Chapter 17
Waste & Resources

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17 WASTE AND RESOURCE

17.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the impacts on waste and resources associated with the Construction and Operational Phases of the BusConnects Galway: Dublin Road scheme (hereafter referred to as the Proposed Development).

The potential impacts associated with the development of the Proposed Development during the Construction Phase have been assessed. This includes the creation and management of surplus materials due to construction activities such as utility diversions, road resurfacing and road realignments.

The potential impacts associated with surplus materials from ongoing road infrastructure maintenance during the Operational Phase have been assessed.

The assessment has been carried out according to best practice and guidelines relating to waste and resources assessment, and having regard to other similar large-scale road, rail and transportation projects.

Demolition, site clearance, excavation and construction are activities which will take place during the Construction Phase which are likely to generate surplus materials. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects. During the Operational Phase maintenance activities are likely to generate surplus materials. These are included in this assessment.

Key aspects of the Proposed Development relevant to this waste and resources assessment are set out in Chapter 5 (Construction) of this EIAR and include:

- Construction and reconstitution of cycleways, footpaths, road widening and urban realm improvements;
- Removal of trees, concrete kerbs, walls, fences, and gates;
- Removal of small retaining walls;
- Removal of roundabout and modifications to signalised junctions;
- Demolition of two single storey buildings;
- New street furniture, including traffic lights and bus stops, and landscaping works;
- Removal of boundary walls, fences, and gate walls;
- Minor utility diversions and/or protections will be required; and
- Excavation of pavements and carriageways.

A summary of the surplus materials arising from excavation, demolition, construction and operation of the Proposed Development is presented in Section 17.4.

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Development are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate.

17.2 Sustainable Resources and Waste Management Principles

17.2.1 Circular Economy

The principal objective of sustainable resource and waste management is to use resources more efficiently, where 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 (refer to Figure 17-1).

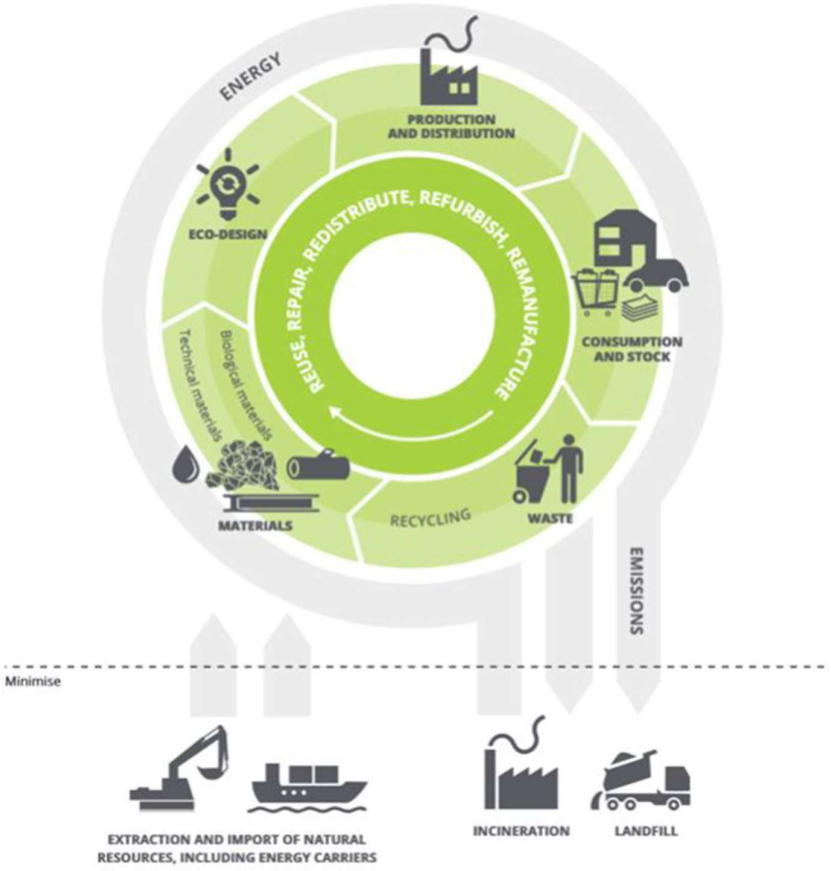

Figure 17-1 A Simplified Model of the Circular Economy for Materials and Energy (European Environment Agency (EEA) 2016)

The European Union (EU) Circular Economy Action Plan (European Commission 2020) notes that:

'*the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade*.'

The Department of Communications, Climate Action and Environment's (DCCAE's) A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020 – 2025 (hereafter referred to as the National Waste Action Plan) (DCCAE 2020) notes that:

'*In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value*.'

Where residual waste generation is unavoidable it will be dealt with in a way that follows the waste hierarchy as illustrated in Figure 17-2 European Waste Hierarchy and set out in Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2009 on waste and repealing certain Directives and Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (hereafter referred to as the Waste Framework Directive). The Government of Ireland released a Whole of Government Circular Economy Strategy 2022-2023 (Government of Ireland 2021), setting out a

policy framework for transitioning to a circular economy, measures to reduce the circularity gap, raise awareness and support investment into circular initiatives and identify barriers.

17.2.2 The Waste Hierarchy

The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed to landfill. Where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy, as illustrated in Table 17-2 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 17-2 European Waste Hierarchy

The consideration of resources in the context of this assessment includes a review of the potential for beneficial reuse of materials arising from the construction of the Proposed Development (e.g. excavated soil and stones, concrete or bituminous mixtures).

Other topics related to waste and resource management, such as Construction Phase traffic impacts, water quality impact and mineral resources are considered in the following chapters:

- Construction Phase traffic impacts are considered in Chapter 6 (Traffic & Transport);
- Water quality and pollution risk are considered in Chapter 13 (Water); and
- Mineral resources are considered in Chapter 14 (Land, Soils, Geology & Hydrogeology) and Chapter 18 (Material Assets).

If excavated material is not required for the construction of the Proposed Development the appointed contractor will undertake a study of suitable end uses including other construction projects beyond the Proposed Development, with priority to be given to activities which are higher up the waste hierarchy. The material would then be considered as a resource for reuse beyond the Proposed Development in so far as is reasonably practicable and may be notified to the Environmental Protection Agency (EPA) as a by-product, as appropriate.

17.3 Methodology

17.3.1 Study Area

The study area for waste and resources generation assessment from the Proposed Development comprises the areas and activities within the Proposed Development boundary (including the Construction Compound and temporary land take).

