Chapter 19

Resource and Waste Management

Contents

19. Material Assets: Resource and Waste Management

19.1. Introduction

The Transport (Railway Infrastructure) Act 2001 (as amended) provides for the making of a Railway Order application by Córas Iompair Éireann (CIÉ) to An Bord Pleanála. The European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 (S.I. No. 743 of 2021) gives further effect to the transposition of the EIA Directive (EU Directive 2011/92/EU as amended by Directive 2014/52/EU) on the assessment of the effects of certain public private projects on the environment by amending the Transport (Railway Infrastructure) Act 2001 ('the 2001 Act').

An examination, analysis and evaluation is carried out by An Bord Pleanála in order to identify, describe and assess, in the light of each individual case, the direct and indirect significant effects of the proposed railway works, including significant effects derived from the vulnerability of the activity to risks of major accidents and disasters relevant to it, on: population and human health; biodiversity, with particular attention to species and habitats protected under the Habitats and Birds Directives; land, soil, water, air and climate; material assets, cultural heritage and the landscape, and the interaction between the above factors.

This chapter of the Environmental Impact Assessment Report (EIAR) identifies and describes the potential waste and resource impacts associated with the proposed Project in accordance with the Transport (Railway Infrastructure) Act 2001 (as amended) and the EIA Directive (EU Directive 2011/92/EU as amended by Directive 2014/52/EU). The assessment examines the potential impacts during the construction and operational phases of the proposed Project. This chapter considers the waste likely to arise from the site enabling works, construction and operation works. It outlines how any waste materials arising from the proposed Project will be managed in accordance with the principles of the waste hierarchy as outlined in the European Communities Revised Waste Framework Directive i.e., prevention, reduction, preparing for reuse, recycling, other recoveries, and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery). The chapter has also been prepared with and should be read in conjunction with the following chapters of the EIAR:

- Chapter 4 Project Description;
- Chapter 5 Construction Strategy;
- Chapter 6 Traffic and Transportation;
- Chapter 9 Land & Soils;
- Chapter 10 Water (Hydrology & Flood Risk);
- Chapter 11 Hydrogeology; and

- Chapter 13: Climate.

19.2. Legislation, Policy, and Guidance

The key legislation and guidance referenced in the preparation of the EIAR is outlined in Chapter 1 Introduction (Sections 1.5, 1.6 and 1.7). Resource and waste management takes place in accordance with a policy and legislative framework and the assessment of likely significant effects of the proposed Project on Resource and Waste Management has taken account of the topic specific legislation, policy, and guidance documents as outlined below.

19.2.1. Legislation

European Legislation

- Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste;
- Council Regulation (EU) 2017/997 of 8 June 2017 (Re. Hazardous Waste);
- Commission Directive (EU) 2015/1127 amending Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives Text with EEA relevance;
- EU Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment ("the EIA Directive"); and
- EU Waste Framework Directive (2008/98/EC).

National Legislation

- European Union (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020);
- European Union (Waste Directive) Regulations 2011, (S.I. No. 126 of 2011) (as amended, including the European Union (Waste Management) (Environmental Impact Assessment) Regulations 2020 (S.I. No. 130/2020);
- European Communities (Waste Directive) (No. 2) Regulations 2011 (S.I. No. 323 of 2011); and
- Waste Management Act 1996 (as amended and substituted).

19.2.1.1. Legislative Exemptions

The European Union (Waste Directive) Regulations 2011 (SI. No. 126 of 2011) (Regulation 4) substitutes new sections 3 and 4 into the Waste Management Act 1996 (as amended) ("the 1996 Act") and section 3(1)(c) of the 1996 Act now provides that the 1996 Act shall not apply to:

"Uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which is was excavated."

Materials from the proposed Project which fall within this provision are therefore not subject to the requirements of EU and National waste legislation. Furthermore, Article 27 of the same regulations allows an economic operator to notify the EPA, under specific circumstances, that material is a by-product and not a waste. The Article 27 process was introduced into Irish law to implement Article 5 of the Waste Framework Directive (2008/98/EU). Article 27 was amended by Article 15 of the European Union (Waste Directive) Regulations 2020 (S.I. No.323 of 2020) to give effect to Directive (EU) 2018/851.

Excess soil and stone produced during construction projects will be considered a by-product, and not waste, by the EPA if it meets each of the four by-product conditions detailed:

a) Further use of the substance or object is certain;

b) The substance or object can be used directly without any further processing other than normal industrial practice;

c) The substance or object is produced as an integral part of a production; and

d) Further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Classification of material as a by-product means that the material is of a type that is not regulated by waste management legislation, and therefore is not required to be managed as per that legislation. For construction projects, excavated soil and stone material that adheres to the conditions stipulated under Article 27 can be categorised under this exemption. The economic operator and destination for the material must adhere to all applicable requirements for this exemption to be permitted.

The EPA has produced the following guidance to assist the completion of by-product notifications:

- (Draft) By-product - Guidance Note (May 2020) – A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No 126 of 2011); and
- Guidance on Soil and Stone By-products (June 2019) (in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011).

19.2.1.2. Waste Management Act 1996 (as amended)

Any surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) (as amended) and having regard for the Circular Economy

and Miscellaneous Provisions Act 2022 and any such legislative requirements that may be required later.

If the material is deemed to be a waste, removal and reuse/ recycling/ recovery/ disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (S.I. No. 821 of 2007) (as amended). Factors such as the volume of waste requiring management will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

Further details regarding resource and waste management are included in Chapter 5 Construction Strategy.

19.2.2. Policy

Relevant EU, national and local government policy documents that were reviewed and that have informed the assessment include:

- Dublin City Development Plan 2022-2028;
- South Dublin County Development Plan 2022-2028;
- Kildare County Development Plan 2017-2023 (and draft Plan 2023-2029 as available);
- Eastern-Midlands Waste Regional Office – Eastern Midlands Region Waste Management Plan 2015-2021 (EMWRO,.2015) (To be replaced by National Waste Management Plan, currently in preparation, due for publication Q1 2023);
- Department of the Environment, Climate and Communications - Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (DECC, 2021);
- Environmental Protection Agency - National Hazardous Waste Management Plan 2021-2027 (EPA, 2021);
- Environmental Protection Agency - Circular Economy Programme 2021-2027 'The Driving Force for Ireland's Move to a Circular Economy' (EPA, 2021);
- Department of the Environment, Climate and Communications - Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025 (DECC, 2020); and
- European Commission - A new Circular Economy Action Plan - For a cleaner and more competitive Europe (EC, 2020).

19.2.3. Guidance

Relevant guidance documents that have informed the methodology and impact assessment include:

- EPA (2020), Draft By-Product Guidance Note, A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011);
- The Institute of Environmental Management & Assessment (IEMA) (March 2020) Guide to: Materials and Waste in Environmental Impact Assessment;
- EPA (2019) Guidance on Soil and Stone By-products: in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011, Version 3, June 2019;
- Design Manual for Roads and Bridges (DMRB) – HE-DMRB-SE LA 110 – Material assets and waste (formerly IAN 153/11);
- Transport Infrastructure Ireland (TII Dec 2017) The Management of Waste from National Road Construction Projects, GE-ENV-01101;
- HAS and EPA (2017) Guidance for the Management of Household Hazardous Waste at Civic Amenity Sites;
- EPA (2018) Waste Classification – List of Waste and Determining if Waste is Hazardous or Non- Hazardous;
- Department of Environment and Heritage Local Government (2006) Best Practice Guidelines on Preparation of Waste Management Plans for Construction and Demolition Projects; and
- Construction Industry Research and Information Association (CIRIA 1997). Document 133 Waste Minimisation in Construction.

19.2.4. Legislative and Policy Context

The principal objective of sustainable waste and resource management is to use material resources more efficiently, to re-use, recycle and recover material and to reduce the amount of waste requiring final disposal. The value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy.

Where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy, as illustrated in Figure 19-1 and set out in the Waste Framework Directive 2008/98/EC. It is the intention that this would actively contribute to the economic, social, and environmental goals of sustainable development.

Figure 19-1 European Waste Hierarchy

Waste prevention is seen by the European Commission as the key factor in any waste management approach. If the arisings of waste can be reduced in the first place, or the use of dangerous substances in products reduced, then disposal automatically becomes simpler. Waste prevention is linked with improving manufacturing methods and influencing consumers to demand greener products and less packaging.

