

Sure Partners Limited

ARKLOW BANK WIND PARK
PHASE 2
**ONSHORE GRID
INFRASTRUCTURE**

**ENVIRONMENTAL IMPACT
ASSESSMENT REPORT**

VOLUME II

Chapter 16 Resource and Waste Management

ARUP

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Renewables

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16 Resource and Waste Management

16.1 Introduction

This chapter describes the likely significant effects of the proposed development in relation to resource and waste management during the construction, operation and decommissioning phases. Mitigation measures are recommended, where required, and the predicted residual effects are described.

A detailed description of the proposed development including design, operation and decommissioning is provided in **Chapter 5** *Description of Development*. Construction methodology is described in **Chapter 6** *Construction Strategy*.

16.2 Assessment Methodology

16.2.1 General

The principal objective of sustainable resource and waste 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, as outlined in **Figure 16.1**.

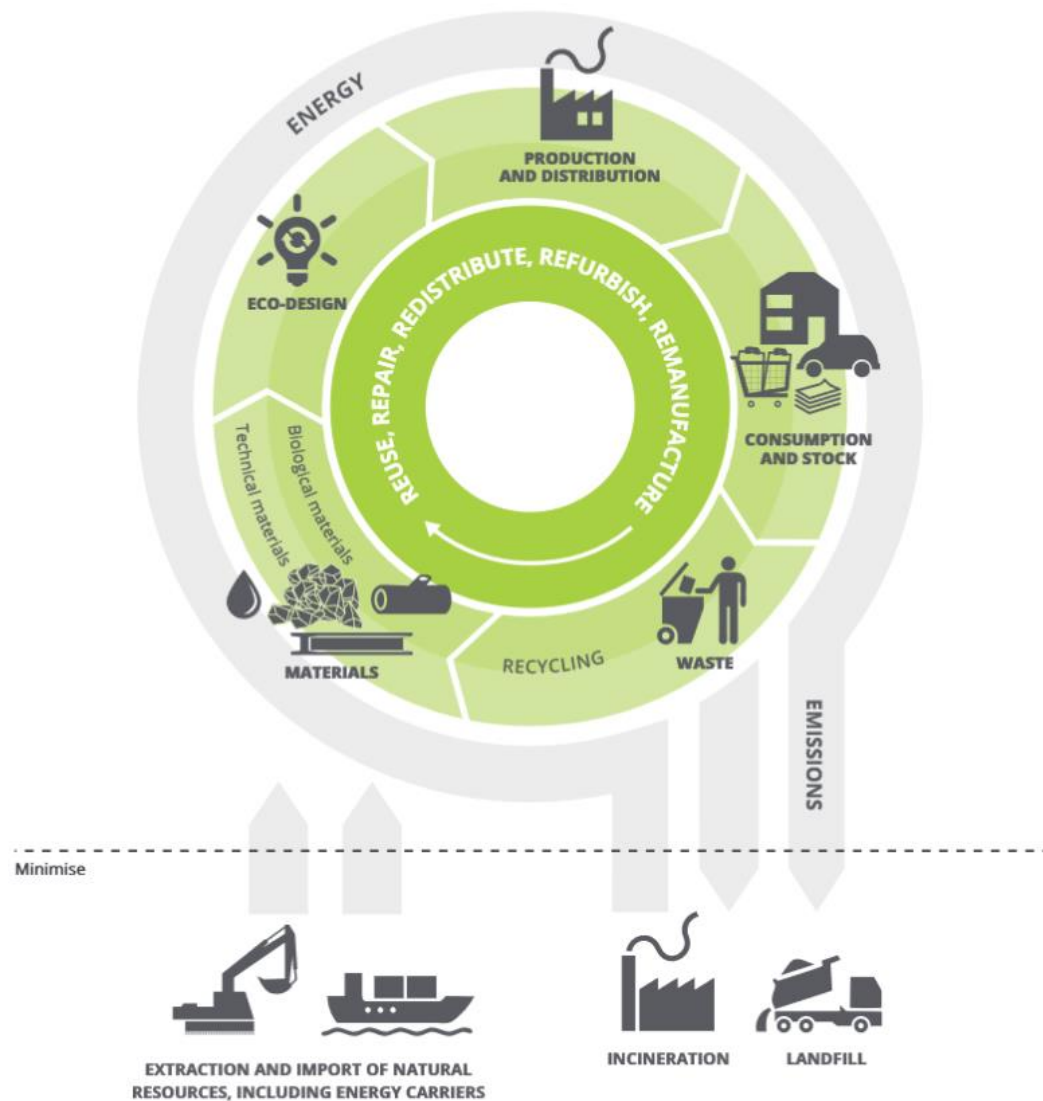


Figure 16.1: Circular Economy (Source: European Environment Agency)

However, where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy as illustrated in **Figure 16.2** and set out in the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126/2011). It is the intention that this would actively contribute to the economic, social and environmental goals of sustainable development.

The European Commission (2020) has adopted a new Circular Economy Action Plan - one of the main 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 published the Irish Waste Action Plan for a Circular Economy in September 2020. 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.

The policy document 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.



Figure 16.2: Waste Hierarchy

Waste generation will take place during the following phases of the proposed development:

- Construction;
- Operation; and
- Decommissioning.

16.2.2 Guidance and Legislation

Resource and waste management takes place in accordance with a 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 development (detailed in **Appendix 16.1 of Volume 3**) are summarised as follows:

- Prevention of waste is the preferred option such that any surplus materials generated are reused within the scheme. 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 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).

