A38 Derby Junctions
TR010022
Volume 6
6.1 Environmental Statement
Chapter 11 – Material Assets and Waste

Regulation 5(2)(a)

Planning Act 2008

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

April 2019

Infrastructure Planning

Planning Act 2008

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

A38 Derby Junctions Development Consent Order 202[ ]

6.1 Environmental Statement
Chapter 11 Material Assets and Waste

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11. Material Assets and Waste

11.1 Introduction and competent expert evidence

11.1.1 This chapter presents the results of an assessment of the likely significant effects of the Scheme in relation to material assets and waste, and considers the use of materials resources and the generation and management of waste associated with the Scheme.

11.1.2 This material assets and waste chapter has been written in accordance with Interim Advice Note (IAN) 153/11 (Highways Agency, 2011) which is intended for the *"identification of impacts associated with materials resource use and waste arisings"* for construction, improvement and maintenance projects and is relevant guidance for this Scheme. In addition to this, Design Manual for Roads and Bridges (DMRB) HA204/08 (Highways Agency, 2008a), HA200/08 (Highways Agency, 2008b), and Annex A of IAN 125/15 (Highways Agency, 2015) have also been followed.

11.1.3 For the purpose of this chapter, material assets and wastes are defined as comprising:

- The use of material resources.
- The generation and management of waste.

11.1.4 Material resources are defined by IAN 153/11 as *"the materials and construction products required for the construction, improvement and maintenance of the trunk road network. Material resources include primary raw materials such as aggregates and minerals, and manufactured construction products"*.

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

11.1.6 This chapter of the Environmental Statement (ES) has been prepared by competent experts with relevant and appropriate experience. Details of the technical lead for the material assets and waste assessment, and their professional qualifications and experience are summarised in Appendix 1.1 [**TR010022/APP/6.3**].

11.2 Legislative and policy framework

11.2.1 As discussed in Chapter 1: Introduction, the primary basis for deciding whether or not to grant a Development Consent Order (DCO) for the Scheme is the National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014). Sections 4 and 5 therein set out policies to guide how DCO applications will be decided and how the impacts of national networks infrastructure should be considered. Table 11.1 identifies the NPSNN policies relevant to the material assets and

waste assessment and where in this ES chapter information is provided to address these policy requirements.

Table 11.1: Relevant NPSNN policies for the material assets and waste assessment

Relevant NPSNN para. Ref.	Requirement of the NPSNN	Location where information addresses policy requirements
5.42 and 5.43 (Waste Management)	The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.	Refer to Section 11.9 (Design, mitigation and enhancement measures). Also refer to the Outline Environmental Management Plan (OEMP) (Appendix 2.1 **[TR010022/APP/6.3]**)

11.2.2 Other relevant policies have been considered as part of the material assets and waste assessment where these have informed the identification of receptors and resources and their sensitivity; the assessment methodology; the potential for significant environmental effects; and required mitigation. These policies include:

- **National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019)**: the NPPF sets out the Government's planning policies for England and how these should be applied, the document was updated in February 2019 and Chapter 17: Facilitating the sustainable use of minerals is of relevance. The following information is relevant to material resources:

  "*So far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously*."

- **Waste Management Plan for England (Defra, 2013)**: fulfils the Waste Framework Directive Article 28 mandatory requirements, and other required content as set out in Schedule 1 to the Waste (England and Wales) Regulations 2011 as amended. The plan is a high level document which outlines the waste that is generated in England and how those materials are managed. The Waste Management Plan provides an analysis of current waste management practices in England, and evaluates implementation of the objectives and provisions of the revised Waste Framework Directive. In terms of

demolition and construction waste, the plan details how the UK is committed to meeting its target under the Waste Framework Directive of recovering at least 70% by weight, of construction and demolition waste by 2020. Uncontaminated excavated soil and stones (European Waste Catalogue (EWC) code 17 05 04) are specifically excluded from this target.

- **National Planning Policy for Waste (Department for Communities and Local Government, 2014)**: provides the planning framework to enable local authorities to put forward, through local waste management plans, strategies that identify sites and areas suitable for new or enhanced facilities to meet the waste management needs of their areas. Information is also included concerning non-waste developments, including any development whose end function is not directly related to waste. Waste developments include: landfills; waste disposal; waste treatment; waste recycling plants; and Household Waste Recycling Centres (HWRCs). The National Planning Policy for Waste (Section 8) states that when determining planning applications for non-waste developments, local authorities should ensure that:

  i. "The likely impact of proposed, non-waste related developments on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the Waste Hierarchy and/or the efficient operation of such facilities; and

  ii. The handling of waste arising from the construction and operation of development maximises re-use/recovery opportunities, and minimises off-site disposal."

- **The National and Regional Guidelines for Aggregates Provision in England 2005 to 2020 (Department for Communities and Local Government, 2009**): sets out revised national and regional guidelines for aggregates provision in England for the period 2005 to 2020, including assumptions on the proportion contribution of alternative sources of aggregate (secondary and recycled aggregates to the overall provision).