Waste from the Proposed Development could be accepted at sites nationally and internationally (that are suitably licensed or permitted for the waste volume and type), for treatment, recovery and disposal. However, as waste management planning in Ireland takes place on a regional basis, the study area generally for waste treatment, recovery and disposal comprises Galway and the Connacht Ulster Waste Region (CUWR) (refer to Figure 17.1 and 17.2 in Volume 3 of this EIAR). The CUWR consists of the following nine local authority regions:

- Cavan County Council;
- Donegal County Council;
- Galway City Council;
- Galway County Council;
- Leitrim County Council;
- Mayo County Council;
- Monaghan County Council;
- Roscommon County Council; and
- Sligo County Council.

Where data is available at a Local Authority or regional level this has been used. National data is used where this is the only available level at which statistics and data is published.

17.3.2 Relevant Guidelines, Policy, and Legislation

The following guidelines and policy documents were considered when undertaking the waste and resources assessment:

- Circular Economy Programme 2021-2027 (EPA 2021a);
- Ireland's First Whole-of-Government Circular Economy Strategy 2022 - 2023;
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (EPA 2021b);
- Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity – Updated report 2020 (Regional Waste Management Offices 2020);
- A new Circular Economy Action Plan for a Cleaner and More Competitive Europe (European Commission 2020);
- National Waste Management Plan for a Circular Economy 2024-2030 (Government of Ireland);
- Whole of Government Circular Economy Strategy 2022 – 2023: Living More, Using Less (Government of Ireland 2021);
- Environmental Protection Agency (EPA) Waste Statistics for Ireland (EPA 2024a, 2024b, 2024c);
- National By-Product Criteria for Site-Won Asphalt (road plannings) BP-N001/2023 (EPA 2023);
- National By-Product Criteria for greenfield soil & stone BP-N002/2024 (EPA, 2024);
- National End-of-Waste Decision EoW-N001/2023 of 12th September 2023 (epa.ie);
- A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 (Department of Communications, Climate Action, and Environment (DCCAE 2020);
- Consultation on the Transposition of the Circular Economy Waste Package (DCCAE 2019);
- EU Construction and Demolition Waste Protocol and Guidelines (European Commission 2018);
- Transport Infrastructure Ireland (TII) The Management of Waste from National Road Construction Projects. Standard GE-ENV-01101 (TII 2017);
- Connacht-Ulster Region Waste Management Plan 2015-2021 (CUWR);

- Circular Economy Action Plan (European Commission 2015);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Waste Classification – List of Waste and Determining if Waste is Hazardous or non-Hazardous (EPA) (2015a); and
- C-SPW-00600 - Earthworks Specification for National Roads (hereafter referred to as the TII Earthworks Standard) (TII 2024).

Directives and Legislation

The following directives and legislation were considered when undertaking the waste and resources assessment:

- Waste Framework Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste;
- European Union (Waste Directive) Regulations 2011-2020 (hereafter referred to as the Waste Directive Regulations);
- Regulation (EC) 1013/2006 of the European Parliament and of the Council on Shipments of Waste;
- S.I. No. 86/2008 - Waste Management (Facility Permit and Registration) Regulations 2008, as amended;
- S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007, as amended;
- S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended;
- S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007, as amended;
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (hereafter referred to as the Landfill Directive) as amended; and
- Waste Management Act 1996, as amended (hereafter referred to as the Waste Management Act 1996).

A summary of key policy and legislation is included in Appendix A17.1 (Legislation and Policy) in Volume 4 of this EIAR.

17.3.3 Appraisal Method for the Assessment of Impacts

The potential environmental impacts of solid waste and resource generation and management associated with the Proposed Development were assessed for both the Construction and Operational Phases. These impacts may be neutral, positive or adverse and are dependent on the measures employed to prevent and/or manage the waste generated.

17.3.3.1 Assessment Methodology

The potential impacts are assessed by describing waste and by-products generation and management from the Proposed Development and comparing this to the current waste and by-product management baseline in Ireland.

The impact assessment and waste management options of this EIAR (as set out in Section 17.5 and Section 17.6) have been considered in line with the waste hierarchy and the Waste Framework Directive - see Figure 17-2.

The following factors were considered when determining the significance of the impacts of the Proposed Development on the various aspects of the baseline environment:

- Desk study of current practices for waste and by-product management in Ireland;
- Data gathered on the types and quantities of waste and by-product generation and management from the Proposed Development. This is compared with the established baseline set out in Section 17.4;
- An assessment of the likely environmental impacts that may arise from the quantity of waste requiring disposal to landfill, in line with the significance criteria set out in Chapter 1 (Introduction) of this EIAR;

- The surplus materials arising and waste infrastructure capacity in the CUWR in which the Proposed Development is located; and
- A review of the Proposed Development in the context of the waste hierarchy and circular economy principles to determine the mitigation measures required.

17.3.3.2 Legislation, Policy, and Guidance

The assessment considers relevant waste management legislation, policies and guidance applicable to all infrastructure components along the Proposed Development. This includes, but is not limited to the legislation, policy and guidance set out within Section 17.3.2.

17.3.3.3 Significance Criteria

The criteria used to categorise the significance of waste and resources impacts is based on the EPA Guidelines (EPA 2022) as set out in Chapter 1 (Introduction) of this EIAR, which range from Imperceptible to Profound. The Institute for Environmental Management and Assessment (IEMA) released a guide to Materials and Waste in Environmental Impact Assessment (IEMA 2020) (hereafter referred to as the IEMA Guidance) setting out a standard approach to undertaking waste assessments for EIA (IEMA 2020). The EPA Guidelines are complemented by the more detailed approach set out in the IEMA Guidelines.

The IEMA Guidance sets out that the receptor for waste relates to availability of regional (and where appropriate, national) landfill void capacity baseline data collected on the availability and capacity of non-landfill waste management infrastructure (in conjunction with any identified trends) may be used to provide a more comprehensive context for assessing the magnitude of impacts (see Table 17-1). These magnitude criteria have informed the overall assessment of impact significance, using professional judgement.

Table 17-1 Significance Criteria adapted from EPA Guidelines and IEMA Guidance for Magnitude of Impact for Inert and Non-Hazardous Waste

No Change	Negligible	Minor	Moderate	Major
Zero waste generation and disposal from the development	Waste generated by the development will reduce regional authorised waste management infrastructure intake capacity by <1%	Waste generated by the development will reduce regional authorised waste management infrastructure intake capacity by 1-5%	Waste generated by the development will reduce regional authorised waste management infrastructure intake capacity by 6-10%	Waste generated by the development will reduce regional authorised waste management infrastructure intake capacity by >10%

As set out in the baseline (Section 17.4), Ireland's construction and demolition (C&D) waste is predominately managed through backfilling material (81%) with only 10% recycled and 7% sent for disposal (EPA 2024a). Therefore, in conjunction with identified trends nationally and in the region, it is considered appropriate to use regional authorised waste management infrastructure intake capacity as the receptor, as set out in Table 17.4, Section 17.4.1.