This chapter has been prepared having regard to the following guidelines:

- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;
- Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Department of Housing, Planning, Community and Local Government (2017) Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and Environmental Protection Agency (EPA) Licencing Systems;
- Department of Housing, Planning, Community and Local Government (2017) Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition;
- Department of Housing, Planning and Local Government (2018) Circular PL 05/2018 - Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) and revised guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;
- Environmental Protection Agency (EPA) (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017);
- European Commission (2012) Interpretation suggested by the Commission as regards the application of the EIA Directive to ancillary/associated works; and
- European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

It should be noted that the Eastern-Midlands Region, which is the waste management region within which the proposed development is located, has 12 constituent local authorities, stretching from Dublin in the east, to Louth in the north and Wicklow to the south.

16.2.3 Categorisation of the Receiving Environment

Waste statistics are published in Ireland on a national basis. Therefore, in relation to waste management, the study area is considered as follows:

- Regional (i.e. Eastern-Midlands) and national in relation to the consideration of baseline waste statistics; and
- Local (i.e. Wicklow County Council), regional (Eastern-Midlands) and national in relation to likely significant effects.

A desk study was undertaken to establish the baseline conditions within the study area. The following sources of information have also been used:

- Eastern-Midlands Region (2015) - Waste Management Plan 2015-2021;
- Eastern-Midlands Region (2016) - Waste Management Plan 2015-2021 Annual Report 2015/2016;
- Eastern-Midlands Region (2017) - Waste Management Plan 2015-2021 Annual Report 2016/2017;
- Environmental Protection Agency (EPA), (2019) Waste Statistics for Ireland;
- EPA (2020) Ireland's Environment - An Integrated Assessment 2020.

16.2.4 Impact Assessment Methodology

In order to understand this context, a literature review has been carried out of relevant legislation, policy and best practice guidance. A desk study was undertaken which included the following tasks:

- Review of relevant policy and legislation which creates the legal framework for resource and waste management in Ireland (**Appendix 16.1 of Volume 3**), including: the Eastern-Midlands Region Waste Management Plan 2015-2021 and the subsequent Annual Reports;
- Description of current waste generation and management practice in Ireland;
- Description of land use requirements, built services and utilities;
- Description of estimated waste generation during construction and operation;
- An impact assessment undertaken in accordance with the EPA Guidelines (Draft August 2017); and
- Identification of appropriate mitigation measures to reduce the quantity of waste sent for final disposal in so far as possible and to promote sustainable resource and waste management practices. These are described in **Section 16.6**.

The significance criteria used to categorise significant effects on resource and waste management are set out in **Table 16.1** and has been developed based on the description of significant effects as outlined in the EPA guidance.

Table 16.1 Significance criteria for likely significant effects on Resource and Waste Management

Significance Level	Criteria
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

16.3 Receiving Environment

In order to establish a baseline and review capacity in relation to construction and operational wastes, a review of published data and statistics was undertaken for Ireland. This information is included to provide the context for the scale of the proposed development in relation to other activities in the country.

16.3.1 Categorisation of the Receiving Environment

Waste statistics are published in Ireland on a national basis. Therefore, in relation to waste management, the study area is considered as follows:

- Regional (i.e. Eastern-Midlands) and national in relation to the consideration of baseline waste statistics; and
- Local (i.e. Wicklow County Council), regional (Eastern-Midlands) and national in relation to likely significant effects.

A desk study was undertaken to establish the baseline conditions within the study area. The following sources of information have also been used:

- Eastern-Midlands Region (2016) - Waste Management Plan 2015-2021 Annual Report 2014/2015;
- Eastern-Midlands Region (2017) - Waste Management Plan 2015-2021 Annual Report 2015/2016;
- Eastern-Midlands Region (2018) - Waste Management Plan 2015-2021 Annual Report 2016/2017;
- EPA (2019) Waste Statistics for Ireland; and
- EPA (2020) Ireland's Environment - An Integrated Assessment 2020.

16.3.2 Waste Management in Ireland

Article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011 (as substituted by Article 15 of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020), herein referred to as ‘Article 27’, allows a material producer to determine, under certain circumstances, that a material is a by-product and not a waste. Article 27 was introduced into Irish law to implement Section 5 of the Waste Framework Directive (2008/98/EU). Excess soil and stone produced during construction projects will be a by-product if it meets each of the four by-product conditions detailed in Article 27 of the Regulations. The area for reuse of by-products in accordance with Article 27 of the European Communities (Waste Directive) Regulations, 2011 comprises the whole country as no regional distinction is made in the Article 27 register.

In 2018, the latest year for which there are published statistics available, 6.2 million tonnes of Construction and Demolition (C&D) waste was generated according to EPA data (EPA 2020), an increase of 1.5 million tonnes from 2017. In addition, a total of 3.6 million tonnes of construction and demolition material was notified as being reused under Article 27 in 2018.

The EPA reports that Ireland achieved 77% material recovery of construction and demolition waste in 2018 (EPA 2020). Under the Waste Framework Directive (2008/98/EC) Member States must achieve 70% of material recovery of non-hazardous, non-soil-and-stone C&D waste, by 2020.

A breakdown of the composition of C&D waste in Ireland in 2018 is set out in **Table 16.2**. 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.

