

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. **Chapter 4** provides a description of the proposed development whilst **Chapter 5** describes the Construction Strategy. The following aspects are particularly relevant to the resource and waste assessment:

Design:

- Throughout the design development for the proposed development, consideration has been given to the minimisation of waste through retention of material on site and material reuse.

Construction:

- During the construction of the proposed development, waste will be generated from site clearance, asbestos removal, demolition and excavation. General construction waste is likely to be generated throughout the construction of the proposed development.

Operation:

- During operation, sludge will be generated from operation of the WwTP. Grit and other materials will also be generated from the preliminary screening of wastewater. Maintenance waste is likely to be generated from repair and maintenance works associated with the proposed development. Office waste will be generated from the Administration building.

16.2 Assessment Methodology

The potential for waste to be generated during the demolition, excavation, construction, operation and decommissioning phases of the proposed development is assessed. Mitigation measures are identified where necessary to reduce the impact of the waste generated by the proposed development in the construction and operational phases.

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, materials and resources is maintained in the economy for as long as possible and 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 16.1).



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



Figure 16.2: Waste Hierarchy

However, where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy set out in the EU Waste Framework Directive (Directive 2008/98/EC) (see Figure 16.2) and actively contributes to the economic, social and environmental goals of sustainable development.

This chapter examines the potential environmental effects of the generation and management of solid waste arising from the proposed development, in the context of the existing local and national resource and waste management environment.

16.2.1 Guidance and Legislation

16.2.2 General

This resource and waste management assessment considers the following aspects:

- The legislative context;
- The construction of the proposed development, including demolition and excavation;
- The operation of the proposed development; and
- The decommissioning of the proposed development.

A literature review was carried out of relevant legislation, policy and best practice guidance (Refer to **Appendix 16.1**). 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 (refer to **Appendix 16.1**), including the Eastern - Midlands Region Waste Management Plan 2015-2021 and the Irish Water National Wastewater Sludge Management Plan 2016;
- Description of estimated waste generation during the construction, operational and decommissioning phases; and
- The proposed development was systematically reviewed to identify mitigation and move waste management up the waste hierarchy through implementation of best practice (refer to Figure 16.1 and **Appendix 16.1**).

Mitigation measures are proposed to minimise the effect of the proposed development on the environment, reduce the quantity of waste sent for final disposal in so far as possible and to promote sustainable waste management practices. These are described in **Section 16.5**.

The construction strategy for the proposed development is set out in **Chapter 5**. The direct and indirect effects of transport (which includes traffic associated with the movement of waste material) are considered in **Chapter 7** and the geological characterisation of the proposed development is considered in **Chapter 14**.

16.2.3 Guidance and Legislation

Resource and waste management takes place in a policy and legislative framework. A review of relevant legislation, policy and best practice guidance was 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 (See **Appendix 16.1**) are summarised as follows:

- Prevention of waste is the preferred option such that the value of products, materials and resources are maintained 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 may not be prevented, reused or recycled it should be transported and disposed in accordance with the Waste Management Acts 1996 to 2011; 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).

16.2.4 Study Area

Chapter 4 provides a description of the proposed development whilst Section 5 describes the Construction Strategy.

Waste Management Planning in Ireland takes place on a regional basis and the proposed development is located in the Eastern-Midlands Region for the purpose of waste planning. However, Arklow is adjacent to County Wexford which is located in the Southern Region for the purpose of waste planning. Waste statistics are also published in Ireland on a national basis. Therefore, the study area in relation to the consideration of baseline waste generation and treatment is regional and national whilst the study area in relation to effects is local, regional and national.

16.2.5 Assessment Methodology

The methodology followed in carrying out this resource and waste impact assessment aligns with the overarching EIA guidance as described in **Section 1.4.3 of Chapter 1**.

16.3 Baseline Conditions

16.3.1 Construction Waste

Construction waste, including demolition and excavation waste, will be generated as a result of the proposed development. In order to establish a baseline and review capacity in relation to construction waste, a review of published data and statistics was undertaken.