If waste prevention cannot be achieved, recovery of as many of the materials as possible should be encouraged. The European Commission has defined several specific 'waste streams' for priority attention, the aim being to reduce their overall environmental impact. This includes packaging waste, end-of-life vehicles, batteries, electrical and electronic waste. EU directives require Member States to introduce legislation on waste collection, reuse, recycling, and disposal of these waste streams. Where possible, waste that cannot be recycled or reused should be recovered by incineration with energy recovery, with landfill or incineration without energy recovery used only as a last resort.

In March 2020, the European Commission adopted a new Circular Economy Action Plan - one of the main building blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Circular Economy Action Plan identifies buildings and construction as a key area where there are opportunities for resource efficiency and circularity.

The Department of the Environment, Climate and Communications (DECC) published the Irish Waste Action Plan for a Circular Economy in September 2020. An illustration showing how a circular economy operates is included in the action plan and is reproduced in Figure 19-2. The Plan outlines the commitment in the new Programme for Government to implement a new National Waste Action Plan providing new waste policy and giving direction to waste planning and management in Ireland.

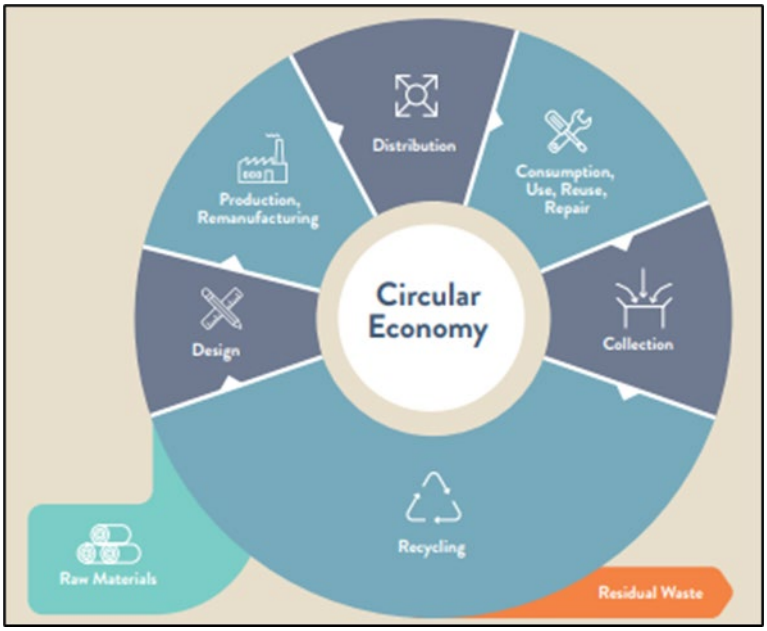

Figure 19-2 The Circular Economy (source: DEEC 2020)

The Irish Waste Action Plan for a Circular Economy contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection and Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

Waste management in Ireland therefore takes place in accordance with a defined policy and legislative framework. A review of relevant legislation, policy and best practice guidance has been undertaken to inform the impact assessment and recommended mitigation.

The key components of EU, national and local policy, legislation, and guidance relevant to the proposed Project are summarised as follows:

- Prevention of waste is the preferred option such that any surplus materials generated are reused within the proposed Project. This means that products, materials, and resources are maintained at their highest value in the economy for as long as possible, the generation of waste is minimised, and the principles of circular economy are implemented;

- Where construction waste is generated, it should be source separated to facilitate reuse, recycling and maximise diversion of waste from landfill;

- Where operational waste is generated, it should be source separated to facilitate reuse, recycling and maximise diversion, including biodegradable waste, from landfill;

- Where waste cannot be prevented, reused, or recycled it should be transported and disposed of in accordance with the Waste Management Acts 1996 to 2016 as amended; and

- Waste may only be transferred from site by a waste collection permit holder and delivered to an authorised waste facility, i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence.

19.3. Methodology

This section outlines the approach and methodologies that were followed for the desktop assessment, in describing the location of feasible sources, and availability of construction materials required to construct the main elements of the Project, as well as suitable recovery and waste management infrastructure (that are licensed for the associated waste type) that could accept waste arisings and or other resources generated by the Project.

The following approach has been undertaken to inform the assessment:

- Identification of historic waste facilities or pits/quarries that may contain landfilled material which could be potentially impacted by the proposed construction works;

- Identification of materials and waste materials including waste volumes that will arise from the construction, operation and maintenance of the proposed Project and identification of potential re-use options to minimise waste quantities; and

- Identification of suitable waste facilities in the region to accept waste material arising from the construction, operation, and maintenance of the proposed Project. This includes an assessment of their suitability, proximity and available capacity to accept waste arisings from the Project.

19.3.1. Study Area

The Design Manual for Roads and Bridges ("DMRB") Guidance LA110 Material Assets and Waste sets out the requirements for assessing and reporting the effects on material assets and waste. In terms of Study Area, the guidance refers to a "First Study Area" and a "Second Study Area" which are defined as:

- *First Study Area: "The area within which construction materials will be consumed (used / deployed), and waste generated (including temporary compounds and storage areas etc.) NOTE 1: This typically comprises the project / construction footprint. NOTE 2: It is the activities associated with these elements that a project is directly responsible for, and over which it has immediate influence."*

- *Second Study Area: "1) Feasible sources and availability of construction materials required to construct the main elements of a project. 2) Suitable recovery and waste management infrastructure that could accept arisings and/or waste generated by a project."*

The IEMA (2020) Guidelines also propose two study areas for within which baseline data for materials and waste can be defined. The IEMA Guidelines state that the definition of a study area will depend on both the location of a development, the types of materials required and waste to be

generated. Where materials and wastes can be sourced and managed locally, the study area may be proportionately / correspondingly small. Where sourcing and management of materials and waste is required at regional, national and/or international level, the study area would likely be defined accordingly. The two study areas are proposed by IEMA (2020) for materials and waste are:

1. *"The development study area comprises the scheme or project footprint (the red line boundary or limits of deviation), and any areas required for temporary access, site compounds, working platforms and other enabling activities."*; and

2. *"The expansive study area extends to the availability of construction materials, and capacity of waste management infrastructure and remaining landfill void, within a defined (for example, a mineral and waste planning) region, or – as appropriate – across multiple regions."*

The Resource and Waste Management Study Area for the proposed Project has therefore been identified as:

- The first study area - The construction footprint/project boundary (including compounds and temporary land-take). This study area includes the associated storage areas and construction compound sites; and

- The second study area - The planning authorities covered by the project namely Dublin City, South Dublin, and Kildare. In terms of waste management, these local authorities are part of the Eastern Midlands Region waste management region. The second study area includes the location of feasible sources, and availability of construction materials required to construct the main elements of the project and suitable recovery and waste management infrastructure (that are licensed for the associated waste type) that could accept arisings.

19.3.2. Survey Methodology

19.3.2.1.1. Desk Survey

Relevant information for the waste management assessment was collected through a detailed desktop review of existing data sources, including available EPA, OSI and Local Authority information. The sources of information that were searched and reviewed to inform the desktop assessment in the preparation of this report are outlined in Table 19-1. In addition, information on resource use was obtained from a review of Chapter 4 Project Description, Chapter 5 Construction Strategy and discussions with the design team.