4.8 million tonnes of this C&D waste was comprised of soil and stones, making up 77% of the material waste stream. **Table 16.2** shows the quantity (tonnes) of waste materials collected by authorised waste collectors.

Table 16.2 Material Categories of C&D Waste treated in Ireland (EPA, 2018)

Material from C&D sources	Quantity (tonnes)	% of material stream in reference to total
Soil and Stone	4,786,162	77
Mixed C&D Waste	414,983	7
Concrete, Bricks, Tiles and Similar	755,525	12
Metals	179,043	3
Bituminous Mixtures	60,759	1

Material from C&D sources	Quantity (tonnes)	% of material stream in reference to total
Segregated Wood, Glass and Plastic	23,068	0.4
Total	6,219,540	100

Data issued by the EPA demonstrates that final treatment operations (recycling, backfilling, use as a fuel, disposal) of C&D waste materials varied greatly between material streams. By far the largest quantity of C&D waste was used for backfilling (a recovery operation), which mainly reflects the dominance of soil and stones in the overall composition mix.

The EPA reports that a total of 500,000 tonnes of hazardous waste was managed and treated in Ireland in 2018. Hazardous waste types include contaminated soils, motor oil, asbestos and chemical waste. 73% of hazardous waste was exported for treatment in 2018.

16.4 Characteristics of the Proposed Development

The Arklow Bank Wind Park (ABWP) is an offshore wind farm, located off the coast of County Wicklow, on the east coast of Ireland.

The proposed development will comprise the onshore grid infrastructure associated with the Arklow Bank Wind Park Phase 2 Project. This includes the 220kV onshore export cables and fibre optic cables, from the landfall of the offshore export cables at Johnstown North, to a proposed new 220kV substation at Shelton Abbey and overhead line connection from the new substation to the National Electricity Transmission Network (NETN).

The site at Shelton Abbey for the proposed onshore 220kV substation was identified following a detailed site selection and assessment study. This site is the northern portion of a larger site which had been previously occupied by Irish Fertiliser Industries (IFI) up until 2003. The site is currently owned by Crag Digital Avoca Ltd, which has planning permission to develop a data centre on the site and an adjacent area (planning reference 18940). There is a landfill, associated with the former IFI plant, to the east of the site and an embankment on the northern side where the access road to the Avoca River Business Park is located. The proposed development is shown in **Figure 5.1, Chapter 5 Description of Development**.

The site was previously the subject of an EPA licence, as part of the wider industrial site area. However, the proposed substation site area was removed from that licence through a partial licence surrender. The adjacent area to the southeast remains licensed by the EPA due to historic landfill activities (Register Number: P0031-02). No licence obligations remain in relation to the proposed substation site.

The proposed development is described further in **Chapter 5** *Description of Development*.

16.4.1 Natural Resources

The main use of materials by the proposed development will be in the construction phase. The bulk materials, which will be used, will include concrete, crushed stone, sand, and steel. The High-Voltage Alternating Current (HVAC) and fibre optic cables and the electronic and electrical equipment for the substation will be comprised of various metals, plastics and composite materials. Timber and metal will be used in temporary works, during the construction phase. Where possible, raw materials such as concrete, crushed stone and aggregate will be sourced locally. Other materials will be sourced nationally and internationally.

According to the Central Statistics Office (CSO), construction turnover in Ireland was €19.4 billion in 2016. The value of civil engineering construction for utility projects (Statistical Classification of Economic Activities in the EU (NACE) Rev 2 activity code 422 - water, electrical and telecommunications, excluding buildings) in 2016 was €379 million. The total value of the construction of residential and buildings (NACE Rev 2 activity code 412) was €7.3 billion in 2016. The value of ready-mix concrete production in Ireland in 2018 was €341 million. These figures indicate the scale of the civil engineering and building sector in Ireland and the level of availability and consumption of building materials.

16.5 Potential Effects

This section describes the potential effects of the proposed development on resource and waste management. Potential effects represent the worst-case scenario in the absence of mitigation.

16.5.1 'Do Nothing' Scenario

In the scenario where the proposed development does not proceed, the resource and waste management effects described in this chapter would not arise. The impact would be neutral.

16.5.2 Construction Phase

16.5.2.1 Site Clearance

Prior to the commencement of construction, the contractor will be required to carry out site clearance works which include the felling of trees and removal of vegetation from each of the working areas within the proposed development site planning (red line) boundary.

Organic waste (such as trees and vegetation) will be removed from site by a waste collection permit holder and delivered to an authorised composting or organic waste facility.

The extent of vegetation clearance will not be significant based on site and route selection.

There will be vegetation removed at the landfall and along the cable route, including tree, shrub and hedge removal to allow for construction activities to take place. The lands will be reinstated as close as possible to their original condition post construction, with shallow rooted planting over the cable wayleave at field boundaries. The vegetation clearance will be kept to the minimum required to facilitate construction. Where organic waste contains invasive species, this will need to be handled and treated separately, as outlined in the Invasive Species Management Plan, included in the Construction Environmental Management Plan (CEMP) (**Appendix 6.1 of Volume 3**). There will be approximately 600 tonnes of embankment material containing Japanese knotweed which will be delivered to a waste facility authorised to accept this type of waste (an example of such a facility is the Indaver Meath Waste-to-Energy facility).

