

## 5. Construction Activities

### 5.1 Introduction

This chapter of the EIAR describes the construction activities and sequencing for the proposed Ringaskiddy Resource Recovery Centre. It considers how the proposed development will be constructed, including duration, site preparation, services and utility requirements, import and disposal of materials and general construction activities for this type of development.

It is anticipated that, with the proper implementation and management of the construction activities described in this chapter the construction phase of the development will have no significant or long-term impact.

### 5.2 Geotechnical Investigation

In order to ascertain the underlying ground conditions onsite, preliminary soil and hydrogeological investigations were carried out on the site, which included drilling of boreholes and excavating trial pits. The results of the site investigations are described in more detail in **Chapter 13 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession** of this EIAR.

It seems likely that, in the past, the hillside at the site followed the gentler slope of the surrounding land, refer to **Section 13.3.2.4 in Chapter 13**. Anecdotal evidence suggests that substantial quantities of material were removed from the site and used for reclamation purposes elsewhere in the Ringaskiddy area, thus creating the escarpment now evident on the site.

The topsoil layer is relatively shallow over most of the site. This layer is underlain by soft silty clays, with some fine sands and gravels. Depth to the bedrock varies across the site, from 1.0M below ground level (bgl) at the northern end of the site, where material has been removed in the past, to greater than 9.0m bgl close to the southern boundary.

### 5.3 Duration and Activities

#### 5.3.1 Overview

The schedule for the construction and commissioning of the Resource Recovery Centre is approximately 31 months.

The road upgrade, associated road drainage and diversions of services will take circa eight weeks to complete. The diversion to the 220kV underground cables, if required would take circa four additional weeks. It is anticipated that the road upgrade, associated road drainage and diversions of services will proceed in advance of the main construction of the Resource Recovery Centre. Refer to **Section 5.3.2** below for further details. Of the 12-week duration period, Gobby Beach car park may need to be closed for up to six weeks to facilitate the construction works. However, access to the beach will be maintained for the duration of the works.

The placement of the sacrificial beach material (shingle) required for the coastal protection works will take approximately three weeks to complete. Refer to **Section 5.4.3** below for further details. It is envisaged that the coastal protection works will be undertaken towards the end of the construction phase.

It is envisaged that the main stages of construction will be as follows:

- Implement Japanese Knotweed management plan for construction phase, fence off infestation area along the western boundary of the site and continue with treatment, etc, as required. Note, advance knotweed treatment commenced in 2016 and will continue as required (Refer to **Section 5.12.7** below for further details).
- Construct temporary road to south of existing L2545 road,
- Upgrading the section of the L2545 road at the northern boundary, including upgrading the drainage and diversion of services,
- Construction of new site entrance,
- Diversion of existing services within the site, including the gas main, which lies close to the southern and eastern boundaries, and overhead power lines,
- Strip topsoil and vegetation,
- Bulk excavations and general site re-grading, including placing of fill in western field,
- Establish the initial contractor site compound, including the construction phase power supply, fencing and securing of the site,
- Construction of earth retaining structures, which will happen in tandem with bulk excavations and general site re-grading,
- Establish main contractors' compounds and laydown areas,
- Construction of foundations for main process building,
- Construction of bunker, underground holding tanks and drainage/underground services,
- Construction of ground floor slab of main process building,
- Installation of plant and equipment, which will be undertaken in tandem with external and internal completions and finishes,
- Erection of superstructure of main process building,
- External and internal completions and finishes of main process building,
- Construction of substation, administration building and other ancillary buildings,
- Installation of external plant and equipment,
- Construction of internal roads and parking areas,
- Underground services,
- Surface water drainage system,
- Foul drainage system,
- Connection to existing water and foul services,

- Fit-out and commissioning buildings and equipment,
- Erection of site fencing,
- Site landscaping,
- Placing of sacrificial material on the beach at the toe of the glacial till face at the eastern boundary of the site,
- Removal of contractor facilities and site hoarding.