The approach of the EPA was supplemented by the IEMA Guidance in order to establish the waste management significance ratings for this assessment of non-hazardous waste. The EPA significance ratings are used to describe the impacts arising from the construction and operation of the Proposed Development.

17.3.4 Data Collection and Collation

17.3.4.1 Desk Study

A desk study was undertaken which comprised the following tasks:

- Review of relevant policy and legislation which creates the legal framework for waste and resource management in Ireland;

- Review of the estimated surplus materials and by-product generation for the Construction Phase of the Proposed Development and subsequently incorporated into the development of the EIAR;
- Review of Operational Phase waste (i.e., associated with carriageway maintenance);
- Review of the Proposed Development design during development of the EIAR to identify appropriate mitigation and move waste management up the waste hierarchy through implementation of best practice where possible;
- Types, quantities and management of construction and demolition (C&D) waste arisings generated in Ireland and the relevant Local Authority and CUWR jurisdictions were reviewed;
- Types, quantities, and management of commercial and industrial waste generated in Ireland and CUWR jurisdictions (Regional Waste Management Offices 2020) were reviewed; and
- Availability (type and capacity) of waste infrastructure within each of the Local Authority jurisdictions through which the Proposed Development will pass and also in the CUWR were obtained.

17.3.4.2 Waste Generation Phases

A summary of both phases of the Proposed Development and the source of surplus materials considered in this assessment is set out in Figure 17-3. For the purpose of the Proposed Development, bituminous materials have been quantified and assessed under the excavation activities.

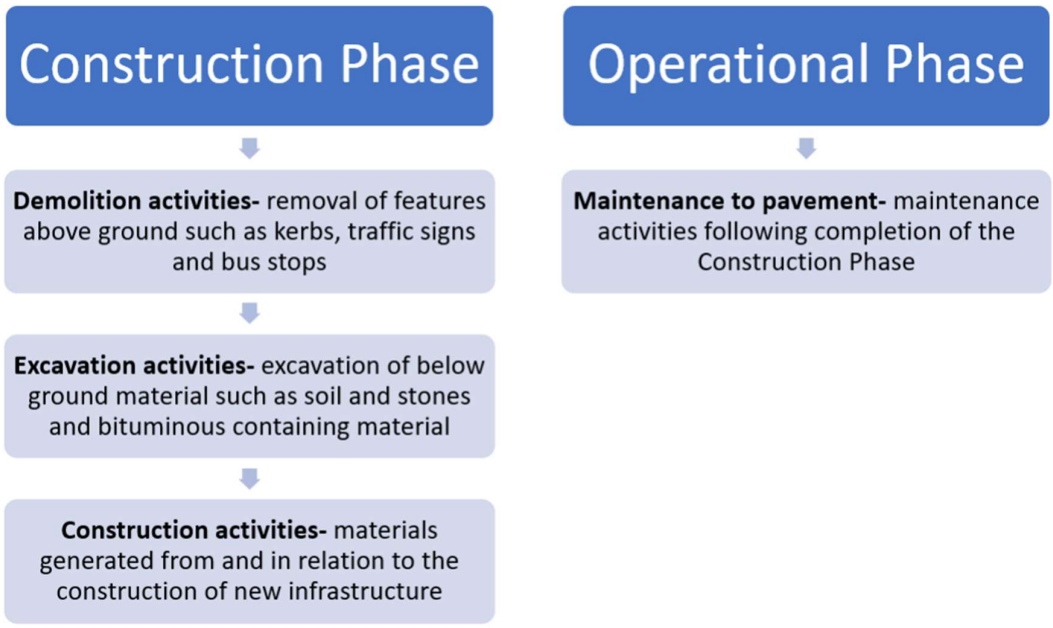

Figure 17-3 Summary of Surplus Materials Source Considered in this Assessment for Each Phase of Proposed Development

Construction Phase

Information including the following was gathered to inform the impact assessment related to C&D waste for the Proposed Development:

- A description of proposed demolition, excavation material quantities and properties;
- Consideration of options for reuse within the Proposed Development of materials generated during construction; and
- Consideration of the on-site and off-site treatment, reuse, recovery, or disposal of materials.

Operational Phase

During the Operational Phase, the predominant surplus materials generation will result from maintenance activities.

The assessment quantified surplus materials being generated only in the areas being widened and narrowed as a result of the Proposed Development, as the existing road network would continue to require maintenance in any event and so forms part of the baseline. It is assumed that additional maintenance would be required, above the baseline, in areas that will be widened. It is assumed that less maintenance will be required, compared to the baseline, in areas that will be narrowed as part of the Proposed Development. In the Operational Phase the infrastructure will be maintained by the local authority, in accordance with their own standards and requirements.

17.3.5 Waste Management Principles

In the construction of the Proposed Development the appointed contractor will have regard to the following principles of the waste hierarchy, in line with the Waste Framework Directive (see Figure 17-2).

17.3.5.1 Prevention and Reuse

Waste prevention and minimisation is the most environmentally sustainable means of managing surplus material from demolition, excavation and construction materials. The principles of prevention and minimisation of waste are inherent in the design of the Proposed Development.

Where naturally occurring material will be used for the purpose of construction in its natural state within the Proposed Development, this material will not be deemed to be a waste in accordance with the Waste Management Act 1996. Naturally occurring material, including topsoil, will be reused for the purpose of construction throughout the Proposed Development, where feasible. The material will also be subject to testing to ensure it is suitable for its proposed end use.

Where non-naturally occurring surplus excavation material occurs within the Proposed Development it will be beneficially reused within the Proposed Development, where feasible. The use of excavation material on other projects, for example in engineering works or landscaping may take place where feasible and where it cannot be reused on-site. Where construction by-products are proposed to be further used on-site or off site, this will take place in compliance with Article 27 of the EC Waste Directive Regulations 2011. The appointed contractor will be responsible for ensuring compliance with these regulations, where appropriate.