Within the permanent wayleave where it crosses farmland, the wayleave agreement allows the planting of crops and shallow rooted plants, to facilitate ongoing agricultural use, during operation of the proposed development. Planting of deep-rooted plants or construction of buildings is precluded. This is outlined in **Chapter 17 Material Assets**.

At the substation, flood defence works, and NETN connection site clearance will include the removal of fences and cutting back vegetation. All vegetation adjacent to the overhead line (OHL) at the substation which has the potential to fall onto the OHL will be cut or trimmed to ensure the necessary safety clearances. The extent of trimming will depend on distance from the OHL and will involve a scalloping or profiling effect which will minimise the effect on vegetation. Vegetation will be reinstated or replaced with shallow rooted plants on completion of construction works.

The existing tower foundation within the EPA licensed land (to be decommissioned as part of the proposed development) will be left in situ to avoid any disturbance of lands within this area. The other existing tower foundation (outside the existing licensed area) to be decommissioned as part of the proposed development, will be broken down to a depth of approximately 1m below ground level and the stubs cut off. Waste material will be segregated on site and will be removed from site using a permitted waste carrier for recycling or disposal at a licensed site. The ground will then be reinstated and landscaped to match the surrounding ground.

Temporary access routes and construction compounds may also result in loss of localised vegetation – again, this vegetation will be reinstated or replaced with shallow rooted plants on completion of construction works.

The estimated total organic waste generated by the proposed development is summarised in **Table 16.3**.

Table 16.3 Total Organic Waste

Vegetation	Approximate Quantity (tonnes)	LoW* Code
Treelines/Hedgerows	15.6	02 01 07
Shrub	113	02 01 07
Woodland (for M11 worst-case option only)	280	02 01 07
Woodland (north and west of substation)	592	02 01 07

*Environment Protection Agency (2018) List of Wastes

16.5.2.2 Excavation

Excavation will be required at the landfall, cable route, substation site and connection to the NETN. The most environmentally sustainable means of managing excavated material is its prevention and minimisation. Prevention and minimisation are inherent in the design of the proposed development. Excavated material as part of the construction works will generally consist of:

- Rock, at the landfall compound;
- Topsoil and subsoil; and
- Made Ground.

To ensure that there will be no queuing of trucks on public roadways the transport of material to and from site will be managed in accordance with the measures outlined in the Construction Traffic Management Plan (CTMP), which is included in the CEMP, attached as **Appendix 6.1 of Volume 3** to this EIAR.

Spoil management measures have been included in the CEMP (**Appendix 6.1 of Volume 3**) and will be further developed by the contractor. These measures set out how volumes of excavated material in and out of the area are managed.

The Environmental Protection Agency List of Waste (LoW) codes have been included in **Appendix 16.2 of Volume 3**.

A significant proportion of the surplus excavation material from the landfall site and cable route will consist of uncontaminated soil, stone and naturally occurring material which may be reused in its natural state within the site. The excavated material will be re-used on site in so far as possible.

The excavated material will be stored within the site boundary pending reuse. The storage locations include at the temporary construction compounds and along the cable route in the temporary cable construction corridor, as outlined in **Chapter 6 Construction Strategy**.

This reuse is certain and as such the material is not deemed to be a waste in accordance with Article 2 of the Waste Framework Directive (2008/98/EC) (EC, 2008) and Section 3 (c) of the Waste Management Act 1996 (as amended).

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, or recovery at suitable authorised waste facilities i.e. facilities which have been granted a Certificate of Registration, Waste Facility Permit or EPA licensed soil recovery facilities in accordance with the *Waste Management Acts 1996-2016*.

Potential recycling/recovery activities include processing of stone to produce construction aggregate, infilling of quarries, raising land for site improvement or development.

On the substation site, excavated material is likely to include blue red or grey brown sandy clayey gravel with occasional plastic, concrete, wood, steel, wires and red bricks. Asphalt will also be excavated. A red clay was identified which is likely to be a by-product of the past industrial use of the site. While it is estimated that small quantities of this red clay are present on the substation site elevated soil concentrations of arsenic, copper, lead and zinc were detected in tests of the red clay. The following List of Waste (LoW) codes apply:

- 06 10 02* ¹classification relates to wastes from the manufacture, formulation, supply and use of nitrogen chemicals, nitrogen chemical processes and fertiliser manufacture which contain dangerous substances.
- 17 05 03* ¹Soil and Stone containing Hazardous Substances

Please refer to **Chapter 9 Land and Soils** for further information on ground investigation.

Material excavated in the course of installing underground services and footings, which is not suitable for reuse on site, or surplus to requirements, will be stockpiled, tested and classified. Where feasible classification for reuse on other construction site(s), for example as a “by product” under Article 27, will be considered. Where the material is not suitable for reuse it will be categorised in accordance with the EPA (2018) *List of Waste and Determining if Waste is Hazardous or Non-hazardous*. 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) for the specific waste types it receives.

Where horizontal directional drilling (HDD) is used to install the cables (at the landfall site and along the cable route at certain crossings), a bentonite mixture which will be used as the lubricant for the drilling head will be recycled in a closed-loop system. A small volume of soil and bentonite will leave the trench at the entrance of the HDD but this will be minimal (i.e. a few cubic metres of soil plus a small volume of bentonite).

¹ Hazardous waste is marked with an asterisk

Bentonite containing wastes will be removed from site by a waste collector authorised to transport this waste and delivered it to a waste facility authorised to accept it.