### 5.3.2 L2545 Upgrade and Drainage Upgrade

#### Introduction

The proposed upgrade works to a section of the L2545 local road, which adjoins the northern boundary of the site, will consist of raising a section of the road to a maximum elevation of 3.45mOD, installing large diameter pipes to provide storm water storage and upgrading the surface water drainage. The likely duration of the works will be 12 weeks in total. This work will be undertaken in advance of the main construction works. The road and drainage upgrade are fully described in **Section 4.5.17 of Chapter 4 Description of the Proposed Development**, of this EIAR. A summary is provided below.

#### Outline description of L2545 upgrade – increase in road levels

The proposed L2545 upgrade works will include raising a 185m section of the road to a maximum height of 3.45mOD between the car park and the eastern end of the Hammond Lane Metal Company. This is approximately 1.0m above the existing road level. The road will be raised over a length of approximately 185m in order to ensure a smooth transition down to existing road levels, in accordance with road design standards. The recently constructed footpath on the northern side of the road will also be raised to the new road level.

#### Outline description of L2545 drainage upgrade

The proposed road drainage network upgrade will extend along the entire northern boundary of the Indaver site. The increased storage will be in the form of oversized pipes placed underneath the road. This is described further below.

A new linear concrete surface water channel, 260m in length, will extend from the western boundary (of the western field area) of the Indaver site, running along the southern edge of the L2545 until it meets the entrance to the Hammond Lane Metal Company. This section of the L2545 is currently super-elevated – i.e. the camber on the road falls from north to south, therefore surface water drains to the south. This section of the L2545 will not be raised as the existing levels are already above the predicted 1 in 200-year design tidal level (2.73mOD) and it will be protected to 3.35mOD by the proposed elevated section of road to the east. The new surface water channel will be drained at regular intervals by gullies which will outfall to the existing 450mm diameter surface water sewer beneath the road. Therefore, surface water will no longer flow from the road into the Indaver site (western fields) to the south.

The raised section of the L2545 between the car park and the eastern end of the Hammond Lane Metal Company will be drained by a kerb and gully sealed drainage system which will be connected to two new surface water pipes underneath the road.

The two 1500mm diameter pipes will be approximately 190m in length and will provide 660m<sup>3</sup> of surface water storage. There will be three large concrete chambers constructed on the line of the twin surface water pipes at the start middle and end of the run. The first two chambers will be situated in the road and the terminal chamber will be constructed at the entrance to the car park by Gobby Beach. The recently constructed surface water drainage system on the Haulbowline road will be diverted into the terminal chamber. This chamber will be connected to the existing 450mm diameter surface water sewer via a short length of new 450mm diameter pipe, a new Class 1 bypass hydrocarbon interceptor and a new manhole constructed on the line of the existing pipe. This will allow the upgraded surface water drainage system to discharge to sea via the existing 450mm surface water outfall at Gobby Beach.

All of the above works will be within Indaver ownership, apart from a small area in Hammond Lane ownership. Consent has been given by Hammond Lane to undertake these works.

### **Outline description of existing services along L2545**

The known underground services are a 450mm diameter watermain, 220kV electricity cables, 4 bar gas distribution main, public lighting cables, Eircom underground cables, Enet fibre optic cables, private foul sewer and surface water drainage pipes. There is also an overhead electricity cable crossing the road.

### **Outline description of construction works required for L2545 upgrade**

A construction traffic management plan will be implemented by the appointed Contractor in advance of commencing the works on site. Refer to **Section 5.12** below for further details.

Whilst the construction of the road upgrade and associated drainage upgrade can proceed in parallel with the construction of the waste to energy facility, the raising of the levels of the western field lands would require the road drainage works to be complete. Therefore, it is anticipated that the road upgrade and drainage works would be commenced at the beginning of the project and progressed to completion as soon as possible.