The most recent complete figures published by the EPA relating to construction and demolition waste are for the year 2014 with 3.314Mt (million tonnes) of C&D waste finally treated (recovered or disposed).

The quantity of construction and demolition waste managed in Ireland is indicative of economic activity. At the peak of the economic and construction boom in 2007, approximately 17.8Mt of C&D waste was collected for treatment. This fell to 3Mt in 2011 and 3.314Mt of construction and demolition waste was treated in Ireland in 2014. The EPA states¹ that:

“With a government policy focus on the provision of social housing, major road infrastructural projects and the new children’s hospital, construction and demolition waste generated will increase again in the coming years.”

The Eastern Midlands Regional Waste Management Strategy 2015-2021 reports that 1.911Mt of construction and demolition waste was collected within the region in 2012. The nearby Southern Regional Waste Management Strategy 2015-2021 reports that 970,319 tonnes of construction and demolition waste was collected within the region in 2012.

An indicative breakdown of the composition of construction and demolition waste in Ireland in 2014 is set out in Table 16.1. These figures should be considered as a guide only as construction and demolition waste can vary significantly from one project to another, depending on the nature of the development and the waste management practices employed on-site.

Soil and stones accounted for almost 75 % of the total quantity of construction and demolition waste finally treated in 2014 and is a significant waste stream in terms of quantity arising. The quantity of contaminated soil (hazardous waste) has also increased due to increasing construction activity in recent years.

¹ EPA (2016) Ireland’s Environment –An Assessment 2016

Table 16.1: Material categories of construction and demolition waste treated in Ireland in 2014 (Source: EPA¹)

Material from construction and demolition sources	Quantity (tonnes)	% of material stream in reference to total
Metal waste	173,810	5.24%
Glass waste	2,904	0.09%
Paper and cardboard waste	211	0.01%
Plastic waste	348	0.01%
Wood waste	52,155	1.57%
Waste containing PCBs	2	0.00%
Mixed waste	2,504	0.08%
Mineral waste	401,409	12.11%
Asbestos waste	6,246	0.19%
Soil and stones	2,463,749	74.35%
Residue from treatment of mixed waste	210,520	6.35%
Total	3,313,858	100.00%

Figure 16.3 shows the final treatment routes for construction and demolition waste material classes in 2014. Recycling was the dominant treatment activity for separated materials (e.g. construction and demolition waste glass). Residues from sorting (e.g. fines) were used as landfill cover (backfilling) and difficult wastes that could not be recovered were disposed of (e.g. residues from sorting of waste, construction and demolition waste containing asbestos or polychlorinated biphenyls (PCBs)).

Final treatment operations (recycling, backfilling, use as a fuel, disposal) varied greatly between material streams. By far the biggest amount of construction and demolition waste was used for backfilling (a recovery operation), which mainly reflects the dominance of soil and stones in the overall composition mix.

Under the Waste Framework Directive (2008/98/EC) there is a target for Member States to achieve 70% material recovery of non-hazardous, non-soil & stones C&D wastes by 2020. Ireland achieved 68% recovery in 2014.

The construction sector also generates hazardous waste such as hazardous soils, lead-acid batteries, waste electrical and electronic equipment, asbestos, solvent-based paints and varnishes, pesticides and waste oils. The EPA reports that in 2016 80,273 tonnes of hazardous soil was exported from Ireland for treatment. Over 90% was exported to Germany and Belgium².

² <http://www.epa.ie/nationalwastestatistics/hazardous/> [accessed 29/8/2018]