The contractor will further develop and implement the measures as outlined in the Construction Waste Management Plan (CWMP), included in the CEMP (**Appendix 6.1 of Volume 3**).

A summary of the excavated materials, re-use and disposal or recovery associated with the proposed development is provided in **Table 6.9 of Chapter 6 Construction Strategy**.

The excavated material will be tested to ensure compliance with the requirements of Class 1 or Class 2 general fill as defined in Transport Infrastructure Ireland (TII) publication titled ‘Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013)’.

As shown in **Table 6.9 of Chapter 6 Construction Strategy**, approximately 214,000 tonnes of material will be reused on site. This naturally occurring material will primarily be reinstated along the cable route.

Material that is not re-used on site will be disposed of or recovered for re-use elsewhere. A summary of material likely to require removal from site and the estimated classification is included in **Table 16.4** below.

Table 16.4 Summary of Material Likely to Require Removal from Site

Material	Estimate Quantity (tonnes)	Classification
HDD Bore Material	3,600	Non-hazardous waste LoW Code – 01 05 04
Crushed stone	49,000	TII Series 600 Class 1
Asphalt/pavements build up	1,530	Where feasible this will be reused as a by-product. Where this is not possible it will be delivered as a waste to an authorised waste facility.
Haul Roads build up*	22,000	TII Series 600 Class 1
Flood defence embankment material	600	The flood defence embankment contains Japanese knotweed and will be delivered to a waste facility authorised to accept these invasive species.

Material	Estimate Quantity (tonnes)	Classification
Tower foundation excavation	400	TII Series 600 Class 1 or Class 2
Substation site excavation material	23,000	Disposed of or recovered at an authorised waste facility
Hazardous material from substation site	2,000	Delivered to an authorised hazardous waste facility

* Reuse of haul road material subject to the routes being adequately maintained and not suspected to contain any suspected contamination.

It is the responsibility of the contractor to ensure all material which is reused on site as a by-product complies with the relevant legislation including Article 27. Where onsite reuse of by-product material requires a notification to the EPA, (for material that is not naturally occurring) it will be the responsibility of the contractor to ensure compliance with Article 27.

Where removal of waste from site is required this will be delivered for recycling, recovery or disposal at licensed and/or permitted waste facilities.

There are a number of authorised waste facilities currently operating in Wicklow and Wexford, details of which are provided in **Appendix 16.3** of **Volume 3**. These have an annual combined intake capacity of approximately 624,000 tonnes.

As outlined in **Table 16.4**, and **Table 6.9** of **Chapter 6 Construction Strategy** approximately 72,930 tonnes of material which is likely to be suitable for reuse on construction sites will be generated. Provided the four tests set out in Article 27 are complied with it is proposed to deliver this material to construction sites for beneficial reuse. The contractor will be responsible for identification of suitable sites for reuse of the material in accordance with Article 27. In 2018 3.6 million tonnes of material was notified to the EPA as by-product under Article 27. The proposed by products for reuse from the proposed development represent c. 2% of this figure.

As outlined in **Table 16.4**, and **Table 6.9** of **Chapter 6 Construction Strategy** an estimated 29,200 tonnes of material from the proposed development will be wastes which will require removal from site for recovery or disposal at authorised facilities. There are number of authorised waste facilities currently operating in Wicklow and Wexford, details of which are provided in **Appendix 16.3** of **Volume 3**. These have an annual combined intake capacity of approximately 624,000 tonnes. Therefore, the waste arising from the proposed development will likely represent c. 3.5% of this figure.

16.5.2.3 Construction Materials

The proposed development will require imported materials, primarily concrete, crushed stone, road paving materials and steel, for the construction of the substation and crushed stone and cable material and High Density Polyethylene (HDPE) ducting for the installation of the cables.

Concrete, sand, crushed stone and steel will be imported to site during the construction works, when required, as outlined in **Chapter 6 Construction Strategy**. The volumes of materials are presented in **Table 16.5**.

Recycled and reused materials will be used where feasible subject to material testing to ensure they are appropriate for the proposed use and subject to all regulatory and environmental requirements.

Table 16.5 Construction Materials

Material	Estimated Quantity
Bentonite clay	210 tonnes
High Density Polyethylene (HDPE)	73,000m
Concrete	17,000 tonnes
Structural Steel	565 tonnes
Reinforced Steel	375 tonnes
Sheet Piling Steel	525 tonnes
Weak-Mix Concrete	12,000 tonnes
Cables	78,000m
Metal Earth Rods	35 tonnes
Crushed Stone	83,000 tonnes
Granular Fill	87,000 tonnes
Asphalt	3400 tonnes
Bituminous Material	5300 tonnes
Steel Cladding	6 tonnes

Most of the construction materials will be sourced locally and nationally (primarily within the region), with a ready supply available.

16.5.2.4 Construction Waste

Construction works and temporary works facilities are likely to generate construction waste. Construction waste is defined as waste which arises from construction activities, including surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

Construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Asphalt/tar;
- Metals;
- Liquid wastes (wheel-wash run-off, sanitary waste from portable toilets).

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

- Waste electrical and electronic components;
- Cable materials;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

In the case of the proposed development, the most likely type of construction waste will be bituminous material from excavation, surplus concrete and unusable or damaged ducting segments which will arise on site.