Table 19-1: Data Sources Used to Inform the Assessment

Data Source	Nature of the information acquired
EPA Unified GIS Application (EPA Geoportal / EPA Maps)	Information on waste facilities, landfills. Information on potential waste facilities for the acceptance of waste generated by the Project. Details on quarries and waste sites which could be potentially significantly impacted by the proposed project. Available at: http://gis.epa.ie/. Accessed Jan 2022.
EPA Licence Database	Information on current and past licenced waste and industrial (IE/IPC) facilities and landfills. https://www.epa.ie/our-services/licensing/licencesearch/ Accessed Mar 2022
EPA Website	www.epa.ie/environment-and-you/circular-economy/ Accessed May 2022
Geological Survey of Ireland Maps	Information on underlying bedrock, groundwater conditions, geohazards etc. Available at: www.gsi.ie Accessed Jan 2022
Aerial photography and Google Maps	Base mapping. Accessed Jan 2022
Ordnance Survey Ireland (OSI) maps	OSI Six-inch mapping: 1833-1946: Pits. OSI Six-inch mapping:1833-1946: Quarries. Accessed Jan 2022
Dublin City Development Plan 2022-2028	Information on DCC policy and objectives in terms of waste and waste management.
Kildare County Development Plan 2017-2023 and Draft Kildare Development Plan 2023-2029.	Information on KCC policy and objectives in terms of waste and waste management.
South Dublin County Development Plan 2022-2028.	Information on SDCC policy and objectives in terms of waste and waste management.
Eastern Midlands Region Waste Management Plan (EMRWMP) 2015-2021 (*under review; new plan due in 2022*)	National and regional measures to ensure the best overall outcome by applying the waste hierarchy to the management of waste streams. Accessed Jan 2022 https://www.mywaste.ie/pre-draft-consultation/
Ireland's National Waste Statistics - Summary Report for 2019 (EPA, 2021)	EPA data on waste generation and management in Ireland in 2019. It highlights key trends and progress towards EU targets and identifies where further measures are needed to improve Ireland's recycling rates and deliver the transition to a circular economy. Accessed Jan 2022 https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/

Data Source	Nature of the information acquired
Report on Construction and Demolition Waste Stone and Soil Recovery / Disposal Capacity, Dublin City Council (RPS, 2015)	Internal communication.
Consultations with stakeholders	Information on waste management, waste facilities etc.
Chapter 4 Project Description and Chapter 5 Construction Strategy	Details of materials required and waste emissions from the proposed Project.
Chapter 9: Land and Soils of this EIAR	Soil quality and details of site and ground investigations undertaken at route selection and at design stage; refer to details.
Chapter 13: Climate of this EIAR	Consideration for use of sustainable materials.

19.3.2.2. Field Surveys

Data from the surveys undertaken as part of the inter-related technical disciplines where relevant were used to inform the assessment. No additional field surveys have been completed to inform this assessment.

19.3.2.3. Models / Tools Used in Assessment

No modelling software/ tools were used in the Resource and Waste Management assessment included in this EIAR.

19.3.3. Assessment Methodology

19.3.3.1. Key Parameters for Assessment

The key parameters to be assessed in this chapter are resource use and waste emissions arising. Sustainable use of resources for the proposed Project are considered in terms of their source, transport to site and use of sustainable materials. Waste emissions arising from the proposed Project are considered in terms of quantities and types of materials arising, the disposal route to recycling and/or recovery and/or landfill and/or energy recovery. Other material arising from the proposed Project i.e. soil and stone, is considered in terms of sustainable diversion from the disposal/recovery tier via by-product classification to other facilities as part of the Article 27 notification process.

19.3.3.2. Assessment Criteria and Significance

The criteria for determining the significance of the effects in terms of resources and waste management comprises a two-stage process which involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied within this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

IEMA have developed guidance for the assessment of materials and waste in EIA to aid practitioners in assessing the impacts and effects of consuming materials, and from generating and disposing of waste, in a consistent manner. The IEMA Guide to Materials and Waste in Environmental

Assessment (2020) sets out the relevant sensitive receptors in terms of Materials and Waste impacts:

- *"Materials are, in their own right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary materials) long-term availability; this results in the depletion of natural resources and adversely impacts the environment."*

- *"For waste, the sensitive receptor is landfill capacity. Landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities. This requires the depletion of natural and other resources which, in turn, adversely impacts the environment."*

For the purposes of this assessment, the sensitivity and magnitude for Resource Use uses the DMRB Guidance LA110 Material Assets and Waste definitions. These are presented in Table 19.2 and Table 19.3.

Table 19.2: Definition of Terms Relating to the Sensitivity of Receptors - Resource Use

Significance	Description based on DMRB
Very Large	Use criteria for large categories.
Large	Project achieves <70% overall materials recovery / recycling of non-hazardous CDW to substitute of primary materials.
Moderate	Project achieves less than 70% overall materials recovery / recycling of non-hazardous CDW to substitute of primary materials.
Slight	Project achieves 70-99% overall materials recovery / recycling of non-hazardous CDW to substitute of primary materials.
Neutral	Project achieves >99% overall materials recovery / recycling of non-hazardous CDW to substitute of primary materials.

The criteria for defining magnitude in this chapter is outlined in table following.

Table 19.3: Definition of Terms Relating to Magnitude of Impact for Resource Use

Significance	Description Based on DMRB
Significant	Category description met for moderate or large effect.
Not significant	Category description met for neutral or slight effect.

For the purposes of this assessment the sensitive receptors for waste are based on the IEMA definitions and are considered to be those options at the base of the waste hierarchy i.e., landfill capacity as well as other less-desirable forms of waste management such as incineration. The sensitivity of landfill void capacity is therefore assessed by examining the current trends in landfill/ incinerator capacity and depletion according to the criteria outlined in Table 19.4 and Table 19.5. The estimated amounts of waste arising from the proposed Project during the construction and operational phases are then compared to the remaining void capacity.

Further, the IEMA guide states: "… *it is considered that infrastructure that is used to process and recover arisings (and hence divert them from landfill) is a beneficiary of waste feedstock and has the ability to reduce adverse impacts. Such facilities are therefore an influencing factor in the reduction of the magnitude of waste impacts on landfill void capacity, rather than being a sensitive receptor in their own right."*

As the excess soil and stone arising from the proposed Project is not necessarily considered a waste, the use of Article 27 by-product classification and diversion to other appropriate / licensed facilities is considered a sustainable option for managing that soil resource. The capacities of facilities to handle by-product are therefore not classed as sensitive receptors but are considered as part of this assessment.

Table 19.4: Definition of Terms Relating to the Sensitivity of Receptors (IEMA, 2020)

Negligible	Low	Medium	High	Very High
Across construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous void capacity is expected to…				
...remain unchanged or is expected to increase through a committed change in capacity.	...reduces minimally: by <1% as a result of wastes forecast.	...reduces noticeably: by 1-5% as a result of wastes forecast.	...reduces considerably: by 6-10% as a result of wastes forecast.	...reduces very considerably: (by >10%) end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.
Across the construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) hazardous void capacity is expected to…				
...remains unchanged or is expected to increase through a committed change in capacity.	...reduces minimally: by <0.1% because of wastes forecast.	...reduces noticeably: by 0.1-0.5% because of wastes forecast.	...reduces considerably: by 0.5-1% because of wastes forecast.	...reduces very considerably (by >1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

The criteria for defining magnitude in this chapter is outlined in table following.

Table 19.5: Definition of Terms Relating to the Magnitude of an Impact (IEMA, 2020)

No Change	Negligible	Minor	Moderate	Major
Inert and non-hazardous waste				
Zero waste generation and disposal from the proposed Project.	Waste generated by the proposed Project will reduce regional* landfill void capacity baselineby <1%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline by 1-5%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline by 6-10%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline by >10%.
Hazardous waste				
Zero waste generation and disposal from the proposed Project.	Waste generated by the proposed Project will reduce national landfill void capacity baseline by <0.1%.	Waste generated by the proposed Project will reduce national landfill void capacity baseline by <0.1-0.5%.	Waste generated by the proposed Project will reduce national landfill void capacity baseline by <0.5-1%.	Waste generated by the proposed Project will reduce national landfill void capacity baseline by >1%.

**or where justified, national. Forecast as the worst-case scenario, during a defined construction and/or operational phase.*

The significance of the effect on sensitive receptors is determined by correlating the magnitude of the impact and the sensitivity of the receptor, outlined in Table 19.6. Where a range of significance of effect is predicted, the final assessment for each impact is based upon expert judgement. The definitions for significance in Table 19.6 are as defined in the EPA Guidelines (2022), with 'moderate' and 'major' using the EPA definitions of 'significant' and 'very significant', respectively. For the purposes of this assessment, any effects with a significance level of slight or less have been concluded to be not significant in terms of the assessment:

- **Profound:** An effect which obliterates sensitive characteristics;
- **Major:** An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment;
- **Moderate:** An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends;
- **Slight:** An effect which causes noticeable changes in the character of the environment without affecting its sensitivities; and
- **Imperceptible:** An effect capable of measurement but without significant consequences.