17.3.5.2 Recycling, Recovery and Disposal

Where surplus materials are generated which cannot be reused, these will be waste and will be delivered only to recycling or recovery facilities authorised and in accordance with the Waste Management Act 1996, as amended, and which hold a Certificate of Registration, Waste Facility Permit or EPA Licence.

All wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

The option of disposal is the least desirable outcome for surplus material generated by the Proposed Development and will only be considered where it is not feasible to deliver wastes for recycling or recovery to appropriately licensed/permitted facilities for reuse/recycling purposes.

In addition, where waste facility capacity does not exist within Ireland for management of specific waste streams, such as hazardous soils, these will be exported for treatment, recovery or disposal in accordance with the provisions of Waste Management (Shipments of Waste) Regulations 2007, as amended (S.I. No. 419/2007) and in accordance with current practice in Ireland.

It will be the responsibility of the appointed contractor, under the Waste Management Act 1996, as amended, to ensure that all material delivered to authorised waste facilities is correctly classified and will meet the waste acceptance criteria of the receiving site.

It will be the responsibility of the appointed contractor to secure agreements for reuse, recycling or disposal of surplus materials from the Proposed Development in construction projects or authorised facilities where appropriate, in accordance with the Waste Management Act 1996, as amended, and associated regulations.

17.3.5.3 Best Practice Waste Management Measures

Table 17-2 sets out a list of best practice waste management measures which will be implemented by the appointed contractor, where practicable, during the Proposed Development construction in accordance with the waste hierarchy.

Table 17-2 List of Waste Management Best Practice Actions (Construction Phase)

Stage in Hierarchy	Action
Recycling	Where possible, metal, timber, glass, and other recyclable material will be segregated and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation.
Recycling	On-site office and food waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes.
Recycling	Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate.
Prevention	The site will be maintained to prevent litter and regular litter picking will take place throughout the site.
Prevention	'Just-in-time' delivery will be used as where practicable to minimise material wastage (Building Research Establishment (BRE) 2012; EPA 2015b)
General	The appointed contractor will record the quantity in tonnes and types of waste and materials leaving the site during the demolition works. 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 disposed of.
Prevention	Paints, sealants and hazardous chemicals will be stored in secure, bunded locations.
Prevention	All hazardous waste will be separately stored in appropriate lockable containers prior to removal from site by an appropriate waste collection holder.
General	Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility.
General	The appointed contractor will ensure that any off site interim storage facilities for excavated material have the appropriate waste licences or waste facility permits in place.
Prevention	All staff on-site will be trained on how to minimise waste (i.e. training, induction, inspections and meetings).
Prevention	Materials on-site will be correctly and securely stored (BRE 2012).
Prevention / Recycling	Segregated skips will be used on-site if space permits (particularly for hazardous, gypsum, metal, timber, inert waste and general waste) (BRE 2012).

17.4 Baseline Environment

The baseline environment for waste and by products management in Ireland is described in the following sections. Construction waste, including demolition and excavation waste, will be generated during the Construction Phase of the Proposed Development. Construction waste, due to maintenance activities, will also be generated during the Operational Phase of the Proposed Development.

Construction waste, including demolition and excavation waste, will be the main type of waste generated as a result of the Proposed Development.

There will be small quantities of municipal-type waste generated during construction and operation. Therefore, the waste management baseline of construction and municipal waste was established for both the Construction and Operational Phases.

Article 27 of S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011, as amended (Article 27) allows the EPA to determine, under certain circumstances, that a material is a by-product and not a waste. Substances or objects, such as soil and stones, produced during construction projects may be determined as a by-product if they satisfy all of the following criteria:

1. Further use of the material is certain;
2. The material can be used directly without any further processing other than normal industrial practice;
3. The material is produced as an integral part of the production process;
4. 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.

Substances or objects will be a by-product if they meet each of the conditions detailed in Article 27. The baseline area for reuse of by-products in accordance with Article 27 comprises the whole country, as no regional distinction is made in the Article 27 register.

Where it is proposed to use an Article 27 EPA notification in relation to excavation material from the Proposed Development, the appointed contractor will be responsible for ensuring compliance with Article 27 including notification of the EPA, seeking a determination from the EPA and compliance with all relevant Agency guidance on the matter.

Where it is proposed to use soil from offsite which is a by-product and subject to Article 27, the appointed contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Article 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available construction by-products arising from other sites will be used in the development of this site in place of virgin materials.

The Government noted in the Waste Action Plan for a Circular Economy 2020 that selected waste streams would be the subject of sector or industry wide Article 28 of S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011, as amended (Article 28), End-of-Waste determinations. Should a determination be made which applies to wastes arising from the Proposed Development, and the contractor wishes to apply the declaration, it will be the responsibility of the contractor to ensure that all of the conditions of the declaration and Article 28 is complied with.

17.4.1 Construction and Demolition Waste

List of Waste (LoW) codes for typical C&D wastes are included in Appendix A17.2 List of Waste Codes for Construction and Demolition Wastes in Volume 4 of this EIAR. In 2022, the latest year for which there are published statistics available, 8.3 million tonnes of C&D waste was generated, a decrease of 9% from 2021 (EPA 2024a). Of this waste, 6.7 million tonnes comprised soil and stones, making up 82% of the material

waste stream. A breakdown of the composition of C&D waste in Ireland in 2022 is set out in Table 17-3. These figures should be considered as a guide only as C&D waste can vary significantly from one project to another, depending on the nature of the development and the waste management practices employed on-site.

Table 17-3 Quantity of C&D Waste Collected by Authorised Waste Collectors in 2022 (EPA 2024a)

Waste Materials from C&D Sources	Quantity (tonnes)	Proportion of Material Stream (%)
Soil and stone	6,741,489	82
Mixed C&D waste	544,415	7
Concrete, brick, tiles and similar	616,687	7
Metals	206,851	3
Bituminous mixtures	104,270	1.0
Segregated wood, glass, and plastic	54,101	>1
Total	**8,267,813**	

The EPA reported 389,908 tonnes of hazardous waste was generated in Ireland in 2022, a decrease of 16% (over 77,000 tonnes) from 2021 (EPA, 2024b). The construction sector contributed 15% to hazardous waste generated in 2022 from sources including contaminated dredge spoil and smaller amounts of asbestos, asphalt, contaminated wood, concrete, bricks, metals, and tiles. Typically, these wastes are treated on-site or off-site at hazardous waste treatment facilities in Ireland or exported to facilities in other countries.

