12.7 The PC(s) will advertise the Project as a donor site under the DOW COP scheme where excess materials are likely to be present that cannot be re-used within the Project.

B2.12.8 Not all material produced during the construction process will be classed as waste, but excess material will need to be classified by the PC(s) in accordance with WM3 guidelines prior to its removal from site. The Project will use all the relevant tools to comply with waste legislation and guidance including the Demolition Protocol, Quality Protocol, CL:AIRE DOW :COP, exemptions and / or permits.

Contaminated materials

B2.12.9 Contaminated materials will be segregated from ‘clean’ excavated materials to avoid cross-contamination before they are sent for appropriate and licensed treatment, recovery or disposal. In addition the outline MMP will be developed further by the PC(s) in accordance with the DOW COP to demonstrate how excavated materials will be managed and re-used.

B2.12.10 Any waste arisings of made ground, soils and sub soil should be classified as per Environment Agency Waste Management 3 (WM3) (Environmental Agency, 2021)[10] guidelines for waste classification. The PC(s) will develop a testing and classification regime for these materials to ensure the correct waste sentencing or possibility of re-use.

B2.12.11 Not all material produced during the construction process will be classed as waste, but excess material will need to be classified in accordance with WM3 guidelines prior to its removal.

B2.12.12 The removal of material may not be compliant with the relevant Environmental Permitting requirements in the absence of suitable classification. The MMP will be prepared pre-construction by the PC(s)

[10] Environment Agency (2021) Waste Management 3 (WM3) available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021051/Waste_classification_technical_guidance_WM3.pdf [accessed10 January 2022]

and will include the proposals for the handling of contaminated material following the protocols within the DOW COP.

Materials storage areas

B2.12.13 The location of material storage areas will be determined by the PC(s) following detailed design and detailed construction phase planning when storage requirements are finalised. The locations and management of the material storage areas will comply with all measures set out in the EMP, including avoiding known constraints highlighted for protection within the ES, the EMP (Application Document Number 2.7) and the Project Design Principles (Application Document Number 5.11). This will ensure that any constraints upon location and positioning are complied with at all times.

B2.12.14 To enable construction works to take place, material storage areas will be required at multiple locations to facilitate holding material in the short or long term for compounds, haul roads or permanent works. The areas are likely to be de-vegetated and topsoil removed. Material cut will then be removed where required to larger material deposit locations where it will either be placed within landscape fill areas or directly within fill areas on the schemes. It is essential that good practice is followed to ensure the material being stored remains in good condition, being adequately sealed and placed in the desired thicknesses to prevent deterioration of the material's such as topsoil. The location of material storage areas is dependent on materials suitability and any visual constraints for bunded areas along the Project.

B2.12.15 Materials will be moved in the most efficient way possible, taking note of access routes, traffic management restrictions and available storage. Where possible, material will be moved away from the main works areas using independent haul roads.

B2.12.16 For cut material, the maximum stockpile height of 5m for most materials, dependent that it does not present any slope failure concerns. In addition, there may be other relevant factors such that will influence the locations such as:

- Any restrictions imposed by the relevant planning departments
- Visual impact of local resident's views
- Topography
- Local ecology.

B2.12.17 For topsoil storage a maximum stockpile height of 2m will be implemented if the topsoil material is going to be retained for future re-use on the Project.

B2.12.18 All stockpiling falls under the temporary works management and will be suitably designed. This will be required to be suitably managed and controlled by the PC(s).

Construction phase

B2.12.19 The depletion of finite material resources will occur through extraction of primary aggregates (e.g. sands and gravels). Structures, drainage and

signage products will be procured with consideration of the environmental impacts associated with their manufacture, as well as other considerations such as structural design, carbon footprint (PAS 2050), energy consumption, long-life performance, visual impacts, durability and cost. The procurement of sustainable materials will be secured, as set out in the EMP (Application Document Number 2.7).

B2.12.20 If any offsite recycled aggregates not meeting the end of waste of criteria are sourced by the Project, the Environment Agency require the PC(s) to apply for a suitable waste permit or waste exemption.

B2.12.1 In addition the Project will be committed to:

- Specifying the use of materials with a high percentage of re-used/recycled content of at least 31%
- Local sources for aggregate supplies should be considered whenever possible.
- Ensuring demolition, excavation and construction arisings) generated are handled, stored, managed and re-used or recycled as close as possible to the point of origin.

B2.12.2 The PC(s) will strive to minimise construction waste. Table 8: Good practice waste minimisation for the construction phase demonstrates good practice which will be considered to further minimise waste arisings during the construction process.