The first task of the road upgrade will be to construct a temporary two-way road, approximately 250m long, to the south of the existing road to create working space for the construction of the raised section of the road, the upgraded drainage system and the diversion of services. The traffic will be diverted onto the temporary road until the upgrade works have been completed. The construction traffic management plan will incorporate a temporary traffic management plan in accordance with **Chapter 8** of the *Traffic Signs Manual (Department of Transport 2010)*. An initial site compound and site offices will be provided within the Indaver site to provide facilities for the workforce for the road upgrade works.

The existing services running along and adjacent to the road will be carefully set out and suitable working methods will be employed to ensure that the existing services are protected during construction.

There is an overhead electricity line crossing the road however only a marginal increase in road level (circa 100mm) is proposed at this location.

The public lighting columns at the northern edge of the footpath, on the northern edge of the road, will have to be raised to match the new road level and the associated duct chambers will also be raised to match the new footpath level.

New Eircom ducting is proposed for the northern road verge to allow Eircom cables to be locally diverted within the road. The gas distribution main will also be locally diverted within the road. The existing surface water drainage from the Haulbowline road will be diverted into the new surface water system. The 450mm diameter watermain will also be diverted along the section of road to be raised between the car park and east of Hammond Lane. This work will be undertaken in consultation with Cork County Council, which is acting as an agent for Irish Water. All of the utilities providers have been consulted in relation to the proposed diversions.

The 220kV power lines and corresponding ESB telecoms fibre optics cables beneath the L2545 may need to be raised as a result of the raising of the L2545. The worst-case option in terms of potential effects would involve diverting the cables into new ducts laid at a higher level underneath the raised section of road. Three new joint bays would be required to allow the raised cable to be jointed back to the existing cables at either end and to join the short length of new cable to the recovered length of cable respectively. The joint bays would be located in the existing road.

Diversion works to the remaining services are not envisaged, however some protection measures, such as cover slabs, may need to be employed.

Due to the presence of the existing services, it may not be possible to batter back the excavation for the large drainage pipes and therefore suitable trench supports e.g. sheet piles or large trench boxes may be used.

The 1500mm diameter pipes and the other pipes, road gullies and new underground services, including the new ducts and joint bays for the potential 220kV cable diversion will be installed and the trenches backfilled, and the new road surfacing will be laid using normal construction method and in compliance with the requirements of Cork County Council and Transport Infrastructure Ireland (TII) specifications. A temporary road surface will be provided which will be replaced with the permanent surface once the main construction project has been completed.

Provision for the site connections to the water main, telecommunications infrastructure and surface water and sanitary (foul) sewers will be made during road upgrade works.

### **Materials required**

The road upgrade will involve the following quantities of bulk materials:

- Excavation of circa 3,050m<sup>3</sup> unsuitable material including circa 225m<sup>3</sup> bituminous macadam,
- Importation of 1,400m<sup>3</sup> pipe bed and surround material,
- Import 1,400m<sup>3</sup> select granular fill for new road construction,
- Importation of 370m<sup>3</sup> asphalt for new road.
- Importation of 1,000m<sup>3</sup> select granular fill for temporary road construction.

The imported granular fill for the construction of the temporary road may be reused for the construction of internal site roads.

All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 (Roads and Traffic)** for further details.

Details on materials import and export requirements and disposal are provided in **Section 5.5** below.

## 5.4 Site Preparation Works

Once the road upgrade has been completed, the site preparation will commence with the establishment of safe access and site roads. A perimeter fence will be erected around the construction site. Re-grading work will be required. Where feasible, excavated material will be retained on site, either in the eastern area or western field, for re-use as bulk fill or for landscaping. Details on material export requirements and disposal are provided in **Section 5.5** below.

All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7, Roads and Traffic** of this EIAR for further details.

It is anticipated that the bulk excavation will take approximately six months. The central part of the site for the waste-to-energy facility will require significant earth retaining structures. These will be constructed in tandem with the bulk earthworks and re-grading.

The material to be removed will comprise overburden and rock. Refer to **Chapter 13 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession** of this EIAR for a description of the soils and geology underlying the site. The bedrock is comprised of sandstone/siltstone and mudstone. The top 0.5m to 1m of the bedrock is weathered and it is expected that it can be removed using a large excavator. It is expected that the remainder can be removed using chisel or hammer-operated rock breakers. It is anticipated that blasting will not be required. Refer to **Chapter 10, Noise and Vibration** and **Chapter, 8 Air Quality** of this EIAR for details on construction noise and dust effects and mitigation measures.