Approximately 169,000 tonnes of hazardous waste was treated in Ireland in 2022. 26,447 tonnes of hazardous waste was treated on site of generation and 142,961 tonnes was treated off-site at Irish hazardous waste management facilities. The remainder was exported for treatment. (EPA, 2024b)

The EPA reports that final treatment of C&D waste in 2022 took place in Ireland (94%) and only 6% was exported abroad for final treatment. Most C&D waste treated in Ireland was recovered by backfilling (81%), while 7% went for disposal and only 10% was recycled (EPA 2024a). Under the Waste Framework Directive, EU Member States must achieve 70% of material recovery of non-hazardous and non-soil-and-stone C&D waste by 2020.

A summary of the permitted waste facilities for the CUWR, active at the time of preparation of this assessment, is provided in Table 17-4. Many permit holders are authorised to accept more than one waste type. Table 17-4 sets out the minimum number and capacity for each waste type. The minimum figure sets out the waste facilities accepting the specified waste type only. Figure 17.1 and Figure 17.2 in Volume 3 of this EIAR show the locations of permitted construction waste facilities in Galway and the CUWR, respectively. Facilities located in Donegal and Monaghan County have been excluded from the baseline due to the travel distance to these facilities.

Table 17-4 Summary of CUWR Waste Facility Permit Data - NWCPO Local Authority Waste Facility Register (2024)

Waste Type	Number of Waste Facility Permit Sites in CUWR	Capacity of Waste Facility Permit Sites in the CUWR (tonnes)
Soil and stones	70	1,205,824
Wood	8	173,800
Concrete	1	1,000
Other Construction Waste	12	189,370
Bituminous Mixtures	0	-

Waste Type	Number of Waste Facility Permit Sites in CUWR	Capacity of Waste Facility Permit Sites in the CUWR (tonnes)
Total	**91**	**1,569,994**

On receipt of an Article 27 notification by the EPA, materials can be determined as a waste or a by-product. In some cases, no determination is issued by the EPA. This means that the material has not been determined as a waste. The EPA received by-product notifications for 4.7 million tonnes of soil and stones material in 2023 and 5.8 million in 2024. The EPA determined that 1.5m tonnes of the soil and stone notified were a by-product and 44,000 tonnes were waste in 2023 with notifications for 97,000 tonnes being withdrawn. In 2024 the EPA has to date determined that 708,640 tonnes of the soil and stone notified were a by-product (EPA 2024c).

The estimated quantity of C&D material notified as a by-product for which no determination was made to the EPA was 3.2 million tonnes in 2023 and 4.7 million tonnes in 2024. The EPA notes in its 2020 'Guidance to Planners, Planning Authorities and An Bord Pleanála on the Management of Excess Soil and Stone from Developments' (EPA 2020) that it will endeavour to issue determinations as waste or by-products for all notifications from 2020 and determinations have started to be issued.

A summary of Article 27 notifications for three key road construction materials for the years 2019 to 2024 is presented in Table 17-5. There has been an increase in the number of notifications for soil and stones and bituminous mixtures from 2019 to 2024, with bituminous mixtures notifications increasing from 175 in 2019 to a peak of 285 in 2024 and soil and stones notifications increasing from 214 in 2019 to 309 in 2024 (EPA 2024c).

Table 17-5 Number of Article 27 Notifications (2019 to 2024)

Waste Type/Year	2019	2020	2021	2022	2023	2024*
Soil and stones	214	187	238	192	292	309
Bituminous mixtures/road plannings	175	209	229	132	142	285
Concrete/demolition concrete	8	15	7	4	1	1

** Records up to September 2024*

Article 27 notification data obtained from the EPA, shows that there were 761,264 tonnes of material notified in the CUWR in 2023 and 270,612 tonnes in 2024 which was established as the baseline for the Proposed Development.

There is only one licenced facility within the region. The Lennon Quarries Limited facility, located in Co. Mayo, is a soil recovery facility with a capacity of 90,000 tonnes per annum (EPA 2024d). Figure 17.3 in Volume 3 of this EIAR shows the location of the Lennon Quarries facility. The regional waste management offices have published a Construction and Demolition- Update Report 2020 which states that (Regional Waste Management Offices 2020):

'In comparison to [the East Midlands and Southern] regions, the CUR had just 10% of the remaining national capacity at the end of 2018.'

Table 17-6 sets out the baseline for construction waste, permitted and licensed, capacity and Article 27 notifications for 2024. This data has been used to establish a baseline of available waste capacity for 2024. The available C&D waste capacity in CUWR, and so the construction waste baseline, is approximately 1.93 million tonnes based on the following assumptions:

- Using the minimum available capacity for permitted facilities within the CUWR (only including facilities that accept a single waste type in order to avoid double counting capacity and excluding Donegal and Monaghan);
- Including only licensed facilities accepting soil and stones; and
- Including all Article 27 notifications for 2024 in the CUWR.

Table 17-6 C&D waste management baseline for CUWR, 2024 (Permitted, Licensed and Article 27 notifications)

C&D Waste Management Baseline for 2024	Capacity/Annual Intake (Tonnes)
Minimum Permitted capacity (Local Authority Waste Facility Register, 2024)	1,569,994
Licenced annual intake (soil and stone facilities) (EPA 2024d)	90,000
Article 27 (by-product) notifications (EPA 2024c)	270,612
Total	**1,930,606**

17.4.2 Municipal Waste

Municipal waste will be generated in small quantities during the Construction and Operational Phases (i.e. associated with maintenance activities) of the Proposed Development. Municipal waste in Ireland is made up of household waste as well as commercial and other waste that, because of its nature or composition, is similar to household waste. According to the EPA, Ireland generated 3.17 million tonnes of municipal waste and recycled 41% of this in 2021 (EPA 2024e).

Of the 3.17 million tonnes of municipal waste generated in Ireland in 2021, 41% was recycled, 42% was used in energy recovery, 16% was landfilled, 11% was sent for organic treatment and 1% of waste was estimated to be unmanaged. Approximately 1.3 million tonnes of Ireland's municipal waste went for incineration with energy recovery in 2021. Of the 3.17 million tonnes of municipal waste, 43% is estimated to be non-household municipal waste. Since 2001, significant changes have occurred in the management of municipal waste in Ireland, notably the dramatic decline in landfilling over this period accompanied by increased levels of recycling in the early 2000s and subsequently an increase in the share of municipal waste sent for energy recovery since 2011 (EPA 2024e).

In September 2020, the DCCAE published a new national waste strategy, the Waste Action Plan for a Circular Economy (DCCAE 2020). The following targets were noted in the National Waste Action Plan for municipal waste in Ireland which will be implemented using waste collection permit conditions:

- Municipal solid waste (MSW) recycling rate of 55%, 60%, and 65% by 2025, 2030 and 2035 respectively; and
- Limit the amount of MSW to landfill to 10% by 2035.