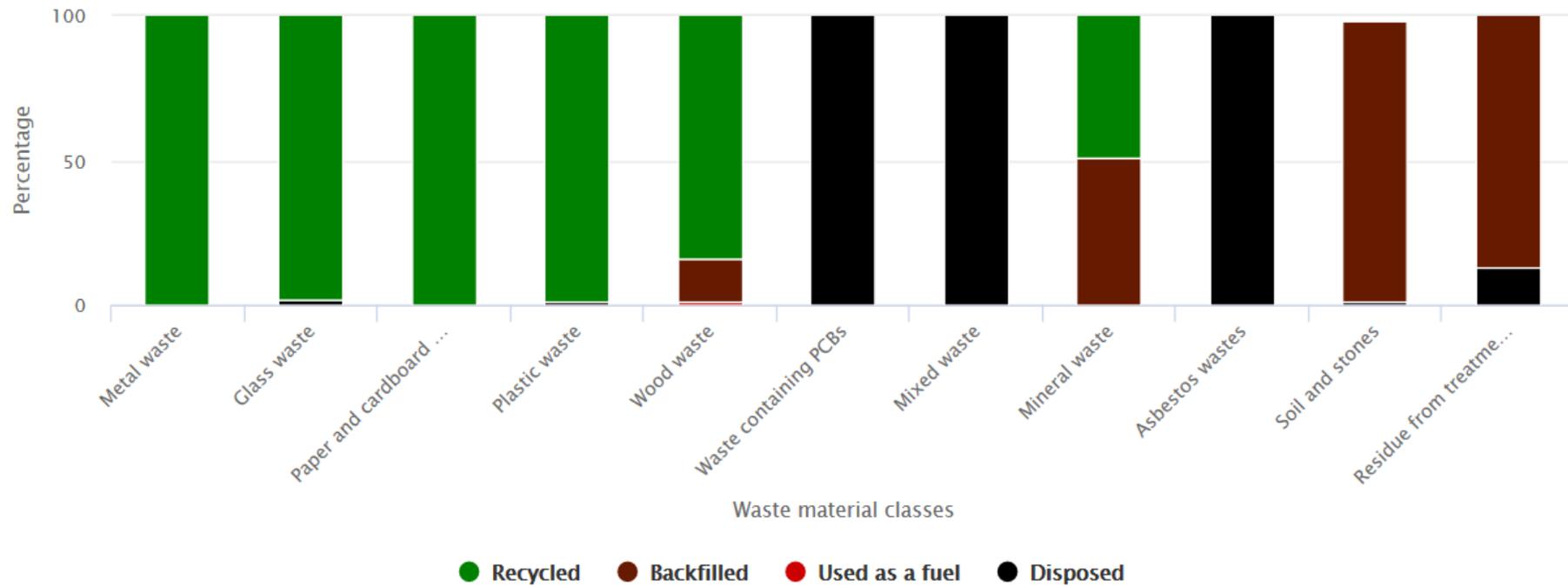


Figure 16.3: Final Treatment for construction and demolition waste Material Classes in Reference to Total for each Material Class, 2014 (Source: EPA³)

³ <http://www.epa.ie/nationalwastestatistics/constructiondemolition/> [Accessed 30 August 2018]

16.3.2 Operational Waste

The solid wastes typically generated during operation of a WwTP of this nature include sludge from waste water treatment, grit and other materials from the inlet works screening processes, maintenance and office wastes.

In 2016 Irish Water published the National Wastewater Sludge Management Plan (NWSMP) outlining its standardised nationwide approach for managing wastewater sludge for the next 25 years. In 2016, 98% of wastewater sludge was treated to produce a biosolids product, which was being reused in agriculture.

In the Eastern Midlands Region 227,988t of sludges were collected in 2012. An additional 43,933 tonnes of water treatment sludges were also collected. In the Southern Region 144,525 tonnes of sludges were collected in 2012. An additional 7,255 tonnes of water treatment sludges were also collected.

16.4 Likely Significant Effects

16.4.1 Do-Nothing Scenario

In the scenario where the proposed development did not proceed as planned (and ignoring the necessity for a WwTP at Arklow to comply with statutory regulations and facilitate future growth), it is likely that the eastern end of the North Quay area may remain substantially unchanged in the short to medium term, while there would not be a requirement for the interceptor sewers.

In this event, the resource and waste management effects described in this chapter would not arise.

16.4.2 Assessment of effects during construction

16.4.2.1 Site Clearance and Demolition

Prior to commencing work the contractor will need to strip surface material within the working areas for the proposed development. This will comprise soils, rock, topsoil, vegetation etc. which is typical of a project of this nature and scale, and this material will be reused within the proposed development in so far as reasonably practicable or transferred for recovery or disposal at appropriately authorised waste facilities in respect of which a waste permit or a waste licence is granted.