Rock crushing may be undertaken on site in order to make the excavated rock suitable for re-use as general fill. Crushed stone will need to be imported onto site. Materials required from quarries will only be sourced from quarries which are listed on the register maintained by the local authority. Further details on material import requirements are provided in **Section 5.5** below.

Site preparation works will also include the facilities for the contractors and the construction management team. These will include the following:

- Setting up of access control to the site.
- Site offices.
- Site facilities (canteen, toilets, drying rooms, etc.).
- Offices for construction management team.
- Secure compound for the storage of all on-site machinery and materials.

- Temporary car parking facilities.
- Permanent and temporary fencing.
- Site Security.

The western field will be used for the construction laydown areas and the construction facilities, following an initial phase of earthworks to raise the ground levels in this area.

### 5.4.1 Main Construction Works

Once site levels have been established by the initial bulk excavation works and construction of the retaining structures, the construction of the waste-to-energy facility will commence with the construction of the foundations for the building and equipment, the bunker and the tanks and services to be located under the ground floor. The upper floors and main building support structures will then be completed. Installation of plant and equipment will be undertaken in parallel. The contractor will work on the construction of the foundations and superstructure and installation of the equipment in the ancillary buildings, and the installation of the external plant and equipment, once construction of the waste-to-energy facility has progressed.

Site roads, car parks and site fencing will be completed, and the landscaping will be undertaken, when the main construction and equipment installation is completed, and commissioning is underway.

### 5.4.2 Construction of Grid Connection

The proposed development includes a grid connection to the boundary of the adjacent ESB Networks Lough Beg substation. The ESB Lough Beg substation is located on the eastern boundary of the Hammond Lane Metal Recycling Company Ltd. The lands over which the entire grid connection will be constructed lie within Indaver's ownership (save for a small section comprising associated works on the adjacent substation owned by ESB Networks). These works will be carried out by ESB Networks and do not form part of the planning application.

The grid connection will be made by running underground cables between the ESB Networks Lough Bed substation and the import/export substation on-site, east of the main site entrance. Underground cables will be laid, using normal construction methods and complying with ESB Networks requirements.

### 5.4.3 Coastal Defence Works

Approximately 1,100m<sup>3</sup> of imported rounded shingle of appropriate size will be placed, as sacrificial material, at the toe of the glacial till face on Gobby beach which forms the eastern boundary of the site. The works will extend along the beach from near the car park at the northern end of the Indaver site to the southern boundary of the Indaver site. The material will be deposited above the high water mark.

The placement of the sacrificial beach material (shingle) required for the coastal protection works will take approximately three weeks to complete. It is envisaged that the first instalment of the shingle will be undertaken towards the end of the construction phase.

The sacrificial material has been designed to remain on site and help lower the natural erosion rate over a number of years. However, the expected duration of the material cannot be determined since it depends on the occurrence of extreme wave events which are impossible to forecast. Therefore, it is anticipated that monitoring of the sacrificial material and the cliff face will take place on an annual basis. Replenishment of the material will be carried out as determined by the monitoring results. It is envisaged that replenishment may be required every two to five years, but it depends on the duration of the material remaining on site. The effects described below for the initial instalment of shingle will be repeated during replenishment.

The shingle, required for the coastal protection works will be sourced from a quarry which is listed on the register maintained by the local authority. The environmental effects associated with the registered quarry have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended. The registered quarry will have similar geological properties to the material found on Gobby Beach so that the shingle chosen will match the existing material on Gobby Beach.

All traffic movements associated with the import of the shingle have been included in the construction traffic impact assessment. Refer to **Chapter 7, Roads and Traffic** of this EIAR for further details.