To achieve these targets from the 41% recycling rate in 2021 improvements are required in waste reduction, segregation and contamination rates. The EPA estimates that (Government of Ireland 2019, 'A Waste Action Plan for a Circular Economy - Ireland's National Waste Policy 2020-2025'):

'*…that Ireland's municipal recycling (including organic waste for composting and anaerobic digestion through the organic bin) rate could increase by 50% (from 40%) if all recyclable (including organic) material was removed from the general waste bins and placed into the correct mixed dry recycling and organic waste bins.*'

Biodegradable municipal waste (BMW) comprises those elements of the municipal waste stream that will degrade biologically, for example food waste, garden and parks waste, wastepaper and cardboard.

Under the Landfill Directive, Ireland is committed to meeting targets for the diversion of BMW from disposal to landfill including a target of less than 427,000 tonnes, refer to National Waste Management Plan 2024 –

2030. There has been a steep decline in Ireland's landfill rate for municipal waste from over 80% in 2001. Ireland must reduce the share of municipal waste landfilled to 10% or less by 2035, which includes waste landfilled at each step along the waste treatment process in Ireland and abroad (EPA 2024e).

17.5 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Development, in the absence of mitigation, but taking into account the best practice measures set out previously in Section 17.3.5 and expanded upon in this Section. This informs the need for mitigation or monitoring to be proposed (refer to Section 17.6). Predicted residual impacts (taking into account any additional proposed mitigation and/or monitoring) are then presented in Section 17.7.

17.5.1 Characteristics of the Proposed Development

Surplus materials are likely to be generated during the following activities and are addressed in this Section:

- Demolition – including waste generated from the removal of features above ground such as kerbs, traffic signs and bus stops;
- Excavation – including waste generated from the excavation of below ground material such as soil and stones and bituminous mixtures etc.; and
- Operation – including waste generated from maintenance activities following completion of the Construction Phase.

Surplus organic materials, including vegetation from shrub, tree or garden clearance or deposits removed from within redundant drainage channels, may generate waste material for treatment at organic waste facilities. There is adequate capacity for the management of such wastes, please see Section 17.4. Segregation facilities may be provided, where necessary, on the construction site to ensure that recovery and recycling of such wastes is maximised.

Small volumes of general municipal wastes will be generated by construction workers during the Construction Phase (e.g. from offices and welfare facilities at the construction compounds). Segregation facilities will be provided on the construction site, if necessary, to ensure that recovery and recycling of such wastes is maximised.

17.5.2 Do Nothing Scenario

In the Do-Nothing scenario, the Proposed Development would not be implemented, and the materials described in Section 17.5 would not be generated. However, ongoing maintenance of the existing road infrastructure would continue to result in waste generation. The resource and waste impact will be Neutral.

17.5.3 Construction Phase

C&D waste is defined as waste which arises from construction and demolition activities. Typical C&D wastes which are likely to arise during the Construction Phase of the Proposed Development are set out in Appendix 17.2 List of Waste Codes for Construction and Demolition Wastes in Volume 4 of this EIAR, including EPA LoW codes.

The most environmentally sustainable means of managing C&D waste and excavated material is its prevention and minimisation. Refer to Section 17.3.5 and Table 17.2 for the principles of waste management. The contactor will be responsible for implementation of these principles for the Proposed Development. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

17.5.3.1 Demolition

All material generated from the Proposed Development will be considered for reuse for construction within the Proposed Development or in other construction projects in accordance with Article 27 of the Waste

Directive Regulations. It will be the responsibility of the appointed contractor to review the feasibility of reuse of materials and ensure that the necessary testing is undertaken to demonstrate compliance with Article 27, as appropriate.

Materials will require on-site segregation by waste classification and, if not suitable for reuse, will be delivered to an authorised recycling, recovery or disposal facility.

Where practicable and appropriate, and if in reusable condition, street and roadside infrastructure such as bus stops, lighting poles, traffic signals, manhole access covers and signs will be reused within the Proposed Development. If not reused, they will be delivered to appropriately authorised recycling or recovery facilities.

Where metal railings and gates are removed, they may have inherent value due to their metal content. These will be delivered for metal recycling to an authorised waste facility where not reused. Some example facilities which are currently authorised to accept metal and electronic waste include:

- Irish Lamp Recycling Co. Ltd, Woodstock Industrial Estate, Kilkenny Road, Athy, County Kildare; and
- Hammond Lane Metal Company, Pigeon House Road, Dublin 4, Dublin.

The least preferable option is disposal to an authorised facility and will only be considered by the contractor when reasonable opportunities for reuse, recycling and recovery are unavailable. Table 17-7 shows the estimated quantity and type of waste that will be generated by demolition activities in connection with the Proposed Development.

Table 17-7 Estimated Demolition Waste Types and Quantities

Waste Type	Approximate Waste and Material Quantity (Tonnes)
Concrete, bricks, tiles and similar	1,620
Metals	20
Segregated wood, glass and plastic	6
Total	**1,646**

The estimated 1,646 tonnes of demolition waste which will be generated as a result of the Proposed Development is equivalent to 0.08% of the C&D waste management baseline in the CUWR set out inTable 17-7. The potential impact of Demolition Waste during the Construction Phase, prior to mitigation, is Adverse, Not Significant and Short-Term.

17.5.3.2 Excavation

Excavation waste will arise from such activities as:

- Excavation of existing carriageways (e.g. road narrowing, removal of islands);
- Excavation of existing footpaths and cycle tracks and pedestrianised areas (e.g. widening, urban realm improvement;
- Alterations of roundabouts and signalised junctions; and
- Excavation for utility diversions and/or protections.

In line with current practice in Ireland, surplus materials and wastes from the Proposed Development will be managed as follows:

- Where practicable, naturally occurring excavated material will be reused within construction in the Proposed Development in accordance with Article 27, the Waste Framework Directive and Section 3 of the Waste Management Act 1996, as amended;
- Excavation material will be used as engineering and landscaping material within the Proposed Development and on other projects requiring the types of materials generated, where practicable,

through Article 27. Reuse of topsoil and excavated material within the Proposed Development is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;

- Should material meet the acceptance criteria set out in Article 28, this material will be delivered to recovery or disposal facilities which are authorised to collect this material under the Waste Management Act 1996 (i.e. which hold a Certificate of Registration, Waste Facility Permit or EPA Licence), should such recovery or disposal facilities become available by the time of commencement of construction of the Proposed Development;
- In accordance with law, all excavation wastes requiring removal from site for recycling or recovery will be delivered to facilities which are authorised under the Waste Management Act 1996, as amended (i.e. which hold a Certificate of Registration, Waste Facility Permit or EPA Licence). Examples of recycling/ recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries;
  - Raising land for site improvement or development;
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and
- In accordance with law, all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

It will be the responsibility of the appointed contractor to secure agreements for acceptance of surplus excavation materials from the Proposed Development in authorised and regulated facilities, in accordance with the Waste Management Act 1996, as amended, and associated regulations.