An estimated 23,500 tonnes of surplus demolition materials will be generated as a result of demolition of existing buildings and structures to facilitate the proposed development. This material will be predominantly comprised of concrete and ferrous metals. A recycling rate of 68% is assumed to be achieved for this material in line with current national construction and demolition waste management practices.

Chapter 5 provides a description of where asbestos has previously been identified at the WwTP site. Prior to any demolition, a Refurbishment / Demolition Asbestos Survey (RDAS) will be undertaken by the contractor so that all asbestos containing materials are correctly identified before any demolition works take place. Asbestos arising during demolition will be removed from site to an appropriately licensed facility (in respect of which a waste permit or a waste licence is granted) in accordance with the Outline CEMP (Refer to **Appendix 5.1**) and with the Waste Management Acts 1996 to 2011. Where transportation of asbestos waste from the proposed development takes place within Ireland this will be undertaken in accordance with the European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011. Where export of asbestos waste from the site takes place this will be undertaken in accordance with the Waste Management (Shipments of Waste) Regulations, 2007.

16.4.2.2 Excavation

Topsoil, soil, rock and naturally occurring material excavated in the course of construction activities will be reused within the proposed development where feasible, subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Where naturally occurring material is used for the purpose of construction in its natural state within the proposed development this material is not deemed to be a waste in accordance with Article 2 of the Waste Directive 2008/98/EC, the European Communities (Waste Directive) Regulations, 2011 and Section 3 of the Waste Management Acts, 1996-2011 as amended.

Reuse must be certain, there must be no intention or requirement for it to be discarded and no further processing required in order for it to be reused.

Alps SWO and Stormwater Storage Tank

The Alps SWO and storage tank will be constructed using open cut techniques including the stormwater tank and overflow to the existing SWO and proposed manholes (MHA3, MHA4, MHA5, MHA6 and MHA7). An estimated 50% of the estimated material excavated at this area could be reused for backfilling the tank and regrading of site levels. It will be used within the boundary of the site of the proposed development and therefore is not classified as waste.

An estimated additional 4,000 tonnes of soil and rock will be excavated at the Alps SWO and stormwater storage tank and will require removal from site.

Interceptor Sewers

The existing wastewater network pipes that are redundant are likely to be abandoned in situ, typically by pumping concrete to form a plug at either end of the line. Downstream of Arklow Bridge (between MHS10 and MHS15), the existing sewer running along the quayside on South Quay will be maintained during construction before being abandoned in situ and plugged.

The proposed interceptor sewer on River Walk/South Quay (between MHS1 to MHS15) will be laid using open cut techniques.

Tunnelling techniques will be used to install the remainder of the proposed interceptor sewer on South Quay (between TSS1 and TSS3), the river crossing and the entire North Quay interceptor sewer (between TSN1 and TSN8). **Chapter 5** provides a detailed description of the indicative construction activities associated with constructing the sewers using these methods.

To facilitate construction of the interceptor sewer in the river channel, a temporary causeway will be required to be installed in the Avoca River to support construction activities at this location. The temporary causeway will be constructed from clean, suitable engineered fill (coarse granular material free from fines with a maximum particle size of 500mm) and will be removed on completion of construction, with the materials re-used elsewhere on site where feasible and subject to testing to ensure it is suitable for the proposed end use.

The tunnel shafts will be constructed using caisson top down construction methods. A number of manholes will be constructed to connect the existing sewer network and the proposed interceptor sewers. These will be constructed using open cut techniques on the existing alignment of the wastewater collection network.

Due to a relatively high water table, dewatering of some excavation material generated from open cut methods will be required before removal from site. The dewatering process will include the use of a silt bag, settlement tanks or other appropriate silt removal systems. The residual silt will be removed from site periodically and delivered for recovery or disposal at licensed and/or permitted waste facilities.