The imported shingle will be transported by road and temporarily deposited at the car park at Gobby Beach. A bulldozer will be used to spread the imported shingle in the designated area. It is anticipated that access for construction machinery across the beach will be facilitated by laying down temporary tracks.

To ensure the safety of the general public, it is envisaged that the area of the beach, in which the construction works will take place and the area of the car park in which the materials will be stored, and which will be used by the machinery, will be closed to the public for the duration of the proposed works, approximately three weeks. However, access to the rest of the beach will be maintained for the duration of the works.

The traffic movements associated with the coastal protection works have been included in the construction traffic impact assessment. Refer to **Chapter 7, Roads and Traffic** of this EIAR for further details).

#### 5.4.4 Construction Methods

The proposed development will be constructed employing best practice in safety and efficiency.

In-situ reinforced concrete will be used to form foundations. In the parts of the site where the ground levels are raised, or where the bearing strata does not have the required geotechnical properties, foundations will be piled. In-situ reinforced concrete will be used to form ground bearing floor slabs, upper floor suspended slabs and earth retaining structures.

Soil nailing or rock anchors may be used for some earth retaining structures, where the rock is suitable. Underground tanks, chambers and process areas will be constructed of in-situ concrete and will be designed as water retaining structures to the relevant codes. Where required these structures will be double contained, using a high-density polyethylene or polypropylene liner.

It is likely that all concrete will be brought to site ready-mixed in trucks. The concrete may be placed directly from the trucks, or it may be pumped or be placed by skips hoisted by a crane.

It is envisaged that some of the minor structural elements (e.g. non-load bearing walls) may be constructed in concrete block work.

The superstructures for the buildings will be constructed in structural steel. Steel members will be fabricated off site, in lengths that are safe to transport, and erected on site. Structural steel will also be used to support the process equipment and to provide access platforms.

The buildings will be clad in profiled metal cladding and the roofing will consist of profiled metal cladding or a membrane type system on and metal deck. Depending on the function of the buildings, the cladding and roof will be insulated.

Cranes will be a significant element of the construction plant and it is envisaged that various crane systems will be used for lifting materials in to place.

## 5.5 Material Imports and Export and Transportation

### 5.5.1 Material Imports and Transportation

The construction of the proposed development will require considerable movements of materials to and from the site. The selection and specification of construction materials will be informed by local availability of these materials. Materials will be sourced locally where possible. Within the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers, where possible. Construction materials will be transported from the suppliers via the national primary route network as far as Ringaskiddy village and will use the L2545 from the Village to the site. Refer to **Chapter 7 Roads and Traffic** of this EIAR for an assessment of the impact of construction traffic.

Almost 30,261m<sup>3</sup> of engineering fill and crushed stone will be imported onto the site. Of the 30,261m<sup>3</sup> of imported engineering fill and crushed stone required for the construction works, approximately 1,100m<sup>3</sup> consists of shingle required for the coastal protection works, approximately 4,796m<sup>3</sup> will be required for the road upgrade and approximately 24,365m<sup>3</sup> of engineering fill required for the site (over the eastern and western fields).

Materials required from quarries will only be sourced from quarries which are listed on the register maintained by the local authority. The environmental effects associated with the registered quarry have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended.

All traffic movements associated with the import of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 Roads and Traffic** of this EIAR for an assessment of the impact of construction traffic.

It is envisaged that replenishment of the shingle for the coastal protection works may be required every two to five years, but it depends on the duration of the material remaining on site. The effects described for the initial instalment of shingle will be repeated during replenishment. There are a number of sand and gravel quarries located in the glacio-fluvial gravel channel extending from west of Classes, to the west of Cork City, to east of Midleton. Material from any of the gravel quarries will be a suitable source for the beach sacrificial material.

In the context of capacity of the market in Ireland for construction materials, the requirements of the construction phase will not be significant.

### 5.5.2 Material Exports and Transportation

The construction of the proposed development will require considerable movements of materials to and from the site. Most of the materials leaving the site will consist of soil and stones from the excavation works.