- **Derby and Derbyshire Waste Local Plan (Derby City Council (DCiC) and Derbyshire County Council (DCC), 2005)**: the plan covers the management of waste in the administrative areas of Derby and Derbyshire. A new Waste Plan is being jointly prepared by DCiC and DCC which will replace the existing Local Waste Plan. The plan will guide waste related development within Derby and Derbyshire (outside the Peak District National Park) until 2030 by setting out the general locations for the major facilities and the principles used to decide planning applications over this period. "Towards a Statistical Basis for the Derby and Derbyshire Waste Plan" is a technical

background paper to inform the Waste Plan preparation process published in March 2013. Consultation closed in May 2013.

- **Emerging DCC and DCiC Joint Minerals Local Plan, consultation, March 2018**: the new Minerals Local Plan will replace the existing Minerals Local Plan (DCiC and DCC, 2000) adopted in 2000 and amended in 2002. The new plan will guide mineral-related development within Derby and Derbyshire (outside the Peak District National Park) until 2030. Consultation closed in May 2018.
- **Derby and Derbyshire Local Aggregate Assessment (LAA) (DCC, DCiC and the Peak District National Park Authority, 2017)**: the LAA sets out the current and future situation in Derbyshire, Derby and the Peak District National Park with regard to all aspects of aggregate supply, in particular, setting out the amount of land won aggregate that the area will need to provide in the coming years.

11.2.3 The assessment has also taken account of the key legislation relevant to waste management for the Scheme, including, but not limited to:

- The Waste (England and Wales) Regulations 2011 (as amended).
- The Environmental Permitting (England and Wales) Regulations 2016.
- Environmental Protection Act 1990 (as amended).
- Hazardous Waste (England and Wales) Regulations 2005 (as amended).
- Waste Framework Directive (European Commission, 2008).

11.3 Assessment methodology

11.3.1 The material assets and waste assessment presented in this chapter has been undertaken in accordance with the guidance provided in IAN 153/11 Guidance on the Environmental Assessment of Material Resources (Highways Agency, 2011). The guidance outlines the scope required for both 'Simple' and 'Detailed' assessments of materials. A 'Detailed' assessment has been conducted for the Scheme, to the extent possible given the information available at this stage of Scheme delivery.

11.3.2 Following the guidance in IAN 153/11, this assessment has identified and quantified the following, using professional judgement where appropriate (using information provided by the Scheme design team and by Highways England's appointed buildability advisors):

- The types and quantities of materials required for the Scheme.
- Details of the sources of materials.
- The cut and fill balance.
- The types and quantities of forecast waste arisings from the Scheme.

- Waste that requires storage on site prior to re-use, recycling or disposal.
- Materials and wastes to be pre-treated on site for re-use within the Scheme.
- Waste requiring treatment or disposal off-site.
- The impacts that may arise from the issues identified in relation to materials and waste.

11.3.3 The material assets and waste assessment methodology has been developed further since the EIA Scoping Report (Highways England, 2018) (refer to Chapter 1: Introduction, para. 1.3.5) was issued. Instead of comparing material use with the national markets for these materials as was proposed in the EIA Scoping Report, the assessment compares the estimated recycling rate of construction waste with national targets, and also compares the proportion of recycled and secondary aggregate that would be used with national and regional targets. It is considered that this methodology provides a more accurate representation of Scheme effects upon material assets and waste.

11.3.4 The receptors for this assessment are:

- Waste management infrastructure in the East Midlands region (specifically the landfill disposal capacity).
- Material assets used for Scheme construction.

11.3.5 The magnitude of material asset impacts and the significance of effects have been assessed by:

- Estimating the likely types and quantities of the main construction materials that would be required by the Scheme.
- Estimating the likely proportion of construction and demolition waste that would be recycled.
- Estimating the proportion of secondary or recycled aggregate that would be used for construction of the Scheme.
- Comparing the likely recycling rate and proportion of recycled and secondary aggregate to relevant national targets.

11.3.6 The magnitude of waste management impacts and the significance of effects have been assessed by:

- Establishing the baseline for landfill capacity in the East Midlands region.
- Estimating the likely types and quantities of waste that would be generated by the Scheme.

- Comparing the likely waste arisings from the Scheme to the baseline landfill capacity, and assessing the likely impact on that capacity.

11.3.7 The criteria used for assessing the magnitudes of impacts and the significance of effects are shown in Table 11.2.