Waste from tunnelling will consist of soil, stone and bentonite clay. A description of the likely method of tunnelling slurry separation is provided in Chapter 5. Where separation plant for drilling slurry on site requires authorisation such as a waste facility permit, this will be obtained from the local authority by the contractor in advance of the activity commencing. Excavated material from tunnel construction will comprise gravel and coarse sand particles, fine sand and silt particles and clay. Temporary stockpiling of excavated tunnel material may take place within the site boundary prior to recovery or recycling at licensed and/or permitted waste facilities. Bentonite clay, a naturally occurring non-hazardous material will be used as a lubricant in tunnelling and as such may be present in tunnelling residues. Bentonite containing waste will also be removed from site for recovery or disposal at appropriately authorised waste facilities in respect of which a waste permit or a waste licence is granted.

Estimated excavation quantities from construction of the South and North Quay Interceptor Sewer are as follows:

- c. 9,700t from open cut construction;
- c. 23,600t from tunnel shaft construction;
- c. 1,400t from underpinning of Arklow Bridge;
- c. 6,110t from tunnelling;
- c. 4,000t from service diversions; and

- c. 17,000t engineered fill from removal of the temporary haul road.

Excavated material is likely to predominantly consist of soil and stones with some non-hazardous materials such as uncontaminated made ground and bitumen. There are likely to be some hazardous materials such as contaminated soils.

WwTP

Construction of the WwTP will occur at the Old Wallboard site which has a history of industrial use as described in **Chapter 2**. Excavation is required to allow for the construction of the foundations and other structures. This is described in further detail in **Chapter 5**. Estimated excavation quantities are summarised as follows:

- c. 26,250t inert excavation material;
- c. 9,400t non-hazardous excavation material; and
- c. 25,200t hazardous excavation material.

During construction, an aqueous sludge will be generated during dewatering activities at the WwTP site. As outlined in **Section 5.5.4 of Chapter 5**, the sludge may be transferred by tanker to an appropriately licensed facility. Given the reasonable worst case of 250m³ of groundwater per day being generated during excavation and dewatering, it is anticipated that this will require up to one tank visit per day to remove the aqueous sludge produced by the groundwater treatment.

Revetment and Sea Outfalls

The existing rock armour in the revetment will be completely removed from crest to toe using excavators. Upon removal, the rock armour will be temporarily stored in a designated place within the site where it would be classified and sorted into suitable material for reuse and material to be transported offsite. An estimated 42,000 tonnes of existing rock armour will require removal from site. An estimated 32,000 tonnes of excavated seabed material will be reused within the scheme. There is also a requirement to remove 50,000 tonnes of excavated seabed material from the site. Any material unsuitable for reuse will be removed from the site by trucks and transported to an authorised recovery/ disposal facility.

Summary

Approximately 220,000 tonnes of excavated material will be generated during construction of the proposed development.

Of this it is estimated that 35,000 tonnes of excavated material from the Old Wallboard Site will be categorised as non-hazardous or hazardous in accordance with *Council Directive 99/31/EC of 26 April 1999 on the landfill of waste* and will require removal from site to authorised facilities in Ireland or abroad.

An estimated 185,000 tonnes of surplus excavation material will require removal from site during the construction phase of the proposed development.

The duration of the construction phase is estimated to be 3.5 - 4 years, however as a reasonable worst case given the programme in Appendix 5.2, it has been assumed that excavation and demolition activities may occur over a two year period.

Therefore, an average of approximately 90,000 tonnes of this surplus excavation material per year will require removal from site over this two year period. A significant proportion of this material is likely to consist of soil and stones.

The contractor will ensure excavation waste generated from the proposed development is tested prior to reuse on site, and removal from site to ensure to ensure material and waste is correctly classified and delivered to the appropriate authorised waste facility. Where waste is delivered off site for storage, reuse or recovery the contractor will ensure that the appropriate waste authorisation is in place for all facilities including storage facilities (i.e. EPA Licence, Waste Facility Permit or Certificate of Registration).

16.4.2.3 General Construction Waste

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

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Asphalt/tar;
- Metals;
- Wood; and
- Other.

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

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

Also included within the 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.