In the unlikely event that asbestos is uncovered, the asbestos containing material will be double-bagged, stored, collected and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

There will be decommissioning of existing towers required for the connection to the NETN. The decommissioned conductors will be taken to an appropriately licensed facility for recycling or reuse. The tower steel will be bundled on site and removed for recycling. Insulator strings will be taken for disposal at an appropriately licensed waste facility.

The existing tower foundation (outside the licenced area) will be broken down to a depth of approximately 1m below ground level and the stubs cut off. Waste material will be segregated on site and will be removed from site using a permitted waste carrier for recycling or disposal at a licensed site. The ground will then be reinstated and landscaped to match the surrounding ground.

Liquid wastes (such as contained wheel-wash runoff, and sanitary waste) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

It is considered that the predicted quantities of waste streams generated by the proposed development are small in the wider context of the national generation of waste materials. Other than the waste generated from the earthworks, it is not expected there would be significant volumes of wastes sent for recovery or disposal at authorised waste facilities. There are a number of authorised waste facilities in the region suitable for recovery or disposal of wastes from the proposed development.

The removal of waste material off site by road and regular deliveries to site will, where appropriate, be managed to ensure no significant impact to road users. This is outlined in **Chapter 13 Traffic and Transport**.

The Environmental Protection Agency List of Wastes (LoW) codes have been included in **Appendix 16.2 of Volume 3**.

16.5.2.5 Summary of Construction Phase Effects

Most of the waste generated from the proposed development will be from the earthworks associated with the construction phase. There will be considerably more re-use of excavated material on site than material disposed off-site, due to the sustainable earthworks design.

It is considered that the predicted quantities of waste streams generated by the proposed development are low in the wider context of the national generation of waste materials.

Most of the construction materials can be sourced regionally with a supply readily available.

Therefore, the likely effects of the proposed development on resource and waste management during the construction phase, prior to mitigation measures being implemented, are considered to be **slight, negative** and **short-term**.

16.5.3 Operational Phase

The substation will be operated remotely and will generally be unmanned during operation. It will receive occasional visits for inspection and maintenance. The wastes generated during maintenance operations will be minimal including repair, replacement and planned upgrade. The specific equipment within the substation that is likely to be repaired or replaced are likely to comprise minor plant items of a few kilogrammes each year.

A Waste Collection Permit granted in accordance with the Waste Management Regulations, 2007 is not required for the proposed substation facility as the waste generated during occasional maintenance works will be removed off site by the maintenance staff upon completion of works including any general waste produced by maintenance staff.

Article 30 of the Waste Collection Permit Regulations lists the relevant exemptions from the requirement to hold a waste collection permit and the requirements that apply to these exempted activities. In general terms, the transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than two tonnes, and in vehicles not designed for the carriage of waste, are exempt. Other categories of waste exempt from requiring a waste collection permit are covered by other statutes and controls.

There will be occasional maintenance staff on the substation site, therefore, foul wastewater generated will be minimal. Foul wastewater will be collected independently from the welfare facilities at the substation site (transmission and connection compounds). Foul wastewater will be stored temporarily in respective, appropriately sized, foul wastewater holding tanks and removed from site periodically, by a licensed service provider, to a licensed wastewater treatment facility. This is detailed in **Chapter 17 Material Assets**.

When compared to the waste generated during the construction phase, the waste generated during operation will be negligible as it will mainly be associated with occasional maintenance works. The resources required during the operational phase of the proposed development mainly relate to materials assets (refer to **Chapter 17 Material Assets**) for which there is local supply available.

Therefore, the likely effects on resource and waste management during the operational phase of the proposed development are considered to be not significant.

16.5.4 Decommissioning Phase

The normal asset life of a substation is circa 50 years but may be extended beyond this. When the proposed development reaches the end of its useful life, it may be refurbished or replaced, and if refurbishment or replacement is not feasible, it will be decommissioned.

If decommissioned, equipment and all above ground structures at the substation site will be removed, and the site returned to its previous state. Once the above ground structures have been demolished, crushed stone and bituminous road surfacing will be removed, and soil imported to topsoil the footprint of the substation site.

Concrete, structural steel, reinforcing steel, metal cladding and waste electrical and electronic equipment will be the primary materials to be generated by the demolition works. Concrete waste arising from decommissioning of the proposed development will be removed to authorised waste facilities in accordance with the relevant Irish waste legislation, with potential for reuse/recycling offsite.

All of the waste electrical and electronic equipment, including the equipment containing SF₆, will be sent to the appropriate specialist facilities for recycling and recovery of their component materials, including SF₆. The management and transport of the waste electrical and electronic equipment, including the equipment containing SF₆, will be in accordance with the relevant legislation, which will be in force at the time the substation will be decommissioned.

The geosynthetic liner implemented as part of the substation site remediation strategy will remain in-situ. Underground ducts and cables will remain in-situ as there would be more of an environmental impact in their removal. Above ground structures along the cable route will be removed, and their locations reinstated.

It is considered that the predicted quantities of waste streams generated by the decommissioning phase are small in the wider context of the national generation of waste materials. It is expected that materials will be recycled or re-used off site where possible.

Consequently, it is expected that the effects on resource and waste management from the decommissioning phase, prior to mitigation measures being implemented will be **slight, negative and long-term**.

16.6 Mitigation Measures and Monitoring

16.6.1 Mitigation Measures

16.6.1.1 Construction Phase

Every effort will be made to ensure that significant environmental effects will be prevented or reduced during the construction phase of the proposed development.