Table 11.2: Magnitudes of impacts and effects significance criteria

Magnitude of impact	Effect significance	Material assets	Waste
Neutral	Not significant	• Project achieves >99% overall material recovery/recycling (by weight) of non-hazardous Construction Demolition Waste (CDW) to substitute use of primary materials; and • Aggregates required to be imported to site comprise >99% re-used/recycled content.	• No reduction or alteration in the capacity of waste infrastructure at a regional scale.
Slight	Not significant	• Project achieves 70-99% overall material recovery recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and • Aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional or national percentage target.	• ≤1% reduction or alteration in the regional capacity of waste infrastructure; and • 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.
Moderate	Significant	• Project achieves less than 70% overall material recovery/recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and • Aggregates required to be imported to site comprise re-used/recycled content below the relevant regional or national percentage target.	• >1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from a project; and • 1 - 50% of project waste requires disposal outside of the region.
Large	Significant	• Project achieves <70% overall material recovery/recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and • Aggregates required to be imported to site comprise <1% re-used/recycled content; and • Project sterilises ≥1 mineral safeguarding site and/or peat resource.	• >1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from a project; and • >50% of project waste requires disposal outside of the region.

Magnitude of impact	Effect significance	Material assets	Waste
Very Large	Significant	• Not applicable.	• >1% reduction or alteration in national capacity of waste infrastructure, as a result of accommodating waste from a project; or • Project would require new (permanent) waste infrastructure to be constructed to accommodate waste.

Scoping

11.3.8 The proposed scope of the material assets and waste assessment was detailed in the EIA Scoping Report (Highways England, 2018) submitted to The Inspectorate on 15 March 2018 (refer to Chapter 1: Introduction, para. 1.3.5).

11.3.9 As recorded within the Scoping Opinion (Planning Inspectorate, 2018), material use and waste generation is expected to be very small during the operational and maintenance phase of the Scheme (refer to Appendix 4.1 [**TR010022/APP/6.3**]). Thus, as confirmed in the Scoping Opinion, the consideration of effects associated with materials and waste during Scheme operation and maintenance have been scoped out of the assessment on the basis that the scale of such activities would be unlikely to generate significant effects.

11.3.10 An overview of the Inspectorate's Scoping Opinion in relation to material assets and waste is presented in Table 11.3. This indicates where Scoping Opinion comments are addressed within this ES chapter and supporting documents.

Table 11.3: Scoping Opinion and response

Scoping Opinion	Where addressed within the ES
The Inspectorate	
11.9.4 Operational phase materials resource use and waste generation - The Scoping Opinion provides limited justification to support the approach that no significant effects to materials will occur during operation. However, having regard to the nature of the Proposed Development and its characteristics the Inspectorate agrees that this matter can be scoped out.	Refer to para. 11.3.9 (and Chapter 4: EIA Methodology, para. 4.1.13)
11.3.1 Study area - The study area is described as the 'wider region within which waste management facilities are located and from where construction materials may be sourced'. This definition lacks clarity – a formal study area should be described and justified in the ES. For example, linked to the relevant local authority waste management area.	Refer to Section 11.6

Scoping Opinion	Where addressed within the ES
11.2.4 LAA 2014 - This document is superseded, the ES should reference the LAA 2017 assessment.	Refer to para.11.2.2
11.2.4 Emerging Derbyshire and Derby Joint Minerals Local Plan - The ES should reference the March 2018 consultation version of this plan or any subsequently adopted plan, where relevant.	Refer to para. 11.2.2
Public Health England	
Relevant areas outlined in the Government's Good Practice Guide for EIA include: – impacts associated with re-use of soils and waste soils, for example, re-use of site-sourced materials on-site or offsite, disposal of site-sourced materials offsite, importation of materials to the site, etc.	Refer to Section 11.9
The EIA should demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal). For wastes arising from the installation the EIA should consider: a) the implications and wider environmental and public health impacts of different waste disposal options b) disposal route(s) and transport method(s) and how potential impacts on public health will be mitigated	Refer to Section 11.9
Environment Agency	
The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works are waste or have ceased to be waste. Under the Code of Practice: a) excavated materials that are recovered via a treatment operation can be re-used on site providing they are treated to a standard such that they are fit for purpose and unlikely to cause pollution b) treated materials can be transferred between sites as part of a hub and cluster project c) some naturally occurring clean material can be transferred directly between sites. Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays. The Environment Agency recommends that developers should refer to: a) the Position statement on the Definition of Waste: Development Industry Code of Practice and; b) the Environmental regulations page on GOV.UK.	Refer to Section 11.9

11.4 Consultation

11.4.1 The Preliminary Environmental Information Report (PEIR) was published in September 2018 (Highways England, 2018) (refer to Chapter 1: Introduction, para. 1.3.11) and presented the environmental information collected together with the preliminary findings of the assessment of likely significant environmental effects of the Scheme at the time.

11.4.2 DCC's comments on the PEIR (dated 17 October 2018) makes reference to the EIA Scoping Report (refer to Chapter 1: Introduction, para. 1.3.5) as well as the PEIR. Key comments from DCC are summarised in Table 11.4, which also indicates where comments are addressed within this ES chapter and supporting documents. As detailed in Table 11.4, other than the comments from DCC, no other comments of relevance to the material assets and waste assessment were received.