Where carriageway is removed it will be reused where possible within the Proposed Development through implementation of the measures set out below.

Due to the nature of the works in an urban environment there are limited opportunities to achieve a cut / fill balance of materials. This could be more readily accommodated on a greenfield project where earthworks embankments / bunds are more common. Material from the existing pavement layers will be temporarily stockpiled at the proposed construction compound and sent to a suitable recovery facility for recycling or reuse as recycled aggregate material in the industry as further described in this Section and Table 17.12. This material will be stored for as a short time as possible to avoid potential for dust or other emissions.

Material for excavation will need to be tested by the appointed contractor for quality, contamination and could potentially be reused as general fill or general landscape fill material in construction under the provisions of Article 27. Material which meets the necessary acceptance criteria will be delivered to an authorised soil recovery facility. Material which requires recycling will be sent to an authorised waste facility and may be used in accordance with Article 28. Article 28 sets the criteria which must be complied with and which the EPA must use to determine when a waste reaches ‘end of waste’ status and becomes a material.

Excavated materials such as capping, subbase, bituminous and concrete materials could be reused or recycled in line with TII specifications:

- Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials (e.g. 6A, 6B, 6C, 6F, 6G, 6H ,6I, 6M, 6N) providing they comply with the Earthworks Specification for National Roads (CC-SPW-00600) (TII 2024);
- Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials (e.g. Granular Material Type A to Clause 803) providing they comply with Road Pavements – Unbound and Cement Bound Mixtures (CC-SPW-00800) (TII 2023a); and
- Subbase and bituminous materials could be recycled in base or binder materials (e.g. Asphalt Concrete base and binder products to Clause 3 or Low Energy Bound Mixtures to Clause 8.1) providing they comply with Specification for Road Works Series 900 Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2023b).

Information on quantities of potential material reuse and recycling is provided in Table 17-12.

These excavated materials will either be removed directly from the Proposed Development or temporarily stored and removed at a later date as part of a spoil/waste management strategy having consideration of the intermittent nature of the construction activities. The waste types likely to be generated during the Construction Phase are set out in Table 17-8.

Table 17-8 Summary of Excavation Material Type and Quantities

Materials from C&D Sources	Approximate Waste and Material Quantity (Tonnes)
Soil and Stone	4,458
Concrete, bricks, tiles and similar	1,770
Bituminous Mixtures	6,935
Total	**13,161**

The total forecast of surplus excavation material from the Proposed Development will be 13,161 tonnes and is equivalent to 0.68% of the C&D waste management baseline for the CUWR set out in Table 17-6.

The potential impact of excavation waste during the Construction Phase, prior to mitigation, is Adverse, Slight and Short-Term.

17.5.3.3 Construction

Construction works, site offices and temporary works facilities are also likely to generate waste. General construction waste can vary significantly from site to site but typically will include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles, and ceramics;
- Bituminous mixtures;
- Metals;
- Wood; and
- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

Also included within this definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

The Construction Phase will require the importation of a number of key construction materials for the Proposed Development works. This material will include items such as concrete, granular fill/aggregate, bituminous mixtures and structural steel. Table 17-9 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Development. For impacts on material assets see Chapter 18 (Material Assets) of this EIAR.

Table 17-9 Estimated Quantities of Major Construction Materials Required by the Proposed Development

Materials	Estimated Quantity (Tonnes)
Aggregate	10,490
Asphalt Products	18,088
Concrete	9,480

In the case of the Proposed Development, the most likely type and quantity of general construction waste will be surplus concrete and unusable or damaged pipe segments which may arise on-site. Quantities of these materials are estimated to be small; assumed to be between approximately 5% and 15% of construction material delivered to site (WRAP 2014). There is adequate capacity for the management of such wastes, (see Section 17.4). Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

The potential impact of construction waste during the Construction Phase, prior to mitigation, is Adverse, Imperceptible and Short-Term.

17.5.3.4 Municipal Waste

It is anticipated that there will be approximately 50, possibly up to 70 at peak, construction staff employed over the Construction Phase of the Proposed Development. Small volumes of general municipal wastes will be generated by construction staff during the Construction Phase (e.g. from offices and welfare facilities. Wastewater from these facilities is considered in Chapter 13 - Water). Segregation facilities will be provided on the construction site to ensure that recovery and recycling of such wastes is maximised. The potential impact of Municipal Waste during the Construction Phase, prior to mitigation, is Adverse, Imperceptible and Short-Term.

17.5.3.5 Summary of Potential Construction Phase Impacts

A summary of the potential impacts for the C&D phase is set out in Table 17-10.

Table 17-10 Summary of Potential Construction Phase Impacts

Assessment Topic	Potential Impact
Demolition Waste	Adverse, Not Significant and Short-Term
Excavation Waste	Adverse, Slight and Short-Term
Construction Waste	Adverse, Imperceptible and Short-Term
Municipal Waste	Adverse, Imperceptible and Short-Term

The Construction Phase of the Proposed Development is not predicted to give rise to significant adverse impacts and all the impacts will be short-term in duration.

17.5.4 Operational Phase

17.5.4.1 Construction and Demolition Waste

Operational waste may arise as a result of carriageway maintenance which will be undertaken at regular intervals, or as necessary. This will primarily consist of bituminous mixtures due to the maintenance of carriageway pavement. Only waste generated from the areas where road widening and narrowing have taken place as part of the Proposed Development, will be considered in this assessment, as routine maintenance, and associated waste generated, would be carried out on the existing road irrespective of the

Proposed Development. It is important to note that maintenance operations will be undertaken under the jurisdiction of the relevant Local Authority.

It is envisaged that bituminous material will be reused within new carriageway construction as far as practicable and in accordance with all applicable legislation. Bituminous mixtures which are not incorporated into the Proposed Development may be salvaged by the Local Authority for reuse elsewhere in accordance with Article 27, of the Waste Directive Regulations. Bituminous mixtures may be recycled in accordance with the provisions of an Article 28 (End of Waste) decision by the EPA (EPA 2020).