A Construction Waste Management Plan (CWMP) is included in the CEMP (**Appendix 6.1 of Volume 3**). This plan meets the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (Department of Environment, Heritage & Local Government, 2006). The contractor will be obliged to further develop, implement and maintain the CWMP during the construction phase.

The key principles underlying the plan will be to minimise waste generation and to segregate waste at source. The measures to achieve these aims include:

- Where possible 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.
- Office and food waste arising on the construction compounds will be source separated at least into dry mixed recyclables, biodegradable and residual wastes.
- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they contain, including photographs as appropriate.

- The site will be maintained to prevent litter and regular litter picking will take place throughout the site.
- Material Management: ‘Just in time’ delivery will be used so far as is reasonably practicable to minimise material wastage.
- The Contractor will ensure that the material transported off site will go to an appropriately licensed/permitted facility.
- The Contractor will record the quantity in tonnes and types of waste and materials leaving the site. 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.
- 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 appropriate waste collection holder.
- Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility.

In addition to the measures inherent in the design of the proposed development, which will be implemented during the construction phase, the following mitigation measures will be implemented:

- The contractor will minimise waste disposal so far as is reasonably practicable;
- Source segregation: Where possible, metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect;
- Supply chain partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;
- Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase;
- Waste fuels/oils will be generated from equipment used on-site during construction and will be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by a Contractor who holds the appropriate waste collection permit;

- Possibilities for re-use 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 excavation material cannot be re-used within the proposed works the Contractor will endeavour to send material for re-use as a by-product, recovery or recycling so far as is reasonably practicable. Re-use as a by-product can be done under an Article 27 notification once the established EPA criteria for such re-use are met;
- Excavated material will be stored onsite within the planning (red line) boundary prior to re-use;
- 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 of; and
- The Contractor will ensure that any off-site interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place.

Export of hazardous waste from the proposed development outside of the State is subject to a Europe-wide control system founded on EU Regulation 1013/2006 on the Shipments of Waste (known as the Transfrontier Shipment Regulations), as amended. This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. In 2019 in Ireland, 580,977 tonnes of hazardous waste was generated and of this 333,195 tonnes was exported for treatment. The above procedures will be applied to any hazardous waste generated during the construction phase. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation. An estimated 2,000 tonnes of hazardous excavation waste will be generated as part of the proposed development.

16.6.1.2 Operation Phase

As the effect of operational waste is predicted to be not significant, no mitigation is required.

16.6.1.3 Decommissioning Phase

It is expected that, by the time the proposed development will need to be decommissioned, circular economy principles will be in full operation and nearly all of the material arising from the decommissioning works will be reusable. For the decommissioning phase, a materials management plan will be prepared, which will cover the same topics and be based on the same general principles as the construction phase CWMP, included in the CEMP (**Appendix 6.1 of Volume 3**), updated to reflect best practice at the time.

During the decommissioning phase the contractor will segregate materials at source and ensure that all waste and recoverable materials leaving site will be collected by authorised collectors and delivered to permitted facilities in accordance with the relevant Irish legislation, pertaining at the time.

16.6.2 Monitoring

Monitoring required as part of the detailed CWMP, included in the CEMP (**Appendix 6.1** of **Volume 3**) will be undertaken and recorded by the contractor.

Apart from good housekeeping practices no additional monitoring is considered necessary with respect to effects from operational wastes from the proposed development.

Implementation of the decommissioning materials management plan will be monitored, in a manner similar to the monitoring proposed for the CWMP, updated to reflect best practice at the time, during the decommissioning phase.

16.7 Cumulative Effects

This section considers the potential for cumulative effects arising from the proposed development in association with other developments. Specifically, it considers a worst-case scenario, where both the proposed development and the proposed developments for which timelines are not known are under construction at the same time.

A tiered approach to the cumulative assessment has been undertaken, in which the proposed development is considered cumulatively with other projects as follows:

Tier 1 -

- ABWP Phase 2 Offshore Infrastructure;
- ABWP Phase 2 Operations and Maintenance Facility (OMF);
- EirGrid Grid Upgrade Works; and
- Irish Water Upgrade.

Tier 2 -

- Other relevant projects currently under construction;
- Other relevant projects with consent;
- Other relevant projects in the planning process; and
- Other existing projects that were not operational when baseline data were collected.

There are a number of development proposals identified that are currently permitted or proposed in Arklow that were not assessed in this chapter. The nature and scale of these developments are such that development of these projects in combination with the proposed development would not give rise to significant effects to resource and waste management.

A summary of the cumulative effects is given in **Chapter 21 Summary of Cumulative Effects**.

16.7.1 Tier 1

16.7.1.1 Arklow Bank Wind Park Phase 2 Offshore Infrastructure and Operations and Maintenance Facility and Proposed Development

Given the likely overlap between the construction phases of the proposed development, the Arklow Bank Wind Park Phase 2 Offshore Infrastructure and the OMF there is potential for a cumulative resource and waste management effect during the construction of the proposed development. This could give rise to **short term, slight** resource and waste management effects due to an increased demand on waste recovery and/or disposal sites. The developer for each of these projects will be Sure Partners Limited ensuring co-ordination between the developments with regards to selecting a suitable waste recovery and/or disposal site.