In the case of the proposed development, the most likely type of construction waste will be surplus concrete, unusable or damaged pipe segments which may arise on site and drilling waste containing bentonite.

16.4.2.4 Removal of Temporary Works

Following completion of construction, temporary sheet piles may be extracted and removed.

As mentioned previously, a temporary causeway will be installed in the Avoca River to enable sheet piles to be installed herein. This temporary causeway will be constructed of coarse granular material and removed on completion of construction. An estimated 17,000 tonnes of material will require removal from site upon removal of the causeway. This material will be delivered for recovery or disposal at licensed and/or permitted facilities in respect of which a waste permit or a waste licence is granted.

16.4.2.5 Decommissioning of Existing Sewers

On commissioning of the proposed development, a number of the existing sewer pipework on River Walk, South Quay and North Quay will be abandoned and pumped with concrete to seal both ends as detailed in **Chapter 5**.

16.4.2.6 Construction Waste and the Waste Hierarchy

Irish Water is committed to sustainable waste management and the waste management hierarchy set out in the EU Waste Framework Directive (Directive 2008/98/EC) (see also **Section 16.2**). The construction of the proposed development is reviewed below in the context of the waste hierarchy

Prevention

Waste prevention and minimisation is the most environmentally sustainable means of managing excavated material and construction wastes. Prevention and minimisation of waste is inherent in the design of the proposed development.

As mentioned previously, where naturally occurring material is used for the purpose of construction in its natural state within the proposed development this material is not deemed to be a waste in accordance with Article 2 of the Waste Directive 2008/98/EC, the European Communities (Waste Directive) Regulations, 2011 and Section 3 of the Waste Management Acts, 1996-2011 as amended.

Preparing for reuse

The next preferable option in the waste hierarchy is beneficial re-use of surplus excavation spoil as engineering and landscaping material within the proposed development and on other projects requiring the types of materials generated. Reuse of topsoil and excavated material within the proposed development is proposed subject to availability of temporary storage space during the construction phase. The material is also subject to testing to ensure it is suitable for its proposed end use.

Where construction by-products are proposed to be further used on or off site this will take place in compliance with Article 27 of the European Communities (Waste Directive) Regulations, 2011. The contractor will be responsible for ensuring compliance with these Regulations where appropriate.

Recycling, Recovery and Disposal

A significant proportion of surplus excavation material from the proposed development will consist of soil and stones which can be accepted for recovery and recycling at EPA licensed and permitted facilities. Recycling/ recovery activities include:

- Processing of stone to produce construction aggregate;
- Backfilling of quarries; and
- Raising land for site improvement or development.

The option of delivery of inert uncontaminated material for disposal to landfill is the least desirable destination for surplus material generated by the proposed development and will only be considered where sufficient void capacity cannot be secured at appropriately licensed/permitted facilities for recovery purposes. It is unavoidable that a small percentage of excavation material, due to the presence of contaminants will have to be disposed of off-site. All material presented for disposal will have to meet the receiving sites waste acceptance criteria.

Where material for reuse within the proposed development will be processed through crushing and screening to achieve required specifications for end use the contractor will obtain the appropriate permit or licence from Wicklow County Council or the EPA prior to commencement of these activities.

Where removal of waste from site is required this will be delivered for recovery or recycling at facilities holding a Certificate of Registration, Waste Facility Permit or EPA Waste Licence.

The most significant waste generated from the proposed development will be excavation soil and stones with an estimated 49,400t per year likely to be generated during the construction phase. Research was undertaken to determine if licensed capacity is likely to exist at authorised and regulated facilities for acceptance of surplus excavation material generated from the proposed development. The case studies presented in **Appendix 16.2** identify a number of named facilities. The identified facilities merely represent a subset of the total number of facilities available in the region. The review shows that there is adequate authorised capacity in the region to receive the excavation soil and stones likely to be generated by the construction of the proposed development. The case studies are provided for demonstrative purposes and it will be the responsibility of the Contractor to secure agreements for acceptance of the surplus spoil in similar authorised and regulated facilities, in accordance with waste management legislation and requirements.