Table 11.4: Consultee comments on the PEIR

Scoping Opinion	Where addressed within the ES
Derbyshire County Council (DCC)	
"*The Materials section of the PEIR includes details of the proposed approach to mineral and waste considerations in the Environmental Statement. Derbyshire County Council and Derby City Council are the Join Minerals and Waste Planning Authorities for the area covered by all three of the grade separation junctions.* *In the context of the above, it is important that the Environmental Statement and/or associated Planning Statement, provides an assessment of the likely impacts of the scheme against the policies of the adopted Derby and Derbyshire Waste Local Plan (2005). It should be noted in this context that the two authorities are currently preparing a new Waste Local Plan for the area which will ultimately replace the adopted Plan of 2005.* *Reference should be made in the Environment Statement to the Derby and Derbyshire LAA 2017. Referenced should be made to the Adopted Derby and Derbyshire Minerals Local Plan and to the emerging Derbyshire and Derby Joint Minerals Local Plan, which was published for consultation in March 2018 and how the scheme meets the requirements of the policies in the adopted and emerging Local plans.* *It is particularly welcomed and supported that paragraph 10.6.5 of the PEIR indicates that the proposed scheme is currently being progressed to optimise the requirements for cut and fill and where possible this will be minimised to reduce the import and export of materials and waste; and that material generated at the Kingsway and Markeaton junctions is likely to be re-used at Little Eaton junction. However, it is noted that the total cut volume is estimated to be approximately 130,000 cubic metres whilst the estimated fill requirement totals 474,000 cubic metres and so a net import of fill material would be required to construct the proposed scheme. It is important, therefore, that the Environment Statement provides full*	Refer to para. 11.2.2. Impacts of construction traffic on air quality and noise are considered in Chapter 5: Air Quality and Chapter 9: Noise and Vibration, respectively.

Scoping Opinion	Where addressed within the ES
details of the types and quantities of materials that would be sourced to provide the fill materials for the construction of the scheme and the origin of those materials, which should ideally be sourced locally within Derbyshire where at all possible in order to reduce travel distances. The need to import such large volumes of material by HGVs is also likely to have implications for the wider road network during the construction phase, which will need to be taken onto account in the ongoing transport modelling referred to above."	

11.5 Assessment assumptions and limitations

11.5.1 This assessment is based upon the Scheme design and details regarding Scheme construction and operation as provided in Chapter 2: The Scheme.

11.5.2 Some details relating to the sources of some construction materials are not available given that such details would only become available during the construction works detailed design stage. Nevertheless, the assessment presented herein is based on estimated material asset requirements and waste generation estimates, taking into account advice from the Scheme design and Highways England's appointed buildability advisors.

11.5.3 Information on the current permitted regional landfill capacity is provided in Table 11.7. There is no available information on any potential changes to this permitted capacity by the time of Scheme construction.

11.5.4 This assessment does not consider the environmental impacts associated with the extraction of raw materials and the manufacture of products, nor the impact at waste management facilities. It is assumed that any such issues would have been subject to the applicable environmental assessment, permitting and planning approval for the relevant facilities.

11.6 Study area

11.6.1 The study area for construction materials and assets assessment includes the whole of the UK, since the main construction materials include aggregate, concrete, asphalt and steel which have national (and in some cases international), rather than local supply chains.

11.6.2 The study area for waste generation is defined by the boundary of the Scheme, within which waste would be generated. The study area for waste management comprises the wider region within which waste management infrastructure is located i.e. the East Midlands.

11.7 Baseline conditions

11.7.1 The baseline conditions relate to the current regional landfill capacity in the East Midlands region, and national targets for recycling of material resources in construction, as based upon the most recently published sources of information.

11.7.2 There is no information available on future waste infrastructure capacity or materials usage, and hence the baseline scenario uses current available data.

Material resources

11.7.3 The baseline target for recovery of non-hazardous construction and demolition waste is 70% by weight by 2020, as set out in the Waste Framework Directive and the Waste Management Plan for England (Defra, 2013). Uncontaminated excavated soil and stones (EWC code 17 05 04) are specifically excluded from this target.

11.7.4 The baseline targets for alternative aggregates (which comprises 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 the National and Regional Guidelines for Aggregates Provision in England 2005 to 2020 and are summarised in Table 11.5 (Department for Communities and Local Government, 2009). The relevant target for Scheme is the 14% guideline for the East Midlands region.

Table 11.5: National and regional guidelines for aggregates provision

Region	Total aggregate provision (million tonnes)	Alternative materials targets (secondary and recycled aggregates)
South East	502	26%
London	197	48%
East	382	31%
East Midlands	784	14%
West Midlands	370	27%
South West	656	22%
North West	392	30%
Yorkshire & the Humber	431	31%
North East	193	26%
England (total)	**3,908**	**25%**

11.7.5 The Derbyshire and Derby Minerals Local Plan, Towards a Minerals Local Plan Spring 2018 Consultation, Background Paper Sand and Gravel and Background Paper Crushed Rock for Aggregate (DCiC and DCC, 2018) list the quarries in Table 11.6 as being sources of construction materials.