Table 19.6: Matrix Used for the Assessment of the Significance of the Effect

		Magnitude of Impact				
Sensitivity of Receptor		**No Change**	**Negligible**	**Minor**	**Moderate**	**Major**
	Negligible	Imperceptible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight
	Low	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight	Slight or moderate
	Medium	Imperceptible	Imperceptible or slight	Slight	Moderate	Moderate or major
	High	Imperceptible	Slight	Slight or moderate	Moderate or major	Major or Profound
	Very High	Imperceptible	Slight	Moderate or Major	Major or Profound	Profound

19.3.4. Consultation

The overall project stakeholder and public consultation undertaken in respect of the Project is set out in the Public Consultation No. 1 Findings Report (for PC1) and Public Consultation No. 2 Findings Report (for PC2) which are included in Volume 4, Appendix 1.3 and 1.4. All feedback was collated, including feedback specific to the EIAR topic 'Material Assets: Resource and Waste Management'. This feedback has informed this chapter including the baseline and impact assessment presented.

Specific consultation was also undertaken with key stakeholders in relation to EIA Scoping. A summary of the issues raised in relation to the scope of the EIA is included in Volume 4, Appendix 1.2. Feedback on the scope and level of detail of the assessment, data sources and methodologies as they pertain to the EIAR topic 'Material Assets: Resource and Waste Management' have been reviewed and have influenced this chapter of the EIAR.

Specific consultation was also undertaken with representatives of various Departments in Kildare, South Dublin and Dublin City Councils. This included a combination of presentations, workshops and meetings to discuss the project, technical design issues and environment and planning matters.

Nine pre-application meetings were held with ABP to explain the project and present technical and environmental information. A summary of the information presented and the environmental issues discussed at the nine meetings is provided in Volume 4, Appendix 1.6. Feedback relevant to the topic 'Material Assets: Resource and Waste Management' has been reviewed and has influenced this chapter of the EIAR.

19.3.5. Difficulties Encountered / Limitations

There were no particular difficulties in compiling this chapter. It should be noted that the material estimates provide an estimate of the main materials likely to be required during the construction of the proposed project and the wastes likely to be generated. These estimates will be further refined through detailed design. Furthermore, changes to permitted waste management facilities and capacities of waste facilities are likely throughout the course of the project.

19.4. Receiving Environment

As detailed in Chapter 4 Project Description, the proposed Project has been divided into four geographic zones (Zones A to D) however it is noted that the scale of resource and waste management does not lend itself to description at zone level. Baseline and impact assessment has been focussed on project, local and regional level in line with good practice.

Construction waste, including demolition and excavation waste, will be generated at the construction phase of the proposed Project. Materials arising from maintenance activities will also be generated during the operational phase of the proposed Project. Construction waste, including demolition and excavation waste, will be the main type of waste generated because of the proposed Project. There will also be small quantities of municipal-type waste generated during construction and operation (e.g., associated with construction compounds etc.).

Baseline data has been collected at national and regional level including availability of construction aggregates; construction, demolition, and excavation waste arisings; as well as information on regional and national waste transfer and treatment and disposal facilities capacity.

Due to the historic and existing land use along the railway line, contaminated ground is likely to be encountered (e.g., diesel spillage, waste contamination, etc.) within the existing rail corridor. There is potential for ground contamination to be encountered in areas where track widening / lowering is required. Railway corridors can also act as corridors for the spread of invasive species which may require specialist treatment for eradication.

19.4.1. Resource Use

In 2018, the Irish Concrete Foundation published the 'Essential aggregates: Providing for Ireland's needs to 2040' report in response to Government's Project Ireland 2040 to highlight the strategic importance of aggregates. The report details that Ireland has abundant natural reserves of high-quality aggregates (stone, sand, and gravel). The Irish quarrying industry comprises approximately 500 large commercial quarries. These quarries produce aggregates from crushed rock, sand and gravel which are used as key building materials. Aggregates are also the basic raw materials for concrete products which are ubiquitous in Ireland's built environment. The report indicates that there are approximately 220 ready mixed concrete plants located throughout Ireland.

Table 19.7 provides information on aggregates production in Ireland 2013 to 2018.

Table 19.7: Total Aggregates Production in Ireland 2013-2018

Year	2013	2014	2015	2016	2017	2018
Aggregates (in tonnes)	25,000,000t	26,000,000t	28,000,000t	33,000,000t	32,000,000t	36,000,000t

Table 19.8 provides quantity information on ready mixed concrete production in Ireland 2013 to 2018.

Table 19.8: Total Ready Mixed Concrete in Ireland 2013-2018

Year	2013	2014	2015	2016	2017	2018
Ready Mixed Concrete (m^3)	2,400,000	3,000,000	3,500,000	4,100,000	4,500,000	4,900,000

19.4.2. Existing Waste Facilities

There are over 80 licensed waste facilities within Eastern Midlands Region and two further facilities that have applied for waste licenses that are capable of the disposal of materials arising - Volume 4, Appendix 19.1 of this EIAR provides a list of these facilities, the annual and total licensed intake, the type of wastes accepted and the nature of the facility. The list includes soil recovery facilities, integrated waste management facilities, waste to energy facilities and landfills. Detailed information on all these facilities can be found on the Waste Facility Permit and the Certificate of Registration Database on the National Waste Collection Permit Office (NWCPO) and on the EPA websites.[1]

19.4.3. Construction and Demolition Waste

Construction and demolition waste (CDW) typically comprises soil and stones (representing the majority) concrete, brick, wood, glass, plastic etc. Currently, most of the CDW generated in Ireland is recovered or reused. Where recovery or reuse is not feasible, it is disposed of at suitably licensed facilities. The main route for recovery is through the process of backfilling where soil and stone material is used is used for land improvement or engineering purposes. This is typically processed through a licensed facility.

According to the EPA Waste statistics[2], 8.8 million tonnes of CDW was generated and collected in Ireland in 2019, an increase on previous years. The majority (96 percent) of CDW underwent final treatment in Ireland in 2019 with over 82% of the CDW collected being used as backfill as the main soil recovery process. Despite the high level of recovery, 10% also was reported as going for disposal and only 7% for recycling (including wood, glass, and plastics).

The proposed Project is located within the administrative area of Dublin City Council, South Dublin County Council and Kildare County Council, which are part of the Eastern-Midlands Waste Region. The regional waste management is guided by the Eastern Midlands Region Waste Management Plan 2015-2021 which was published in 2015. A replacement waste plan, which is focussed nationally, is in preparation and it is anticipated in 2023.

The EU Waste Framework Directive (2008/98/EC), enacted in Ireland under the Waste Directive Regulations, 2011 of the same title, requires Member States to take the necessary measures to achieve the minimum recycling/recovery target of 70% by weight for non-hazardous CDW, excluding naturally occurring materials, by 2020. The EPA reported 84% CDW recovery in Ireland in 2019.

Further detail on facilities in proximity to the proposed Project that can accept CDW for recovery or disposal are provided in Volume 4, Appendix 19.1 of this EIAR.

It is estimated that over 465,000 m^3 of surplus material in the form of soil and stone (topsoil/ soil/ track ballast) will be generated from the proposed Project. This is the largest portion of the projected arisings. A small portion of this will be reused on site, e.g., track ballast. Surplus clean soil and stone material may be suitable to be managed as a by-product notification in accordance with Article 27 of the EC Waste Directive Regulations 2011. By-product notifications provide an opportunity for reuse

[1] National Waste Collection Permit Office (NWCPO) website: http://facilityregister.nwcpo.ie and www.epa.ie
[2] https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/construction--demolition/. Accessed July 2022.

of surplus clean soil and stone material arising from construction activity. Materials that are reused, under Article 27 notification are managed as resources, not waste.

19.4.4. Historic Waste Facilities, Pit and Quarries

One historic landfill site has been identified in proximity to the corridor. This site is situated approximately 119m from the line in Rahadoon, Sallins, and was used for municipal waste disposal.