Table 8: Good practice waste minimisation for the construction phase

Good Practice	Description
Sustainable procurement	Materials selected will be durable to ensure long life and reduced need for replacement. Over-ordering of materials will be avoided and suppliers that minimise packaging will be used. Where feasible any packaging will be returned to the supplier for recycling. Construction material specifications will prioritise the procurement and use of recycled/secondary aggregates and other recycled materials e.g. wood for formwork.
Supply chain partners	All members of the supply chain will be made aware of the SWMP for example this could be written in their contracts. The PC(s) is responsible for the delivery of the SWMP and the Project Manager will ensure that it is delivered. Workshops will be held throughout the construction period to help reinforce the SWMP and ensure that all partners are kept up to date with developments. Targets will be established for the minimisation of waste and the recycling of materials. These targets will then be communicated to the workforce and performance against them will be measured and used to promote positive PR.
Avoid wasteful working practices	Staff will be given appropriate training both as part of site induction and at intervals throughout the life of the Project such as Toolbox Talks.
Materials management	Materials will be appropriately handled and stored throughout their lifecycle from delivery to inclusion, e.g. return surplus materials to storage.

Good Practice	Description
	Materials will be delivered to the site 'just-on-time', this will limit the need for excess onsite storage and will limit the chance of wastage through damage of the stored materials. There will be designated areas for the storage of materials.
Modern Methods of Construction	The introduction of Modern Methods of Construction (MMC) will continue to be investigated during the construction phase of the Project.

Re-use of materials

B2.12.3 The PC(s) will maximise the re-use of any existing materials and construction elements wherever possible. The PC(s) will establish a waste storage and recycling area for the safe storage and processing of recovered materials to ensure that opportunities for re-use are maximised.

B2.12.4 Table 9: Re-use good practice for the construction phase demonstrates good practices which will be investigated to re-use materials during the construction phase.

Table 9: Re-use good practice for the construction phase

Good Practice	Description
Timber	Wood is a very durable material and can be re-used many times onsite before it needs to be replaced. Uncontaminated timber can also be re-used as formwork and hoarding. Store off cuts for use. Pallets can also be re-used for the storage of onsite materials not otherwise on pallets. Uncontaminated wood can be chipped and re-used in landscaping.
Inert	Unused bricks and blocks can be reclaimed and re-used in other buildings or could be stored for use in any paving required for public realm.

Recycling of materials

B2.12.5 While reduction of waste will remain the highest priority, waste produced will be segregated for recycling and recovery. This will allow materials to be recycled and ultimately reduce the amount of waste that has to be finally disposed of.

B2.12.6 Table 10: Recycling good practice for the construction demonstrates construction site waste management good practices which will be investigated to optimise the amount of materials recovered during the construction process.

Table 10: Recycling good practice for the construction phase

Good Practice	Description
Timber	Unusable timber waste can be separated in a container so that offsite recycling can occur. The PC(s) will also consider returning storage pallets where possible.
Concrete	A cost benefit analysis should be undertaken to identify if any concrete waste could be segregated from the general construction waste and be suitably stored for crushing concrete onsite for use as aggregate where it is not possible to use it in its current form.

Inert	The PC(s) undertake cost benefit analysis to identify if any inert waste from construction works can be stored onsite for crushing onsite for use as aggregate for highways and landscaping where it is not possible to use it in its current form. The criteria for the costs would include equipment, labour and transportation of the inert materials onsite. The criteria for the benefits would include potential commercial savings on the cost of procuring recycled aggregates and waste management fees as well as the environmental returns.
Plastic	Plastics can be segregated and investigations will be made to identify a plastics recycler. It may be possible to recycle a range of plastics including High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE), Polypropylene (PP), Polyvinyl chloride (PVC) and Polystyrene.
Packaging	The PC(s) will encourage its suppliers to reduce packaging materials and deliver products in returnable transport packaging where possible.
Metals	Metal wastes will be segregated and sent for offsite recycling. It is recommended that high value metals, such as steel, aluminium and copper are stored separately and sold on to merchants and/or material suppliers.
Hazardous Waste	Hazardous waste such as oils and solvents will be recycled where possible.

Recovery targets

B2.12.7 At least 70% (by weight) CDW will be subjected to material recovery in accordance with the Waste Directive. In addition, the Project will aim to achieve at least 90% (by weight) material recovery of non-hazardous CDW.

B2.12.8 Over and above the requirements set out in the Waste Directive, National Highways and the PC(s) will also set targets for waste recovery both onsite and offsite (third party waste management contractors can recover waste further) identified in Table 11: Construction waste tonnage based recovery targets. The PC(s) will aim for best practice recovery rates and will be expected to demonstrate why it is not technically or financially feasible to achieve these rates if that is the case.