Table 11.6: Commodities available within Derbyshire

Quarry name and operator	Commodity	Approximate distance and direction from Scheme (km)
Mercaston Quarry, Hanson Aggregates	Sand and gravel	18km north-west
Willington Quarry, CEMEX	Sand and gravel	17km south-west
Shardlow Quarry, Hanson Aggregates	Sand and gravel	17km south-east
Swarkestone Quarry, Tarmac	Sand and gravel	21km south
Ball Eye Quarry, Deepwood Mining	Limestone	26km north-west
Slinter Top Quarry, Slinter Mining Co.	Limestone	26km north-west
Dene Quarry, Tarmac	Limestone	26km north-west
Bone Mill Quarry, Longcliffe Quarries	Limestone	33km north-west
Grange Mill Quarry, Ben Bennett Jnr.	Limestone	33km north-west
Longcliffe/Brassington Moor, Longcliffe Quarries	Limestone	32km north-west
Whitwell, Tarmac	Limestone	51km north-east
Dowlow, Hope Construction Materials	Limestone	51km north-west
Brierlow Quarry, Lhoist	Limestone	54km north-west
Ashwood Dale, Omya Uk	Limestone	60km north-west
Tunstead Quarry, Tarmac	Limestone	64km north-west
Dove Holes Quarry, Cemex	Limestone	65km north-west
Glossop Quarry, Wienerberger	Sandstone	113km north-west

Waste

11.7.6 The Environment Agency collates and publishes data received from permitted waste facilities on the wastes accepted and removed from their sites, and on remaining landfill capacity. The latest publically-available data for landfill capacity is from 2017 and shown in Table 11.7 (Environment Agency, 2018).

Table 11.7: East Midlands landfill capacity 2017

Landfill type	Landfill capacity ($000m^3$)
Hazardous merchant	948
Hazardous restricted	-
Non-hazardous with SNRHW* cell	18,072
Non-hazardous	13,455
Non-hazardous restricted	3,525
Inert	22,796
Total	**58,796**

* SNRHW = selected non-reactive hazardous waste

11.8 Potential impacts

Construction

11.8.1 Prior to implementation of the mitigation, the potential impacts of the Scheme with regards to material resources and waste arisings include:

a) Effects on the availability and use of secondary and recycled construction materials.

b) Effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.

Material assets

11.8.2 Table 11.8 summarises the types of materials that would be used and the wastes that may be generated by the Scheme.

Table 11.8: Types of material use and waste generation

Project activity	Material resources required	Waste arisings
Site remediation/ preparation/ earthworks	• Fill material for construction purposes • Primary and secondary/recycled aggregates for ground stabilisation	• Surplus excavated materials • Stripped topsoil and subsoil • Contaminated soils (if present) • Site clearance, green waste arisings
Demolition	• Materials are not required for demolition works	• Waste arisings from the demolition of existing buildings or structures (e.g. the buildings at Queensway/A52 Ashbourne Road)
Site construction	Construction materials including: • Concrete • Pre cast drainage products • Steel bridge beams	• Packaging material from materials delivered to site • Excess and broken/damaged construction materials

Project activity	Material resources required	Waste arisings
	• Plastic drainage products • Asphalt and bituminous material • Cement bound granular material • Well graded granular material • Precast concrete kerb • Timber • Plywood • Cementitious grout • Reinforcing steel • Reinforcing fabric • Geotextile • Geo-composite drainage system • Pipe bedding aggregate • Filter drain material • Imported fill for embankments • Capping layer and sub-base • Sand and gravel	• Existing highway infrastructure and technology as removed by excavation works • Waste oils from construction vehicles • Construction worker generated wastes (excluding sewage wastewater which would be managed as per the OEMP – refer to Appendix 2.1 [**TR010022/APP/6.3**])

11.8.3 The estimated main types and quantities of materials anticipated (excluding earthworks) to be used during Scheme construction are shown in Table 11.9. Where required, material densities as outlined in the Waste & Resources Action Programme (WRAP) Designing Out Waste Tool for Civil Engineering (WRAP, undated) have been used to convert quantities from m^3 to tonnes or tonnes to m^3.

Table 11.9: Estimated main types and quantities of materials used during Scheme construction

Material resources	Quantity (approximate)		
	Tonnes	m^3	Other
Cement bound granular material	54,000	26,000	-
Concrete (ready mixed)	175,000	70,000	-
Concrete (products) e.g. precast concrete	-	-	17,000m
Steel	9,000	11,000	-
Asphalt and bituminous material	86,000	36,000	-
Aggregates (Type 1 sub-base)	54,000	28,000	-
Geotextile	-	-	412,000m^2
Filter drain material	7,500	3,400	-
Timber/plywood e.g. form work and shuttering	700	1,300	-

11.8.4 For most highways schemes, the largest quantities of waste and materials are generally those associated with earthworks, especially in those cases where a balance between excavation (cut) and material placement (fill) cannot be achieved. The predicted cut and fill for the Scheme is presented in Table 11.10.