16.4.2.7 Cumulative

A number of other development proposals are currently permitted or proposed in Arklow town as discussed in **Sections 2.6.6 of Chapter 2**. The nature and scale of these developments are such that construction of these projects at the same time as the proposed development, would not give rise to significant resource and waste management effects.

The proposed Arklow Flood Relief Scheme has also been considered during this assessment. It is likely that the proposed Arklow Flood Relief Scheme (which would be subject to its own EIAR in due course), may include dredging of the river channel, placement of a flood embankment at the eastern edge of Arklow Town Marsh, removal of an area of land at South Quay and construction of flood walls along the river on its southern side.

Design coordination between the proposed development and the design of the proposed Arklow Flood Relief Scheme to date is such that the detail of the proposed development anticipates the proposed Arklow Flood Relief Scheme in so far as is possible. For the purposes of this assessment, it has been assumed that both infrastructure schemes could proceed in parallel or overlap to a degree.

Cumulative construction effects of the other development proposal with the proposed development could give rise to short-term moderate negative resource and waste management effects.

16.4.3 Assessment of Effects during Operation

The sludge produced by the proposed development will be thickened and dewatered to a minimum 18% dry solids, with the dewatered sludge being transported to one or a number of sludge hub centres for further treatment and appropriate disposal in accordance with the Irish Water National Wastewater Sludge Management Plan (NWSMP). The anticipated volume of dewatered sludge cake which will be produced is estimated at 14 m³ per day. This is equivalent to approximately one truck removing sludge cake from the WwTP per day.

While, as set out in the NWSMP, it is likely that the majority of wastewater sludge will continue to be treated to produce a biosolids product for reuse in agriculture in the medium term, the use of a sludge hub centre allows for economies of scale and greater flexibility in the development and selection of new treatment processes in the future, particularly energy recovery. The reuse of the treated Arklow WwTP sludge in agriculture is subject to a separate regulatory regime and will be in accordance with an appropriate Nutrient Management Plan and regulated in line with statutory requirements, including those under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017.

Screenings and grit from the inlet works and SWOs' screening and/or grit removal operations will be collected by suitably permitted contractors and disposed of at an appropriately licensed facility in accordance with the *Waste Management Acts, 1996 to 2011*. Grit and screenings will be produced during operation of the wastewater treatment plant. It is estimated that approximately 1.62 m³ of screenings will typically be produced per day.

Waste resulting from administrative offices and maintenance requirements is currently categorised as non-household municipal waste. In relation to baseline waste generation for this type of waste in Ireland statistics are reported at a national level. The most recently published EPA statistics relate to 2014 and note that 1,181,554 tonnes of non-household municipal waste was generated in Ireland.

In 2012, 568,873 tonnes of commercial waste was collected in the Eastern Midlands Region, while 390,403 tonnes of non-household municipal waste was collected in the Southern Region. Municipal office and food waste is likely to be generated from the Administration Building. This will be collected by an authorised commercial waste collector as part of their weekly waste collection service in Arklow town.

Maintenance waste will be generated during maintenance of the sewer network and the wastewater treatment plant. Maintenance contractors will remove maintenance waste generated during the course of their work.

16.4.3.1 Cumulative

As outlined in **Section 2.6.6 of Chapter 2**, a number of other development proposals are currently permitted or proposed in Arklow. 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 resource and waste management effects.

16.4.4 Assessment of Effects during Decommissioning

Irish Water considers that the proposed development will be a key strategic asset in the Irish Water portfolio and as such it will be maintained and upgraded as required in line with all of its other strategic assets. The design life for the proposed development is 50 years.

In the event of decommissioning, the following measures would be undertaken by Irish Water to ensure that there will be no likely significant effects associated with the decommissioning of the proposed development:

- All raw materials, chemicals, oils, fuel etc. on site at the time of closure will be returned to the supplier, or collected and recycled or disposed of by an authorised waste contractor and at an authorised facility, as appropriate;
- All WwTP buildings and process equipment would be decontaminated and decommissioned in an appropriate manner;
- Infrastructure and underground pipelines are not anticipated to be removed. If removed these will be recycled or disposed of by an authorised waste contractor and at an authorised facility. Generally, specialist equipment would be sold for reuse, where possible, or disposed of off-site;
- All buildings, structures and pipelines would be decommissioned; and
- Roads, hard-standing and site fencing would be retained.