Another historic landfill site is located at Pollardstown Refuse Depot, Loughbrown, The Curragh. This is situated approximately 377m from the line. Neither of the two historic landfills contain hazardous material. The historic OSI six-inch mapping and GSI Quaternary mapping indicate the presence of three disused sand pits and two small historic quarries within 300 m of the rail line.

19.4.5. Evolution of the Environment in the absence of the Project (Do Nothing)

Annex IV of the EIA Directive sets out the information required to be included in an EIAR. This includes:

> *"A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge."*

In the event that the proposed Project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

In this "do-nothing" scenario the interventions for the electrification of the railway would not be undertaken along the corridor. As such, the associated use of natural and man-made construction materials and associated waste arising will not occur, thereby reducing the demand on natural resources and waste facilities albeit without the increased rail capacity which may result in additional fuel demands and maintenance relating to road traffic to compensate for the limited capacity on the rail network.

During the operational phase, the existing diesel-powered trains would remain on the railway line and the necessary capacity enhancements would not be achieved. As the fleet reaches obsolescence it would result in increased maintenance and resource use due to the requirement for more frequent maintenance resources and increasing fuel use which could result in impact to service users and costs due to rising fuel prices. In line with government policy, there would be a continued shift toward electric vehicles with the older diesel fleet becoming obsolete, generating associated waste stream and new demand for materials for the newer EV fleet. This will occur with and without the proposed Project.

Available capacity in waste management facilities will continue to be used by new development and refurbishment works in line with national planning commitments under the National Development Plan and related sectoral plans but guided by the National Waste Management Plan (in preparation).

19.5. Description of Potential Impacts

19.5.1. Potential Construction Impacts

19.5.1.1. Resource Use

Resource use considered in this assessment includes the materials to be used during the construction phase of the proposed Project. The estimated quantities of materials required for the proposed Project are shown in Table 19.9.

Table 19.9: Estimated Materials Quantities

Description	Quantity	Unit
Concrete drain	1,059	m
Concrete	4,418	m^3
Precast concrete	45	m^3
Concrete slab	3,264	m^2
Demolition	11,917	m^2
Cill beam	6	nr
Expansion joint	26	m
Formwork	855	m^2
HDPE 450mm	447	m
H4A containment	552	m
Containment - Steel and Precast	589	m
Kerbs	165	m
Pile / cassions	6,677	m
Precast beams	1,080	m
Road markings	299	m
Track Drainage	10,865	m
100mm DBM50 + 30mm AC10 dense surface course	44,877	m^2
Steel flooring	153	m^2
curved roof	117	m^2
Waterproofing	2,577	m^2
Grass verge	905	m^2
Secant Pile wall	37,522	m^2
Piling	20	nr
Cantilever wall	7,668	m^2
Backfilling imported soil	12,628	m^3
Anchors	3,012	nr
Bollards	12	nr
Bridge bearing	10	nr
Manhole	42	nr
Steel plate girder	183	t
Renewed Track	23,787	m
Ballast	7,136	m^3
Concrete Sleepers	36,596	nr
Fixed Buffer Stop	4	m
Turn out	57	nr
S8 type trap	2	nr
Switch & Crossing - Crossover	16	nr
Diamond Crossing	2	nr
Scissors	1	nr

Description	Quantity	Unit
Existing Track to be removed	19,666	m
Tie-in to existing track @ Ch 13+460	6	nr
Provision for a protective wall for the high voltage tower	57	m
Object Controller	13	Nr
4 Aspect Head LED type	177	nr
PLJI Indications	51	nr
Buffer stop signal (FRL)	11	nr
Telephone signal post	182	nr
Disc box	177	nr
Shunt Signal (PLS)	55	nr
Axle Counters	215	nr
Balise	296	pair
Cables (all cabling)	437,112	m
Telecoms Cable (Coper cables)	17,150	m
Containment & Ducting	21	item
New and replacement gantries	2	nr
Standard Case	11	nr
REB Type 4 (Signalling Equipment Building - SEB)	2	nr
Point Mechanisms	89	nr
Foundations	359	nr
Signal Post	177	nr
HV Switchboard comprising 5 circuit breakers and protection equipment - 2 x 3.3 MVA power requirement, 2.30 MVA mic nominal	6	nr
1500V DC Switchboard comprising 6 feeder circuit breakers & protection equipment and 2 return circuit breaker	6	nr
Rectifier Transformer & Rectifier Sets – 2 off (3.3MVA)	12	Nr
Auxiliary transformer –80kVA, auxiliary transformer for 400V AC	6	
A standby diesel generator, 80kVA,	6	nr
A 20kVA uninterruptible power supply (UPS) will be provided to supply critical loads in the event of a total power loss	6	nr
Cable: Copper - DC positive and negative cables	39,304	m
Concrete trough	2,692	m
150mm PVC Cable Duct	3,861	m
Concrete or PVC danger slab	2,676	m^2
Orange warning tape	633	m^2
Points Heaters	89	nr
1 cable 96 FO cable	42,506	m
1 cable 24 FO cable	25,457	m
1 cable 24 FO dedicated to electrification	17,578	m
Demolition Works - Buildings	685	m^2
Rearrangement of Existing Containers; No demolitions or removal of contaminated material	540	m^2
Plant Room Building	160	m^2
Administration Building	360	m^2
Shunter Building	50	m^2
Environmental Compound Area	200	m^2
Fuel Pump/Generator Shed	30	m^2
Substation Footprint	1,618	m^2
New Support Structure; Single Track Cantilever (STC)	83	nr

Description	Quantity	Unit
New Support Structure; Double Track Cantilever (TTC)	378	nr
New Support Structure; Double Cantilever	98	nr
Backstay	193	nr
New Support Structure; boom	642	m
New Support Structure: Bridge/tunnel fixing	185	nr
EW/FW bridge attachment	106	nr
Signal	92	nr
Splices	94	nr
Contact wires	58,899	m
Earth wire	40,614	m
Feeder wire	39,629	m
Jumper Cables	166	nr
Spring tensioner	89	nr
Line side switch	67	nr
Cut in insulator	282	nr

Iarnród Éireann is committed to implementing and maintaining the Green Public Procurement process and therefore circular economy principles will apply. The assessment of effects on material assets considers the achievement of material recovery/ reuse of non-hazardous CDW to substitute use of the primary materials and the recycled/ re-used content of imported aggregates. For the proposed Project, the effects are assessed as being moderate adverse and significant as the average reusability is assumed as 60%.

The appointed Contractor will be required to maximise the use secondary or recycled aggregates in line with tender specifications. Iarnród Éireann will pursue procurement of the highest recycled steel content that is available for the steel usage. This may vary depending on engineering constraints.

19.5.1.2. Waste

Potential impacts during construction include:

- Potential for encountering contaminated material during excavations which is unsuitable for reuse and requires disposal at a suitable licensed facility;
- Generation of surplus non-hazardous excavated material and potential for opportunities for reuse;
- Generation of surplus non-hazardous excavated material more than quantities required by other construction projects within the area leading to volumes requiring disposal;
- Generation of surplus materials and wastes where material supply exceeds material demand;
- Potential for waste materials to be a source of nuisance to neighbouring communities; and
- Potential for direct and indirect impacts on environmental factors such as air quality (due to odour, dust), traffic, noise, soils (contaminated land), landscape and visual (visual impact etc), hydrology (runoff) etc.

Table 19.10 lists the materials expected to arise due to the construction of the project. The table includes, where possible, estimated volumes or weights associated with each key material

(hazardous waste, construction and demolition waste and soil and stone) and how each material will be managed on and off site.

The construction of the proposed Project is envisaged to take place over approximately 50 months. The construction programme has been developed considering how efficiently the works may be undertaken and to reduce the potential for environmental impacts.

Table 19.10: Key Streams of Waste Materials Arising During Construction

Description	Estimated Amount	EWC Code[3]	Onsite Management	Offsite Management
Topsoil	15,000 m^3	17 05 04	Stockpiling separately for reuse onsite if needed or (mostly) to consign offsite.	Article 27 reuse.
Track Ballast	50,000 m^3	17 05 04	Stockpiling separately for reuse onsite if needed or (mostly) to consign offsite.	Article 27 reuse.
Soil and stone	400,000 m^3	17 05 04	Stockpiling separately for reuse onsite or to consign offsite.	Article 27 reuse, or diversion to soil recovery facility if non-waste option unavailable.
Insulation materials and asbestos-containing construction.materials*	TBC by survey	17 06 04*	Segregated storage container.	Management at an asbestos management facility.
Cables	36,000	Various	Segregated storage container.	Management at a dedicated facility.
Concrete (construction sources)	1,500		Stockpiling separately.	Article 28 reprocessing.
Other construction and demolition wastes (including mixed wastes) contain hazardous substances	See Table 19-13.	17 09 03*	Segregated storage container.	Management at a dedicated facility.