Table 11.10: Predicted cut and fill and estimated material re-use and landfilling for the Scheme (approximate)

Junction	Cut (m^3)	Fill (m^3)	Balance (m^3)	Cut material re-use (m^3)	Cut material to be landfilled (m^3)
Kingsway junction	58,143*	66,651	-8,508	20,386	37,759
Markeaton junction	73,714	7,393	66,321	66,343	7,371
Little Eaton junction	43,673**	419,814	-376,141	43,673	0
Totals	**175,530**	**493,858**	**-318,328**	**130,402**	**45,130**

*** includes approximately 7,800m^3 excavation from flood storage areas within the Kingsway hospital site**
**** includes approximately 36,000m^3 excavation from the floodplain compensation area to the west of the River Derwent**

11.8.5 At Kingsway junction, it is anticipated that cut material sourced from an area used for historic landfilling would not be reusable. It is estimated that of the total cut material volume (approximately 58,143m^3), approximately 37,759m^3 would need to be landfilled (refer to Table 11.10), potentially including asbestos containing materials (ACM) excavated from the area of former landfilling (estimate of approximately 7,000m^3 of excavated material containing ACM) (refer to Chapter 10: Geology and Soils).

11.8.6 It is estimated that up to 90% of the material excavated from Markeaton junction (approximately 73,714m^3) could potentially be re-used, with approximately 10% being landfilled (approximately 7,371m^3) (refer to Table 11.10).

11.8.7 At Little Eaton junction it is estimated that approximately 43,673m^3 of material would be generated, which it is assumed would all be available for re-use (refer to Table 11.10).

11.8.8 It is, therefore, anticipated that a total of approximately 45,130m^3 of cut material would need to be landfilled (refer to Table 11.10) (i.e. approximately 26% of the total cut volume), with approximately 130,402m^3 being available for re-use.

11.8.9 The Scheme design has been designed to optimise the requirements for cut and fill. However, the estimated quantities of earthworks materials are imbalanced, with the net import of approximately 318,328m^3 of material (refer to Table 11.10).

11.8.10 It is the intention that as much of the reusable cut material would be re-used on site as feasible. However, should any such materials not be re-used on site, the construction contractor would seek to re-use material elsewhere, although some materials may require off-site disposal.

11.8.11 Impacts related to the transportation of material via the existing road network are discussed further in Chapter 5: Air Quality and Chapter 9: Noise and Vibration.

11.8.12 It should be noted that the origin of imported material resources cannot be confirmed at this time as this would be determined by the Scheme contractor during the construction works detailed design stage. However, there is a wealth of mineral sources within the Derbyshire region (refer to Table 11.6), such that materials required for the Scheme are anticipated to be sourced locally in order to minimise transportation distances. Other potential material donor sites might include collieries, existing quarries and major development schemes in the East Midlands with a materials surplus.

Waste

11.8.13 The estimated main types and quantities of waste generated during Scheme construction and potential recovery rates are shown in Table 11.11. Concrete (products) (e.g. precast concrete) are not included as these products are not currently quantifiable by volume or weight.

11.8.14 Waste arisings have been determined using material wastage rates (rating of good) as outlined in the WRAP Designing Out Waste Tool for Civil Engineering (WRAP undated). The estimated recovery rates are based on the "good practice quick win" recovery rates set out in the "Achieving Good Practice Waste Minimisation and Management" report published by WRAP (WRAP, undated). The overall recovery rate is calculated by tonnage.

Table 11.11: Estimated quantities of non-hazardous construction and demolition waste and potential recovery rates during Scheme construction

Scheme activity	Waste arisings from Scheme	Quantity (tonnes)	Quantity (m^3)	Management routes	Recovery rate (%)
Construction	Cement bound granular material	2,700	1,300	Off-site recycling or disposal	95
	Concrete (ready mixed)	1,350	650	Off-site recycling or disposal	95
	Steel	450	550	Off-site recycling	100
	Asphalt and bituminous material	2,150	900	Off-site recycling or disposal	95

Scheme activity	Waste arisings from Scheme	Quantity (tonnes)	Quantity (m^3)	Management routes	Recovery rate (%)
	Aggregates	2,700	1,400	Off-site recycling or disposal	95
	Filter drain material	375	170	Off-site recycling or disposal	95
	Timber/ plywood e.g. form work and shuttering	35	65	Off-site recycling or energy recovery	90
	Packaging from materials delivered to site	50	135	Taken back by suppliers for re-use or recycling, taken off-site for recycling or disposal	85
	General office waste/ construction worker waste	150	500	Off-site recycling or disposal	50
	Liquid waste	3	3	Off-site disposal (potentially hazardous waste)	0
Site remediation and preparation	Vegetation arising from site clearance	7,000	10,000	Off-site composting or energy recovery	90
	Soil (topsoil and subsoil)	Not expected, all suitable topsoil and subsoil to be re-used on-site where possible.			
Demolition	Demolition of residential structures and bridge deck	98	292	Off-site recycling or disposal	95
Total		**17,061**	**15,965**		**93**

11.8.15 Table 11.11 indicates an estimated non-hazardous waste materials recovery rate of approximately 93%. Excavated material is not included in Table 11.11 or when calculating the overall waste recovery rate, since the majority of material would be re-used on site and hence not be categorised as a waste. This approach is consistent with the waste hierarchy and the objectives of minimising waste generation and reusing materials.