Decommissioning measures would have to be implemented to the satisfaction of the Environmental Protection Agency in relation to the WWDA and the planning authority in relation to any planning permission granted or required. The WWDA would be surrendered in accordance with the relevant requirements. Therefore the effect on resources and waste management, should the proposed development be decommissioned, is expected to be moderate, negative and short term.

16.5 Mitigation Measures and Monitoring

16.5.1 Mitigation

16.5.1.1 Mitigation During Construction

An outline Construction and Demolition Waste Management Plan (CDWMP) is described below. This Outline CDWMP plan will be required to be developed into a Detailed CDWMP by the Contractor(s) following appointment and prior to commencing works on site. The CDWMP addresses waste generation and arrangements made for prevention, reuse, recycling, disposal and collection of recyclables and wastes.

The Outline CDWMP was prepared in line with the guidance⁴. The following is an indicative summary of the content of a CDWMP:

- Description of the project (Refer to **Chapters 4 and 5**);
- Wastes arising including procedures for minimisation/reuse/recycling;
- Estimated cost of waste management;
- Roles including training and responsibilities for C&D waste;
- Procedures for education of workforce and plan dissemination programme.
- Record keeping procedures;
- Waste collectors, recycling and disposal sites including copies of relevant permits or licences; and
- Waste auditing protocols.

Using the information identified in this section the contractor will be required to develop, implement and maintain a CDWMP during the construction of the proposed development.

Construction – All Phases

In addition to the inherent design measures which will be implemented during construction, the following mitigation measures will also be implemented:

- A pre-demolition audit will be undertaken in order to facilitate selective demolition. Selective demolition will be undertaken in order to enable removal and safe handling of hazardous substances and to facilitate re-use and high quality recycling. The Institution of Civil Engineers (ICE) Demolition Protocol, 2008 provides a robust methodology to assess the quantities of materials present in buildings and structures and their waste management options considering the waste hierarchy principle, when reaching the end of their lives. This guidance should be used to inform the demolition audit of the project.

⁴ DoEHLG (2006) Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects

- The contractor will minimise waste disposal so far as is reasonably practicable. Opportunities for reuse of materials, by products and wastes will be sought throughout the construction stage of the proposed development.
- 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 excavated material may not be re-used within the proposed works the Contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable.
- Waste from the proposed development will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.
- Waste from the proposed development will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2016 as amended.
- 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 impact.
- Material management: ‘Just-in-time’ delivery will be used so far as is reasonably practicable to minimise material wastage.
- 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 may be generated from equipment used on-site during construction and may 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.
- 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.
- The contractor(s) 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.

16.5.1.2 Mitigation during Operation

As the impact of operational waste is predicted to be imperceptible no specific mitigation is considered necessary.

16.5.2 Monitoring

16.5.2.1 Monitoring During Construction

Monitoring required as part of the CDWMP and/or CEMP as set out in sections 16.5.1 and Appendix 5.1 in relation to wastes will be undertaken and recorded by the Contractor(s).

16.5.2.2 Monitoring During Operation

Monitoring of sludge generation and management will be undertaken in accordance with the provisions of operational procedures for the WwTP and the NWSMP.

No additional monitoring is considered necessary with respect to effects from other operational wastes from the proposed development.

16.6 Residual Effects

Following implementation of the mitigation described in **Section 16.5** the residual effects are as follows:

16.6.1 Residual Effects during Construction

The residual effect of excavation waste is expected to be slight, negative and short-term.

The residual effect of demolition waste is expected to be slight, negative and short-term.

The impact of general construction waste is expected to be imperceptible and short term.

16.6.2 Residual Effects during Operation

The residual effect of operational waste is expected to be imperceptible and long term.

16.6.3 Residual Effects during Decommissioning

The residual effect of decommissioning waste is expected to be slight negative and short term.

16.7 References

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