[3] Guidance on classification of waste according to EXC-Stat categories. Available at: https://ec.europa.eu/eurostat/documents/342366/351806/Guidance-on-EWCStat-categories-2010.pdf/0e7cd3fc-c05c-47a7-818f-1c2421e55604. (Accessed 11th November 2021).

Other materials arising are listed in Table 19.11.

Table 19.11: Other Streams of Waste Materials Arising During Construction

Description	EWC Code	Onsite Management	Offsite Management
Liquid fuels	13 07 01-03 *	Segregated storage container	Management at a dedicated facility
Mixed dry recyclables	15 01 06	Segregated bin	Recycling
End-of-life tyres (Construction vehicle tyres)	16 01 03	Segregated storage container	Recycling
In-situ concrete from foundations, slabs, fencing posts, footpaths etc	17 01 01	Stockpiling separately	Recycling, disposal
Mixture of concrete, bricks, tiles, and ceramics (from demolition, modification, or removal of buildings (e.g. shunter building, bridges etc.) or bridges) (masonry)	17 01 06	Stockpiling separately	Recycling, disposal
Wood from construction and/or sleepers	17 02 04	Segregated skip – hazardous	Approrpiate reuse or disposal
Plastic from construction	17 02 03	Segregated skip	Return to supplier, recycling, disposal
Iron and steel from construction	17 04 05	Segregated skip	Recycling, disposal
Insulations from construction, other than asbestos	17 06 04	Segregated skip	Recycling, disposal
Spill kits, plant nappies and absorbent mats	15 02 02	Segregated storage container	Management at a dedicated facility
Food, biodegradable kitchen, and canteen waste	20 01 08	Segregated bin	Recycling
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13 * 20 01 19 * 20 01 27 * 20 01 28 * 20 01 30	Segregated storage container	Management at a dedicated facility
Batteries and accumulators	20 01 33 * 20 01 34	Segregated storage container	Management at a dedicated facility
Electrical and electronic components / (WEEE)	20 01 35 * 20 01 36	Segregated storage container	Management at a dedicated facility
Biodegradable waste (vegetation removal)	20 02 01	Stockpiling separately	Composting
Granular filter for sediment control (if present and removal required)	20 02 02	Stockpiling separately	Recovery
Silt barriers / fences (if present and removal required)	20 01 11	Segregated bin	Recycling, Recovery
Permeable geotextile (if present and removal required)	20 01 11	Segregated bin	Recycling, Recovery

Description	EWC Code	Onsite Management	Offsite Management
General mixed waste including commercial waste and municipal waste	20 03 01	Segregated bin	Recovery, disposal
Waste engine, gear, and lubricating oils	13 02 *	Segregated bin	Recycling, Recovery
Run-off from truck wheel wash	17 05 05 *	Stockpiling separately	Management at a dedicated facility

19.5.1.2.1. Site Clearance

Vegetation: The contractor will conduct site clearance works including felling of trees and removal of vegetation along the length of the proposed Project. Vegetation removal will include tree, shrub, and hedge removal to allow for construction activities to take place. Vegetation clearance will be kept to the minimum required to facilitate construction and its removal will be done in accordance with the mitigation provided for the protection of biodiversity listed in Chapter 8 Biodiversity.

Suitable woody vegetation extracted during site clearance will be mulched for reuse on site (e.g., to keep weeds down) and any excess for transport offsite to a licensed composting facility. Therefore, the magnitude of this impact has been classified as being Negligible.

The capacity of the waste facilities available for acceptance of the vegetation exceeds the projected arisings. None of the arisings will be managed at landfill. Therefore, the receptors potentially impacted by the clearing process and eventual disposal are deemed to be of low importance and rarity at a local scale. The sensitivity of the receptors has been classified as Low.

The significance of the site clearance works have, therefore, been determined to have imperceptible or slight significance, which is not significant in EIA terms.

19.5.1.2.2. Built Structures Demolition

Built structures along the route will need to be removed where it has been deemed necessary to deliver the project. Chapter 4: Project Description and Chapter 5: Construction Strategy identify where significant demolitions are required. This is also shown on the Volume 3A Works Drawings Series. The sources of demolition waste generated from these demolitions are presented[4] in Table 19-12.

Table 19-12: Estimated Mass of Demolition Waste Arisings

Location	Building Demolition Waste Sources
Zone A	Within this zone, three residential buildings require demolition.
Zone B	The following demolitions are required (see Chapter 5): • Lookout Tower; • Signalling Gantry; • Shunters Cabin; • Extension to Maintenance Shed and Shunting Hut; • The Signal Box / Cabin;

[4] Estimated at 0.333 tonnes of mixed CDW per m^2 of domestic building area.

Location	Building Demolition Waste Sources
	• Office Toilet Block Facility & Lunch Block (Prefab Unit); • Dan Ryan Truck Rental Building; • Inchicore Works Boundary Wall; • Retaining (Southern Boundary from Inchicore to Sarsfield); • Signalling Gantry; and • Bridges x 3.
Zone C/D	The following demolitions are required (see Chapter 5): • Maintenance Building adjacent to platform 10 and NTCC bldg; • Platform 10; • Existing structures adjacent to Guinness Sidings; and • Bridge.

The estimated quantities of demolition wastes for this project are estimated at 12,143 m^2.

The composition of the specific waste streams arising will be determined by surveys (including asbestos survey) at detailed design, but preliminary proportions are presented in Table 19-13 below.

Table 19-13: Estimated Types and Proportions of Non-hazardous Demolition Waste and Proposed Management

Material	Typical Composition	On-site Management	Off-site Management
Mixed CDW	33%	Stockpiling separately	Recovery
Wood	28%	Segregated skip	Recycling
Plasterboard (Gypsum materials)	10%	Segregated skip	Recycling
Ferrous Metals	8%	Segregated skip	Recycling
Concrete	6%	Segregated skip	Recycling
Mixed other wastes	15%	Segregated skip	Recovery
Total	100%		
Other materials that may arise include: Mixtures of concrete, bricks, tiles, and ceramics Glass Insulations from construction, other than asbestos Insulation materials and asbestos-containing construction materials Other construction and demolition wastes (including mixed wastes) containing hazardous substances WEEE streams			

The non-hazardous inert demolition waste will be segregated for recycling or recovery purposes.

If asbestos or other hazardous materials are identified by survey or otherwise encountered, they will be segregated and stored in accordance with best practice for onward processing at a facility licensed to treat hazardous materials, e.g., with asbestos being managed at facilities located outside Ireland. Therefore, the magnitude of the impact is classified as being Negligible.

As noted in Chapter 5 excavated material from electrical substations will, as far as possible, be used as screening berms on site. Opportunities to reuse demolished railway wall / bridge stone cladding to improve the aesthetic of the substations and create a link to the railway heritage will also be taken.

The volume of building demolition waste generated will have no impact on landfill facilities. Therefore, the receptors potentially impacted by the generation and eventual disposal of building demolition waste are deemed to be of negligible importance and rarity at a regional scale. As such, the sensitivity of the receptor has been classified as Negligible for non-hazardous materials and low for hazardous materials.

The significance of the building demolition works have, therefore, been determined to have Imperceptible or slight impact, which is not significant in EIA terms.

19.5.1.2.3. Earthworks

Earthworks are required along the length of the proposed Project. Most of the material will be brought to suitable licensed sites, as identified in Volume 4, Appendix 19.1. This will include management of any contaminated ground encountered. Smaller volumes of materials e.g., from Heuston West Station and from the Phoenix Park Tunnel Branch Line will be stored at site compounds at Heuston West and Cabra before onward movement to suitable licensed sites.