11.8.16 Cut material from the Kingsway and Markeaton junctions that may not be re-usable (given that material would be part sourced from an area used for historic landfilling) is considered separately as the material may need to be landfilled.

Operation

11.8.17 Material use and waste generation is expected to be very small during Scheme operation. Routine Scheme maintenance would include gully emptying and litter collection. Periodically, maintenance activities such as highway resurfacing would be required. Waste arisings from these maintenance activities are expected to be similar (in both type and quantity) to those generated by the existing highway; with wastes being managed by the regional maintenance contractor for Highways England using established procedures and facilities.

11.8.18 For these reasons, materials use and waste generation during Scheme operation have been scoped out of the assessment – refer to para. 11.3.9.

11.9 Design, mitigation and enhancement measures

11.9.1 The following mitigation measures would be implemented during the Scheme detailed design and construction phases:

- Waste arisings would be prevented and designed out where practicable.
- Opportunities to re-use material resources would be sought.
- Opportunities to support the circular economy would be considered.

11.9.2 An OEMP (refer to Appendix 2.1 [**TR010022/APP/6.3**]) has been prepared as an iterative process in parallel with the development of the Scheme design and construction methodology. Measures within it include design, construction and operational mitigation, which have been defined in part by the requirements which arise from the technical assessments presented in this ES. The technical assessments within this ES have taken account of the agreed measures within the OEMP as 'embedded mitigation'. The OEMP is provided within Appendix 2.1 [**TR010022/APP/6.3**]. The OEMP contains a range of measures that aim to reduce environmental effects as associated with materials use and waste.

11.9.3 The construction of the Scheme would be subject to measures and procedures defined within a Construction Environmental Management Plan (CEMP). The CEMP would be based on, and incorporate, the requirements of the OEMP (refer to Appendix 2.1 [**TR010022/APP/6.3**]), and would include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to waste management on site. The CEMP would be produced by the construction contractor prior to works commencing in accordance with IAN 183/14, noting that the CEMP would include a Site Waste Management Plan (SWMP).

11.9.4 The SWMP would set out a recording process for the management of waste, including the storage and transport of waste on-site and a recording mechanism for required waste documentation such as Waste Transfer or Consignment Notes (dependent on the waste stream) in order to confirm the assessment of the waste impact and to implement the embedded mitigation measures. The SWMP would include procedures for monitoring the overall construction waste recovery rate and the proportion of secondary and recycled aggregate used in the Scheme, in order to confirm the assessment of materials impacts.

11.9.5 The CEMP would require contractors to adopt good practice in construction waste management which would reduce the quantity of waste generated. The following approaches would be implemented, where practicable, in order to minimise the quantities of waste requiring disposal:

- Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme.
- Implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste.
- Attention to material quantity requirements to avoid over-ordering and generation of waste materials.
- Re-use of materials wherever feasible e.g. re-use of excavated soil for landscaping. Concrete would be taken off-site for crushing and re-use.
- Segregation of waste at source where practical.
- Re-use materials within the construction by carrying out remediation or soil improvement, where feasible, in order to mitigate any contamination or geotechnical risks.
- Re-use and recycling of materials off-site where re-use on-site is not practical (e.g. through use of an off-site waste segregation facility and re-sale for direct re-use or re-processing).
- The re-use of excavated soils during Scheme construction would be governed by a Materials Management Plan (MMP) (included within the CEMP) which would be developed in accordance with CL:AIRE Code of Practice which is a voluntary framework for excavated materials management and re-use. Following this framework would result in a level of information being generated sufficient to demonstrate that excavated material has been re-used appropriately and is suitable for its intended use. It would demonstrate that unsuitable material or waste had not been used in the development. The MMP would detail the procedures and measures that would be taken to classify, track, store, re-use and dispose of all excavated materials that would be encountered during the Scheme construction phase.

11.9.6 The CEMP would require that the following waste management measures are implemented in order to minimise the likelihood of any localised impacts of waste on the surrounding environment:

- Damping down of surfaces during spells of dry weather and brushing or water spraying of heavily used hard surfaces and access points across the site as required.
- Off-site prefabrication, where practical, including the use of prefabricated structural elements, cladding units, toilets, mechanical and electrical risers and packaged plant rooms.
- Burning of waste or unwanted materials would not be permitted on-site.
- All hazardous materials including fuels, chemicals, cleaning agents, solvents and solvent containing products to be kept in sealed containers at the end of each day prior to storage in appropriately protected and bunded storage areas.
- All demolition and construction workers would be required to use appropriate Personal Protective Equipment (PPE) whilst performing activities on-site.
- Any waste effluent would be tested and where necessary, disposed of at an appropriately licensed facility by a licensed specialist contractor(s).
- Where there is a requirement to dispose of surplus or unsuitable soils off-site as waste, the material would be characterised to determine firstly whether it is hazardous or non-hazardous waste in accordance with the Environment Agency's Technical Guidance WM3 (Environment Agency, 2015). Once this is established, the appropriate disposal facility would be determined through Waste Acceptance Criteria (WAC) analysis as required.
- Materials requiring removal from the site would be transported using licensed carriers and records would be kept detailing the types and quantities of waste moved, and the destinations of this waste, in accordance with relevant regulations.