Having regard to the imperceptible resource and waste management effect of the proposed development during the operational phase, no likely negative significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.1.2 EirGrid Grid Upgrade Works and the Irish Water Upgrade and Proposed Development

It is assumed for the purposes of this assessment that the EirGrid grid upgrade works and the Irish Water upgrade works will be undertaken in parallel with the proposed development works which would have the potential for cumulative effects to resource and waste management. However, considering the nature and scale of the construction works involved, the cumulative effects to resource and waste management are expected to be not significant during the construction phase.

Having regard to the imperceptible resource and waste management effect of the proposed development during the operational phase, no likely negative significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.2 Tier 2

16.7.2.1 Developments within the vicinity of the Avoca River Business Park and the Proposed Development

There are a number of permitted and proposed developments in the vicinity of the Avoca River Business Park that have the potential to overlap during the construction phase. These developments include;

- the permitted Crag Digital Avoca Ltd data centre (Planning Reference 18940),
- the proposed Crag Digital Avoca Ltd data centre amended application (Planning Reference 201285),
- the permitted Rappel Enterprises Ltd office development (Planning Reference 138823),
- the permitted Harmony Timber Solutions Ltd office and factory development (Planning Reference 1954) and
- the proposed (not yet permitted) Crag Digital Avoca Ltd 110kV Substation (Planning Reference PL27.307256).

Therefore, there is potential for an increase in demand on resource and waste management during the construction phase, when these developments are considered cumulatively. However, given the existing capacity of waste recycling and/or disposal facilities and the availability of construction materials in the region the cumulative effects to resource and waste management are expected to be **minor, temporary, negative** during the construction phase.

Taking into consideration the imperceptible resource and waste management effect of the proposed development during the operational phase, no likely significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.2.2 Flood Defence Embankment Works in the Avoca River Business Park

There will be possible maintenance and repair works to the existing flood embankment around the Avoca River Business Park as part of a regular inspection, maintenance and repair programme, to manage residual risk of flooding from a potential breach of the embankment. Investigations are to be undertaken which will determine the nature and extent of the works required. Any required maintenance or reinforcement works, will be undertaken in advance of the substation construction, with ongoing maintenance and repair thereafter, subject to regular inspection and monitoring.

There is potential for an increase in demand on resource and waste management as a result of both the proposed development and the potential maintenance and repair works, although as noted, any embankment works will be completed in advance of the proposed development. However, given the existing capacity of

waste recycling and/or disposal facilities and the availability of construction materials in the region the cumulative effects to resource and waste management are expected to be **minor, temporary, negative** during the construction phase.

During the operational phase of the proposed development, an inspection, maintenance and repair programme of the flood embankment at the Avoca River Business Park will be undertaken on an ongoing basis and if any maintenance or repair works are required, these will be carried out. Taking into consideration the imperceptible resource and waste management effect of the proposed development during the operational phase, no likely significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.2.3 Arklow Wastewater Treatment Plant and the Proposed Development

The Arklow Wastewater Treatment plant (WwTP) has received planning permission (Planning Reference PL27.302556) to provide foul water treatment capacity in the town of Arklow.

Given the likely overlap between the construction phases of the Arklow WwTP and the proposed development there is potential for a cumulative resource and waste management effect during the construction of the proposed development. This could give rise to **short term, slight** resource and waste management effects due to an increased demand on waste recovery and/or disposal sites.

Considering the imperceptible resource and waste management effect of the proposed development during the operational phase, no negative likely significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.2.4 Proposed Arklow Flood Relief Scheme and the Proposed Development

The Arklow Flood Relief Scheme is proposed by Wicklow County Council and the Office of Public Works to address recurrent flooding in the town of Arklow. This scheme is still in the planning stages but if permitted has the potential to give rise to cumulative effects with the proposed development.

Given the likely overlap between the construction phases of the Arklow Flood Relief Scheme and the proposed development there is potential for a cumulative resource and waste management effect during the construction of the proposed development. This could give rise to **short term, slight** resource and waste management effects due to an increased demand on waste recovery and/or disposal sites.

Considering the imperceptible resource and waste management effect of the proposed development during the operational phase, no negative likely significant cumulative resource and waste management effects are identified during the operational phase of the proposed development.

16.7.2.5 All Tier 2 and the Proposed Development

Only the Tier 2 projects listed above were considered to have the potential for a cumulative effect with the proposed development with regard to resource and waste management. Other projects identified in Arklow did not overlap during construction and/or were ruled out based on the nature of the works.

It is not expected that there will be significant cumulative effects on resource and waste management caused by the Tier 2 projects and the proposed development.

16.8 Residual Effects

16.8.1 Construction Phase

Following implementation of the mitigation measures as outlined in the CWMP, which is included in the CEMP (**Appendix 6.1 of Volume 3**), most waste materials generated during the construction phase will be re-used either within the proposed development or will be sent for recovery/recycling at authorised waste facilities.

The residual effects of the proposed development on resource and waste management during the construction phase, following the implementation of mitigation measures are considered to be **minor, negative and short term**.

16.8.2 Operation Phase

The waste generated during operations 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 **imperceptible**.

16.8.3 Decommissioning

Waste from the decommissioning phase of the proposed development will be minimised wherever possible or delivered to authorised waste facilities in accordance with the relevant Irish waste legislation. As such, following the implementation of mitigation measures, the residual effect on resource and waste management is anticipated to be **minor, negative and short-term**.

16.9 Conclusion

To conclude, the proposed development will have a minor, negative and short-term effect on resource and waste management, during the construction and decommissioning phases, with no significant effects during the operational phase.

16.10 References

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