The approximate earthworks volumes are presented in Table 19.14. The hierarchy of preference in terms of dealing with the excess is:

1. Retain on site and recycle within the works;
2. Use strategic excess areas of land to deposit material;
3. Use elsewhere on the Iarnród Éireann network or programme of works;
4. Enable contractor to use on another site; and
5. Dispose to appropriate off site facility.

Table 19.14: Approximate Earthworks Volumes

Earthworks Type	Approximate Volume
Topsoil	Approx. 15,000 m^3, of which very little will be required in the future works, but some may be suitable for use as noise or visual bunds at sensitive locations.
Track ballast volumes	Approx. 55,000 m^3 imported to the site in addition to 37,000 m3 recycled (assuming up to 50% wastage).
Soil	Approx. 400,000 m^3 to be removed from site which equates to 50,000 truckloads.
Contaminated soils	The quality and quantity of contaminated soils arising from this project will be determined at the time of excavation.

Topsoil Stripping

Prior to commencement of construction, an estimated 15,000 m^3 of topsoil will be excavated by the contractor. Topsoil stripping will be required at all widening areas plus some of the construction

compounds. This material will be re-used as far as possible within the proposed Project e.g. for noise and visual bunding at sensitive sites. Surplus material will be managed as outlined in Chapter 5 Construction Strategy.

The magnitude of the impact is classified as being Minor. The excess topsoil that is removed from site will be available for use on other projects in accordance with the provisions of Article 27.

Waste facilities are available to accept any soil and stone (including topsoil but noting that topsoil cannot be placed in the void area of soil recovery facilities and would be used in site restoration at soil recovery facilities) that cannot be reused under Article 27 will have the capacity to do so. None of these outlets will be landfill facilities. As such, the receptors potentially impacted by the clearing process and eventual disposal are deemed to be of low importance and rarity at a local scale. As such, the sensitivity of the receptor has been classified as Low.

The significance of the impact in terms of topsoil has, therefore, been determined to have Imperceptible or slight significance, which is not significant in EIA terms.

Track Ballast

Where the track is required to be moved it is envisaged that new or recycled ballast will be brought to site in advance and placed in the new position. Old ballast will be removed to a dedicated site in the Inchicore depot for re-use / recycling / disposal. In areas where corridor widening is required the new tracks will be laid first and then old tracks will be removed and recycled where possible.

The magnitude of the impact is classified as being Negligible.

Waste facilities chosen to accept any soil and stone that cannot be reused under Article 27 will have the capacity to do so. As such, the receptors potentially impacted by the clearing process and eventual disposal are deemed to be of low importance and rarity at a local scale. As such, the sensitivity of the receptor has been classified as Low.

The significance of the impact in terms of Track Ballast has, therefore, been determined to have Imperceptible or slight significance, which is not significant in EIA terms.

Uncontaminated Soil

An estimated 400,000 m^3 of soil will be excavated by the contractor and removed from site (equates to an estimated 50,000 truckloads).

Excavation of soil will be required at all sites, including where widening areas plus some of the construction compounds. Off-site re-use options for surplus clean and inert excavated material include reuse as a by-product on other construction sites subject to Article 27 notification to the EPA. Where reuse cannot be employed, there is the option for recovery at suitable authorised waste facilities i.e., facilities which have been granted a Certificate of Registration, Waste Facility Permit or EPA license.

The magnitude of the impact is classified as being Minor. The excess soil that is removed from site will be available for use on other projects in accordance with the guidelines of Article 27 or through a licensed SRF.

Waste facilities available to accept any soil and stone that cannot be reused under Article 27 will have the capacity to do so. As such, the receptors potentially impacted by the clearing process and

eventual disposal are deemed to be of low importance and rarity at a local scale. As such, the sensitivity of the receptor has been classified as Low.

The significance of the impact in terms of soil has, therefore, been determined to have Imperceptible or slight significance, which is not significant in EIA terms.

Contaminated Soil

The quality and quantity of contaminated soils arising from this project will be determined at the time of soil excavation.

Contaminated soil arisings is remediated at its source site or is treated at licensed facilities in Ireland to non-hazardous status, is landfilled (one landfill in Ireland can process mildly contaminated inert materials) or is exported for processing abroad.

The magnitude of the impact is classified as being Minor.

Non-landfill waste facilities available to accept contaminated soil will have the capacity to do so. As such, the receptors potentially impacted by the clearing process and eventual disposal are deemed to be of low importance and rarity at a local scale. As such, the sensitivity of the receptor has been classified as Low.

The significance of the impact in terms of contaminated soil has, therefore, been determined to have Imperceptible or slight significance, which is not significant in EIA terms.

19.5.1.2.4. Other Construction Waste

Typical construction waste arisings such as concrete and reinforcing steel waste, used formwork / falsework and packaging material are expected to be produced during the proposed Project. There is likely to be an element of Waste Electrical and Electronic Equipment (WEEE) and metal material waste that arises from the construction site such as from the installation and/or upgrading of signalling systems, lighting, or other electrical fixtures. Fuel, lubricants, oil, hydraulic fluids, spill kits, plant nappies and absorbent mats used to maintain the machinery or used during refuelling activities and equipment used in the construction, are also considered in this section.

Table 19.10 and Table 19.11 list the materials expected to arise due to the construction phase of the project. The table includes estimated volumes or weights associated with each material and how they will be managed on and off site.

The reuse and recycling of all construction materials arising from the project shall be investigated fully. For example, concrete may be recycled through the Article 28 process of the European Communities (Waste Directive) Regulations 2011, as amended, using waste management services such as Integrated Material Solutions (IMS) Hollywood, Co. Dublin or similar. By using Article 28 waste material can be:

- ‘Fully recovered’ and no longer be defined as waste;
- Used as a ‘secondary’ resource in place of and fulfilling the same role as a non-waste derived or virgin ‘primary’ resource; or

- New innovations can transform waste into a valuable resource.

Opportunity for materials to be recycled or reused will be fully explored before disposal is considered. It is predicted that very minor loss of capacity. Therefore, the magnitude of the impact is classified as being Negligible.

The receptors potentially impacted by the generation and eventual disposal of typical construction waste are deemed to be of negligible importance and rarity at a local scale. The eventual receptors have low value and low recoverability. Due to the amount of waste generated and comparatively large waste facility, receptors will have a negligible vulnerability to this impact and low overall sensitivity. As such, the sensitivity of the receptor has been classified as Negligible.

The significance of the generation of typical construction waste has, therefore, been determined to have Imperceptible significance in EIA terms.

19.5.1.2.5. Individual Waste

In the construction of the infrastructure necessary for the proposed Project, general individual waste will be generated by day-to-day activities of the construction staff during the construction phase. This will be comprised of the staff's food waste etc.

The magnitude of the impact is classified as being Negligible/Minor. The volume of individual waste generated will have no/limited impact on the facilities available to accept that waste. Therefore, the receptors potentially impacted by the generation and eventual disposal of individual waste are deemed to be of negligible importance and rarity at a local scale. As such, the sensitivity of the receptor has been classified as Negligible.

The significance of the generation of individual waste has, therefore, been determined to have Imperceptible significance in EIA terms.

19.5.2. Potential Operational Impacts

DMRB LLA110 (2019) guidance specifies that the environmental assessment should report on the construction phase and first year of operational activities (opening year).

No significant maintenance activities would occur during the first year of operation, and therefore no significant materials consumption is anticipated.

Operational impacts associated with material waste management will relate to the ongoing waste stream from passengers accessing the train services however this anticipated to be limited in quantity and dealt with by existing waste management practices operated by Iarnród Éireann. The proposed new station at Heuston West has also been scoped out of the assessment as the only waste anticipated is small quantities of general waste generated by the public.

19.6. Mitigation Measures

All materials consumed and waste generated by the proposed Project will be managed in accordance with circular economy principles and the waste management hierarchy, with prevention, reuse, recycling, and other recovery methods favoured over disposal.