B2.12.9 Table 11: Construction waste tonnage based recovery targets displays the construction waste recovery targets identified for the proposed project. The PC(s) will aim for best practice recovery rates and will be expected to demonstrate why it is not technically or financially feasible to achieve these rates. Rates shown below are from a WRAP[11] report entitled Achieving Good Practice Waste Minimisation and Management.

Table 11: Construction waste tonnage based recovery targets

Material	Standard recovery (%)	Good practice quick win (%)	Best practice recovery (%)
Wood	57	90	95
Metals (ferrous and non-ferrous)	95	100	100
Packaging	60	85	95

[11] WRAP (2014) Achieving Good Practice Waste Minimisation and Management

Concrete	75	95	100
Inert	75	95	100
Plastics	60	80	95
Miscellaneous	12	50	75
Electrical Equipment	Limited information	70	95
Cement	Limited information	75	95
Liquids and oils	100	100	100
Hazardous	50	Limited information[12]	Limited information

Supplier take-back schemes

B2.12.10 Wherever possible the PC(s) will establish take-back schemes with suppliers to accept surplus material not incorporated in the works.

B2.13 Onsite practice

B2.13.1 The PC(s) will introduce good onsite practice to ensure waste is managed effectively. While reduction of waste will remain the highest priority, waste produced will be segregated. This will allow materials to be re-used or recycled and ultimately reduce the amount of waste that has to be finally disposed of.

Waste storage area

B2.13.2 The PC(s) will establish waste storage and recycling areas, for each scheme or package, for the safe storage and processing of recovered materials to ensure that opportunities for re-use are maximised. The Project will strive to implement industry best practice with regard to the segregation of waste by adopting the Considerate Constructors Scheme (CCS) *Colour Coding Waste Skips* system (Considerate Constructors Scheme, 2017)[13]. The colour coding scheme is a simple system which colour labels waste skips indicating the types of waste that can be placed in them.

B2.13.3 Where no other waste management option is found to be feasible, wastes shall be sent to an appropriately permitted landfill site in accordance with UK legislation and any National Highways requirements.

B2.13.4 A specific area will be designated and signposted to facilitate the separation of materials for potential recycling, salvage, re-use and return. Recycling and waste bins are to be kept clean and clearly marked in order to avoid contamination of materials. If skips are clearly identified the bulk of the workforce will deposit the correct materials into the correct skip. The PC(s) management plans will identify how construction waste will be managed and mitigated onsite. The PC(s) will include the topic of waste segregation in the site induction and will also undertake regular Toolbox Talks to avoid cross contamination of waste

[12] This cannot be 100% as much hazardous waste (e.g. asbestos) must be landfilled.
[13] Considerate Constructors Scheme (2017) Colour Coded Waste Skips, available at: [redacted] [accessed 23 August 2021]

streams. The PC(s) will also develop a programme of checks of these to ensure skips site staff are segregating waste effectively Where contamination of a skip is identified, the item of waste in the incorrect bin will be removed and transferred to the correct container following the appropriate Health and Safety procedures.

B2.13.5 The waste storage areas shall include impermeable surfaces with appropriate drainage as well as hazardous waste storage areas to minimise cross contamination of other waste streams and surrounding ground. The PC(s) will identify the appropriate drainage which would include temporary interceptors or bunded areas. The separate storage area for hazardous waste shall include labelled bins for aerosols, oil, oily rags and Waste Electrical and Electronic Equipment (WEEE). In addition the PC(s) will clearly identify in the Construction Phase Plan (CPP) the control measures for preventing and managing spills in the waste storage areas. This will include the provision of spill kits in the waste storage areas.

Other recovery options

B2.13.6 The PC(s) will identify potential offsite recovery options for all remaining residual waste. Many waste management contractors can recover residual waste through technologies such as materials recovery facilities (MRF) which could help further segregate and divert waste from disposal.

Landfill

B2.13.7 Where no other waste management option is found to be feasible, wastes will be sent to an appropriately permitted landfill site.

Hazardous Waste

B2.13.8 Hazardous waste will be correctly labelled, will not be mixed with non-hazardous waste, securely contained and disposed of by a registered waste carrier for hazardous waste. The Duty of Care (DoC) applies to hazardous wastes.

B2.13.9 The PC(s) will retain all consignment notes in accordance with waste collection and transfer by an approved supplier before they are sent for appropriate and permitted treatment/recovery/disposal.

Asbestos

B2.13.10 There is potential that some of the existing structures contain asbestos. The PC(s) will develop an Asbestos Management Plan to identify potential sources of asbestos and it will be managed on the Project. All identified asbestos containing or coated materials will need to be segregated separately from ‘clean’ demolition materials to avoid cross contamination before they are sent for appropriate and permitted treatment/recovery/disposal. Any asbestos containing or coated materials will be suitably temporarily encapsulated/ protected/ covered, in line with the asbestos regulations requirements and be clearly identified with warning notices.