11.9.7 The OEMP provided within Appendix 2.1 [**TR010022/APP/6.3**] sets a target that 14% of aggregates should be secondary and recycled aggregates, for those applications where it is technically and economically feasible to substitute these alternative materials for primary aggregates.

11.9.8 The OEMP provided within Appendix 2.1 [**TR010022/APP/6.3**] sets a target recovery rate of 70% by weight for non-hazardous construction and demolition waste. Uncontaminated excavated soil and stones (EWC code 17 05 04) are specifically excluded from this target.

11.10 Assessment of likely significant effects

Material resources

11.10.1 The Scheme would set a target of 14% use of secondary and recycled aggregates, for those applications where it is technically and economically feasible to substitute these alternative materials for primary aggregates. This target is in accordance with the regional guidelines for East Midlands, and given the location of the Scheme (relatively close to large sources of secondary and recycled aggregate). Aggregates required to be imported to site would comprise re-used or recycled content in line with the relevant regional or national percentage target. The effect is, therefore, assessed as being slight and not significant.

11.10.2 By applying good industry practice to management of the waste materials generated by the Scheme, it is anticipated that an overall recovery rate of 93% can be achieved (refer to Table 11.11). This exceeds the Government's 70% by weight target for recovery of non-hazardous construction waste. The effects are, therefore, assessed as being slight and not significant. Uncontaminated excavated soil and stones (EWC code 17 05 04) are specifically excluded from this target.

Waste

11.10.3 Construction of the Scheme is expected to generate approximately 17,061 tonnes (approximately 15,965m^3) of non-hazardous construction and demolition waste (excluding earthworks), which is expected to require management off site (as shown in Table 11.11).

11.10.4 Based on a worst-case assumption that all of the non-hazardous construction and demolition waste requiring management off site is disposed of to landfill, then the approximate 15,965m^3 of waste would utilise approximately 0.03% of the permitted regional landfill capacity as shown in Table 11.7.

11.10.5 It is anticipated that some of cut material from the Kingsway and Markeaton junctions may not be re-usable (given that material would be part sourced from an area used for historic landfilling) and a total of approximately 45,130m3 of material would need to be landfilled. This would utilise approximately 0.08% of the permitted regional landfill capacity as shown in Table 11.7.

11.10.6 Given the above, the Scheme would result in less than 1% reduction or alteration in the regional capacity of waste infrastructure, whilst there is adequate disposal capacity within the region to accommodate all the waste from the Scheme. In practice a large proportion of waste from the Scheme is likely to be recycled or recovered rather than being disposed of to landfill, as shown in Table 11.11. Thus would further reduce the overall quantity of waste requiring disposal. The effects are, therefore, assessed as being slight and not significant.

11.11 Monitoring

11.11.1 No significant material asset and waste effects are predicted as associated with Scheme construction. On that basis, no monitoring of significant effects is proposed.

11.11.2 The OEMP provided within Appendix 2.1 [**TR010022/APP/6.3**] sets out monitoring to be undertaken during the Scheme construction stage to ensure that the mitigation measures embedded in the Scheme design are appropriately implemented.

11.12 Summary of assessment

11.12.1 A summary of the material assets and waste assessment is provided in Table 11.12 which indicates that no significant material asset and waste effects are predicted during Scheme construction.

Table 11.12: Material assets and waste - summary of effects

Receptor	Attribute	Receptor sensitivity	Impact description	Design and mitigation measures	Impact magnitude	Effect significance
Waste management infrastructure in the East Midlands region (specifically the landfill disposal capacity).	Approximately 59 million m^3.	Not applicable	Less than 1% reduction or alteration in the regional capacity of waste infrastructure. Adequate disposal capacity is available within the region to accommodate all the waste from the Scheme.	SWMP to be included in the CEMP (refer to the OEMP in Appendix 2.1 [**TR010022/APP/6.3**]). MMP to be included in the CEMP (refer to the OEMP in Appendix 2.1 [**TR010022/APP/6.3**]).	Slight	Not significant
Material resources used for construction.	• Target that 14% of aggregates should be secondary and recycled aggregates, for those applications where it is technically and economically feasible to substitute these alternative materials for primary aggregates. • Target recovery rate of 70% by weight for non-hazardous construction and demolition waste. Uncontaminated excavated soil and stones (EWC code 17 05 04) are specifically excluded from this target.	Not applicable	Targets likely to be achievable.	Targets to be set in the CEMP (refer to the OEMP in Appendix 2.1 [**TR010022/APP/6.3**]).	Slight	Not significant

11.13 References

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