19.6.1. Construction Phase

19.6.1.1. Resource Use

- The Principal Contractor(s) will be responsible for sourcing materials for the construction of the proposed Project. These materials must comply with specific quality requirements;
- Iarnród Éireann will pursue procurement of the highest recycled steel content that is available for the steel usage. This may vary depending on engineering constraints;
- All aggregates required shall primarily be secondary aggregates and virgin aggregates shall only be employed where secondary aggregates do not fulfil structural requirements and/or are unavailable;
- Iarnród Éireann will support the use of local suppliers and re-use of materials on site to minimise the environmental impact, cost of transport and support the local economy and local communities in line with the proximity principle;
- Where possible, materials will be re-used / recycled to reduce the need for procurement of new materials. In accordance with the IÉ Sustainability Strategy 2021 - 2030, 25% of raw material purchases will come from recycled sources;
- The above actions alongside those committed to in the IÉ Sustainability Strategy 2021 – 2030 shall be implemented as part of the proposed Project mitigation; and
- Throughout the design and construction of the proposed Project, solutions will be sought to minimise the consumption of materials and the generation of waste throughout the lifecycle of the proposed Project. The DMRB LA110 guidance (2019) will be implemented throughout the detailed design and construction of the proposed Project.

19.6.1.2. Waste Management

A Construction Environmental Management Plan (CEMP) has been prepared as part of the Railway Order application – see Volume 4, Appendix 5.1 of this EIAR. This document includes the mitigation from the EIAR including the specific mitigation applying to resource and waste management. Once appointed, the Contractor will take responsibility for the CEMP and delivery of the mitigation and management measures on the ground. The CEMP has had regard to the Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects (EPA, 2021). The contractor will be obliged to implement and maintain the measures and actions contained within in the EIAR during the construction phase.

General Overarching Measures

- The Contractor will develop and implement a Construction Waste Management Plan (CWMP) and a Construction Demolition Waste Management Plan (CDWMP) to ensure that waste

arising on-site during the construction and demolition phase of the DART+ South West Project will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts, 1996-2011 and associated Regulations (1996-2011) are complied with, to ensure that optimum levels of reduction, re-use and recycling are achieved, and with a goal of achieving the waste hierarchy in accordance with the relevant statutory provisions. This waste hierarchy is echoed in the EPA's best practice guidelines for RWMPs;

- A demolition plan must be prepared by the Contractor in advance for each building and structure to be demolished;

- Waste hierarchy principles, i.e., prevention, preparing for re-use, recycling, recovery, disposal, will be implemented at all stages of the Project. These principles are essential in creating a sustainable circular economy. The starting point for all activities will be to prevent the creation of a waste material. It is important to attempt to prevent a waste material being created before searching for an appropriate place to dispose of it. This is in keeping with the circular economy approach;

- A Waste Management Co-ordinator (WMC) will be nominated who will have overall responsibility for the implementation of all waste processes. In conjunction with this, a clear responsibility structure will be introduced in the Project team to ensure difficulties encountered are raised at an appropriate level and acted upon. This is essential in ensuring that all waste is properly dealt with and not looked over accidentally in the mindset that another member of staff will undertake the necessary procedure. Everyone must be aware of their personal role and implement it appropriately;

- Any waste arising from the construction, operation, maintenance, and decommissioning phases of the Project will be deposited at an appropriate facility (as listed in Volume 4, Appendix 19.1) in accordance with the current national waste policy. This is necessary so that all waste is disposed of to the best possible facility type to adhere to the circular economy and resource opportunity strategies;

- In order to establish the appropriate reuse, recovery and/or disposal route for the surplus soils and stones to be removed off-site, it will first need to be classified. The material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out on a number of representative soil samples for a range of parameters to allow the soil to be accurately classified as hazardous or non-hazardous. In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values for acceptance of waste at landfills based on properties of the waste including potential pollutant concentrations and leachability;

- If any unforeseen waste or hazardous material is encountered during the Project, the EPA will be notified, and the material will be deposited at an appropriate waste facility. There is a

possibility that unforeseen or hazardous material is encountered during excavation works. It is important that if such a case arises, the material is managed appropriately;

- Records will be kept on the quantity, nature/ type and quality of all waste leaving the site. Record keeping is important for coherency, future planning and the justification and accountability of past actions; and

- Attempts will be made to reuse soil and stone material arising from excavation works on site as noise bunds, visual screens, etc. Ballast will be reused where possible. Reusing excavated material on-site will reduce the quantity of material needing to be removed off-site. This will also reduce truck movements. It is intended that concrete waste will be dealt with using an Article 28 notification (End-of-Waste). These notifications will allow the concrete waste to be fully recovered.

Measures to be Implemented on Site

- Source segregation: Source separating wastes into dry mixed recyclables, biodegradable, and residual wastes. Clear labelling of waste bins, containers, skip containers and storage areas, including waste stream colour coding and photographs as appropriate;

- Waste auditing: good record keeping systems will be implemented. A recording system will be put in place and maintained by the Contractor to record the waste arising's including quantities (tonnes) and type of waste and materials leaving the site, either for reuse on another site, recycling, or disposal. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed;

- Appropriate storage: Waste fuels / oils will be generated from equipment used on-site during construction and will be classified as hazardous waste. Paints, sealants, and hazardous chemicals etc. will be stored in secure, bunded locations. All hazardous waste will be separately stored and labelled, in appropriate lockable containers, prior to removal from site by an appropriately permitted waste collection service provider;

- Efficient removal: Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility;

- Further efforts will be made to re-use soil and stone material arising from excavation works on site to further reduce the quantity of material needing to be removed off-site;

- Exported materials, particularly soils, will be carefully managed to restrict the spread of Invasive Alien Plant Species (IAPS) (see Chapter 8 Biodiversity for further information on the management of IAPS);

- Concrete waste will be dealt with using an Article 28 notification. These notifications will allow the concrete waste to be fully recovered into new product; and

- As noted under section 19.2.1, by-product notifications (under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011)) provide an opportunity for reuse of surplus clean soil & stone material arising from construction activity. At time of construction, options for Article 27 by-product status will be reviewed, subject to waste management and planning requirements being fully met. Such opportunities offer potential to further reduce indirect effects of waste management resulting from the transport of materials from site, notably traffic, noise, and air emissions from transport related haulage.

19.6.2. Operational Phase

19.6.2.1. Resources

Iarnród Éireann will support the use of local suppliers and re-use of materials on site to minimise the environmental impact, cost of transport and support the local economy and local communities throughout the operational phase of the project in line with the proximity principle. This will include strategies for re-use and recycling to reduce the need for procurement of unnecessary new materials.

19.6.2.2. Waste Management

- Waste hierarchy principles will be implemented to operational contracts and activities to ensure that the circular economy approach is fully supported. Prevention, preparing for re-use, recycling and recovery will be enforced with appropriate licensed waste management facilities chosen to accept waste which could not otherwise be diverted.

- The contaminated sediment collected in the attenuation ponds will contain hazardous chemicals. Therefore, it must be disposed of accordingly. Sediment and plant waste is likely to require pre-treatment prior to disposal. This can take place either as the material is extracted or at the landfill site itself.

19.7. Monitoring

Monitoring is proposed for the construction and operational phases as set out in the following sections.

19.7.1. Construction Phase

Monitoring will be undertaken and recorded by the contractor as follows:

- Records shall be kept of all truck movements relating to the removal of site clearance vegetation, topsoil, and construction soil. The records shall include quantity, nature / type, quality of the material, and the excavation and disposal locations;

- Records shall be kept on the quantity, nature / type and quality of all waste leaving the construction site including individual waste and typical construction site waste; and
- Segregation of construction site waste shall be carefully monitored with waste audits taking place at regular intervals. An audit schedule shall be included in the CWMP prepared by the appointed Contractor.

19.7.2. Operational Phase

No operational phase monitoring is proposed.

19.8. Residual Effects

19.8.1. Construction Phase

Following implementation of the mitigation measures as outlined in Section 19.6 most waste materials generated during the construction phase will be re-used either within the proposed Project or will be sent for recovery / recycling at authorised waste facilities. The residual effects following the implementation of mitigation measures are therefore considered to be minor, negative, and short term.

19.8.2. Operational Phase

The waste generated during operation and maintenance of the proposed Project will not be significant as it will mainly be associated with occasional maintenance works. The residual effect on resource and waste management is expected to be negligible.

19.9. Cumulative Effects

The cumulative assessment of relevant plans and projects has been undertaken separately in Chapter 26 of this EIAR.

19.10. References

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