Where possible, excavated materials will be reused on site for backfilling purposes, re-grading and landscaping. However, it is expected some of the excavated material may not be suitable for reuse on site. Any excavated materials suitable for re-use may deteriorate due to poor materials handling, storage, and exposure to adverse weather conditions. In particular, where materials consist of high fines content and wet weather is experienced during the excavation activities, such materials may become unusable.

It is estimated that up to 74,664m<sup>3</sup> of surplus material will be removed from the site (including material from the road upgrade works). The clean and inert surplus excavated material, which is integral to the construction phase, may be reused as a by-product on other sites subject to Article 27 under the Waste Directive Regulations 2011 and notification to the EPA.

Where a re-use for the material cannot be found, the material may be sent to suitably permitted waste facilities or licensed soil recovery facilities in accordance with relevant waste legislation or disposed at suitable authorised waste facilities. The environmental effects associated with the suitably permitted waste facilities or licensed soil recovery facilities or authorised waste facilities will have already been assessed by the relevant consenting authorities. The impact of the traffic movements on the surrounding road network has been assessed in the construction traffic impact assessment in **Chapter 7 Traffic** of this EIAR.

It is unlikely that any contaminated material will be encountered (refer to **Section 13.3.2.2** and **Appendix 13.2**) however if it is, it will be disposed of to a suitable authorised waste facility, subject to the appropriate waste acceptance criteria at the receiving facility and in accordance with relevant waste legislation.

**Section 15.5.2.9 of Chapter 15 Material Assets**, describes the surplus material management options (re-use, recovery, disposal) and outlines the criteria that the material must meet in order to be disposed of at such facilities.

All traffic movements associated with the export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7, Roads and Traffic** of this EIAR for further details.

## 5.6 Services and Utilities Requirements for Construction

### 5.6.1 Electricity

It is anticipated that the construction work will require a peak load of 300kVA. In liaison with the ESB Networks, a temporary transformer served from local supplies will be installed to provide part of this requirement. The remainder of the power required will be supplied by the use of on-site diesel generators.

### 5.6.2 Water Supply

The construction activities that will require water during the construction phase will be relatively small. The initial estimate of demand is approximately 10m<sup>3</sup> per day, primarily based on the demand requirement for the construction workers and the associated support facilities. In agreement with Irish Water, water will be sourced from the existing water main located in the L2545 road to the north of the site where there is ample supply to meet this demand.

### 5.6.3 Storm Water and Foul Water Disposal

A dedicated holding tank for storage of construction foul effluent will be constructed prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licenced facility.

Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater.

## 5.7 Employment and Welfare

Through the construction phase there will be some variation in the numbers working on site. It is anticipated that a maximum of 320 construction workers will be employed on site at any one time with around 250 workers working a daytime shift and 70 working a night shift.

Temporary office accommodation and other construction facilities will be installed on site for the construction phase. All temporary units will be of a high standard in accordance with statutory regulations, as a minimum.

The co-ordination of people and materials on-site will be one of the key activities throughout the construction phases. The construction traffic management plan will designate traffic routes, timings and parking arrangements.

The site start time will ensure that construction workers arrive in the Ringaskiddy area prior to the morning peak hour for traffic on the local network. No construction vehicles will arrive or depart the proposed development site during the morning and evening peak periods (07:00-09:00 and 16:00-18:00) during the construction phase. Typical working hours during the construction phase will be:

Start	Finish	
0600	2000	Monday – Friday
0700	1300	Saturday

It will be necessary to work overtime (including at weekends) and night shifts at certain critical stages during the project. Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours. Over the 31-month construction phase there will be up to eight weeks of night time working. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled. Refer to **Chapter 7 Roads and Traffic** of this EIAR for further details on construction traffic.

## 5.8 Commissioning Phase

Following completion of construction and installation of equipment, and before operation of the facility commences, there will be a testing and commissioning phase. This phase will comprise:

- Installation compliance checks;
- Commissioning tests;
- Performance demonstration tests.