The quantity of bituminous mixtures generated over the assumed lifetime of the Proposed Development (60 years), will increase, compared to the Do-Nothing scenario, by approximately 5,000 tonnes due to an overall widening of the carriageway. Therefore, there will be an increase in maintenance needs during operation of the Proposed Development, in comparison to required maintenance of the existing carriageway under the Do-Nothing scenario. Therefore, the potential impact of operational C&D waste will be Adverse, Not Significant and Long-Term.

17.5.4.2 Municipal Waste

It is anticipated that maintenance activities during the Operational Phase would result in no greater levels of waste generation than during the Construction Phase. Therefore, the potential impact of municipal waste, generated during maintenance activities during the Operational Phase, prior to mitigation, is Neutral and Long-Term.

17.5.4.3 Summary of Potential Operational Phase Impacts

A summary of the potential impacts for the Operational Phase is set out in Table 17-11.

Table 17-11 Summary of Potential Operational Phase Impacts

Assessment Topic	Potential Impact
C&D waste	Adverse, Not Significant and Long-Term
Municipal waste	Neutral and Long-Term

The Operational Phase of the Proposed Development is not predicted to give rise to significant adverse impacts.

17.6 Mitigation and Monitoring Measures

17.6.1 Construction Phase

The Construction Phase is not predicted to give rise to significant adverse impacts and therefore no specific mitigation or monitoring measures are required. However, a suite of management measures are outlined which the appointed contractor will implement, and, in any event, the appointed contractor will ensure that waste arisings will be managed in accordance with the waste hierarchy and in compliance with the provisions of the Waste Management Act 1996, as amended.

A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor in line with the Best Practice Guidelines for the Preparation of Resource & Management Plans for Construction and Demolition Projects (EPA 2021b). The CDRWMP outlines how waste arising during the Construction and Demolition Phase of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Act 1996, as amended – refer to the CDRWMP within Appendix A5.1 (Construction Environmental Management Plan (CEMP)) in Volume 4 of this EIAR. The appointed contractor will update the CDRWMP in advance of construction commencing.

The following measures will be implemented during construction, where practicable by the appointed contractor, to ensure the maximum quantity of material is reused on the Proposed Development and to contribute to achieving the objectives set out in the National Waste Action Plan as follows:

- Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Development where practicable in the proposed construction compound (subject to material quality testing to ensure it is suitable for its proposed end use); and
- Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Development where practicable. For example, suitable recycled aggregates and appropriate site won material may be specified in the proposed road base / binder layers, sub-base layers under footpaths / cycle tracks, and capping layer material within the road, footpath, and cycle track pavement, subject to testing to ensure material is suitable for its proposed use.

Table 17-12 Quantities of Proposed Material for Reuse and Recycling

Reuse or Recycle	Material for Reuse	Approximate Quantity (tonnes)	Reuse Specification for Example TII Series or Other Reuse Specification	Reuse Class (note: Class to be Provided in all Cases where TII Specification is used)
Recycle on Proposed Development	Bituminous materials	4,855	TII Series 800 and 900 (TII 2023a and TII 2023b)	Bituminous plannings for recycle in sub-base material, base and binder layers
Reuse on Proposed Development	Subbase material	3,480	TII Series 800 (TII 2023a)	Sub-base material
Reuse on Proposed Development	Capping material	4,638	TII Series 800 (TII 2023a)	Capping material

It is estimated that potentially up to approximately 12,973 tonnes of recycled / reused material could be incorporated into the Proposed Development (refer to Table 17-12).

The quantities outlined in Table 17-12 will not result in a change to the significance assessment for the impact assessment of excavation waste. Therefore, the impact of excavation waste will remain Adverse, Slight and Short Term.

The following management measures will be implemented in so far as reasonably practicable:

- Where waste generation cannot be avoided, waste disposal will be minimised;
- Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development;
- Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use;
- Where excavated material cannot be reused within the Proposed Development works, material will be sent for recovery or recycling;
- Source segregation: Metal, timber, glass, and other recyclable material will be segregated (and waste stream colour coding will be used) during construction works and removed off site to a permitted/licensed facility for recycling;
- Material management: ‘Just-in-time’ delivery, where practicable, will be used to minimise material wastage; General construction waste and by-products will be reused within the Proposed Development, where practicable, or appropriately reused (in accordance with Article 27 of the EC Waste Directive

Regulations)2011, as amended, recovered, recycled or disposed of off-site, as arranged by the appointed contractor; and
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation.

Waste auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations to which waste and materials will be delivered will be recorded along with the quantity to each facility. Records will show which material is recovered, which is recycled, and which is disposed of.

Where Article 27 of S.I. No. 126/2011 EPA notifications are required in relation to the Proposed Development, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse.

Any off-site interim storage or waste management facilities for excavated material will have the appropriate EPA Licence, Waste Facility permit or Certificate of Registration, as appropriate, in place. The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e. EPA Licence, Waste Facility Permit or Certificate of Registration).

17.6.1.1 Summary of Predicted Construction Phase Impacts

A summary of the predicted residual impacts during the Construction Phase, following implementation of the appropriate management measures is shown in Table 17-13.

Table 17-13 Summary of Predicted Construction Phase Impacts Following the Implementation of Mitigation and Monitoring Measures

Aspect of the Proposed Development	Potential Impact (Pre-Mitigation and Monitoring	Residual Impact (Post Mitigation)
Demolition waste	Adverse, Not Significant and Short-Term	Adverse, Not Significant and Short-Term
Excavation waste	Adverse, Slight and Short-Term	Adverse, Slight and Short-Term
Construction waste	Adverse, Imperceptible and Short-Term	Adverse, Imperceptible and Short-Term
Municipal waste	Adverse, Imperceptible and Short-Term	Adverse, Imperceptible and Short-Term

17.6.2 Operational Phase

Maintenance operations will be undertaken under the jurisdiction of the Local Authority and in accordance with their waste management plans. No additional mitigation or monitoring measures are considered necessary.

17.7 Residual Impacts

No significant residual impacts have been identified either in the Construction or Operational Phase of the Proposed Development, whilst meeting the Proposed Development objectives set out in Chapter 1 (Introduction).

17.7.1 Construction Phase

The Construction Phase of the Proposed Development is not predicted to give rise to any significant residual impacts.

17.7.2 Operational Phase

The Operational Phase of the Proposed Development is not predicted to give rise to any significant residual impacts with the adoption of the waste management principles.

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