Coal tar

B2.13.11 Asphalt waste containing coal tar is classified as a hazardous waste where the level of coal tar is greater than 0.1%. Coal tar is still classified as a hazardous waste when it is treated using a cold recycling bound mixture. The treatment of coal tar and then use in construction requires an environmental permit unless the requirements of *Regulatory Position Statement 075* are followed.

B2.14 Monitoring

B2.14.1 Monitoring and measurement of waste will be undertaken on a regular basis by the PC(s), with regular interpretations to identify trends and rectify wasteful practices. The results of monitoring will be included in regular site meetings.

B2.14.2 The PC(s) will also update National Highways with the progress of the SWMP on a regular basis.

Review

B2.14.3 Following completion of the construction phase the SWMP will be reviewed by the PC(s) and National Highways, including the Project performance against the Project targets.

Appendix A: Enabling Works Template

Activity	Waste generated	Estimated tonnage	Estimated m^3	Anticipated management
Site clearance/ utility connections/ enabling works	Exported utility trenching as-dug offsite waste *potentially hazardous	TBC	TBC	TBC
	Exported utility trenching as-dug offsite *potentially hazardous	TBC	TBC	TBC
	Exported utility trenching as-dug offsite (non-hazardous)	TBC	TBC	TBC
	Aluminium (power cable and transmission towers) – removed and wastage	TBC	TBC	TBC
	Steel (gas main and power transmission towers) – removed and wastage	TBC	TBC	TBC
	Concrete (pre-cast pipes, slabs, foundations, sewer) – wastage and temporary works	TBC	TBC	TBC
	Concrete (pre-cast pipes, slabs, foundations, sewer) – wastage and temporary works	TBC	TBC	TBC
	Bituminous road surfacing *potentially hazardous (assumes 25% of total contains coal tar)	TBC	TBC	TBC
	Bituminous road surfacing *potentially hazardous (assumes 25% of total contains coal tar)	TBC	TBC	TBC
	Asphalt – wastage and temporary works	TBC	TBC	TBC
	Asphalt – wastage and temporary works	TBC	TBC	TBC
	Excess vegetation from site clearance	TBC	TBC	TBC
	Vegetation from site clearance – reused within the Order Limits	TBC	TBC	TBC
	Iron (manholes) – wastage	TBC	TBC	TBC
	Plastic (utility pipework) – wastage and temporary works	TBC	TBC	TBC
	Plastic (utility pipework) – wastage and temporary works	TBC	TBC	TBC

Appendix B: Demolition Works Template

Activity	Waste generated	Estimated tonnage	Estimated m^3	Anticipated management
Demolition (properties and structures)	Aggregate	TBC	TBC	TBC
	Concrete from demolition reused as recycled	TBC	TBC	TBC
	Concrete from demolition – sent offsite	TBC	TBC	TBC
	Concrete from demolition – sent offsite	TBC	TBC	TBC
	Steel	TBC	TBC	TBC
	Other inert (e.g. brick, glass)	TBC	TBC	TBC
	Other inert	TBC	TBC	TBC
	Insulation	TBC	TBC	TBC
	Insulation	TBC	TBC	TBC
	Mixed metal	TBC	TBC	TBC
	Plastic	TBC	TBC	TBC
	Plastic	TBC	TBC	TBC
	Timber	TBC	TBC	TBC
	Timber	TBC	TBC	TBC
	Plasterboard	TBC	TBC	TBC
	Plasterboard	TBC	TBC	TBC
	Hazardous waste (e.g. asbestos)	TBC	TBC	TBC

Appendix C: Construction Highways Template

Activity	Waste generated	Estimated tonnage	Estimated m^3	Anticipated management
Construction (earthworks, compounds, haul roads and highways)	Concrete	TBC	TBC	TBC
	Steel	TBC	TBC	TBC
	Rubber	TBC	TBC	TBC
	Plastic	TBC	TBC	TBC
	Aggregate	TBC	TBC	TBC
	Cement	TBC	TBC	TBC
	Bentonite	TBC	TBC	TBC
	Bentonite	TBC	TBC	TBC
	Iron	TBC	TBC	TBC
	Asphalt	TBC	TBC	TBC
	Timber	TBC	TBC	TBC
	Contaminated excavated material *potentially hazardous	TBC	TBC	TBC
	Non-hazardous excavated material	TBC	TBC	TBC
	Inert excavated material	TBC	TBC	TBC
	Inert excavated material – retained in Order Limits	TBC	TBC	TBC
	General waste skips	TBC	TBC	TBC
	Cardboard (packaging)	TBC	TBC	TBC
	Dry mixed recycling	TBC	TBC	TBC