### 5.8.1 Installation Compliance Checks

This will be a process of systematically checking that all systems and equipment have been constructed, assembled, aligned and installed correctly, in accordance with the design specifications and drawings, and that all interconnecting pipe work, cabling and wiring has been installed in compliance with the design specifications and drawings.

### 5.8.2 Commissioning Tests

The function of each item of equipment and each system will be tested and verified, in a systematic manner, as being in accordance with the design and specifications. All the alarm and control systems and instrumentation will be tested to demonstrate that they are functioning correctly. Following these tests, each system will be checked to ensure that it is ready to be commissioned under operating conditions including using real materials, temperatures, pressures and voltages.

### 5.8.3 Performance Demonstration Tests

The facility's safety and fire prevention systems and the emission monitoring systems will be subject to the same rigorous testing protocols as the other systems in the plant.

In this commissioning phase, the individual items of equipment and systems will be tested under operating conditions using the materials, temperatures, pressures and voltages to which they will be subjected when in operation. Once the operation of all equipment and systems have been tested and verified individually, they will be integrated, and the operation of complete systems will be tested.

### 5.8.4 Incineration Plant Test Programme

It is likely to be a requirement of the industrial emissions licence that a test programme is undertaken to demonstrate the performance of the waste-to-energy facility, including operations, control and abatement systems, emissions, monitoring equipment and back-up systems. The test programme must be completed, and a report submitted to the EPA before normal operations can commence.

## 5.9 Construction Site Decommissioning

On completion of construction, all construction facilities and equipment such as plant, materials, signage, contractors' offices and laydown areas, etc. will be removed from site. Some contractor facilities will remain until the end of the guarantee period of the incinerator due to guarantee obligations of the contractors.

## 5.10 Potential Construction Effects

### 5.10.1 General

Every reasonable effort will be made to ensure that any damaging environmental effects will be minimised during the construction phase of the proposed development. The construction planning will be geared towards keeping disruption and nuisance to a minimum.

Environmental effects during construction will be mitigated or reduced where possible (refer to the individual chapters in this EIAR for specific mitigation measures).

In this regard, prior to the commencing any works on site, the CEMP included in **Appendix 5.1** of this EIAR will be finalised by the main contractor. Adherence to this plan will be a contract requirement and this will ensure good working practices are followed so as to minimise and manage any environmental effects arising from construction.

Potential construction phase effects are addressed in other chapters of this EIAR. For example, the construction phase effects on air quality, climate and noise and vibration are evaluated in **Chapters 8 Air Quality, 9 Climate and 10 Noise and Vibration** of this EIAR respectively. Construction traffic is addressed in **Chapter 7 Roads and Traffic** of this EIAR. There is an evaluation of the construction effects on flora and fauna in **Chapter 12 Biodiversity** of this EIAR. The construction impact on the archaeological, architectural and cultural heritage is addressed in **Chapter 14, Archaeological, Architectural & Cultural Heritage** of this EIAR. Visual effects and lighting effects during construction are detailed in **Chapter 11 Landscape and Visual** of this EIAR. Potential construction phase effects on Soils, Geology, Hydrogeology and Coastal Recession are addressed in **Chapter 13 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession** of this EIAR.

The potential cumulative effects arising during the construction phase are also addressed in **Chapters 7 Roads and Traffic, 8 Air Quality, 9 Climate, 10 Noise and Vibration, 11 Landscape and Visual, 12 Biodiversity, 13 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession, 14 Archaeological, Architectural and Cultural Heritage, 15 Material Assets, and 17 Cumulative Effects, Other Effects and Interactions** of this EIAR.

Specific construction phase mitigation measures are described in the individual chapters and general mitigation measures are described below.

### 5.10.2 Do Nothing Effects

If the proposed development did not go ahead, it is likely that the lands would remain the same or would be developed by some other developer for another industrial purpose. The road drainage would not be upgraded, and the road levels would not be raised. Consequently, the road would continue to flood following heavy rain and the road would be vulnerable to tidal flooding, particularly following a rise in sea levels due to climate change.

### 5.10.3 Predicted Effects of Decommissioning Phase

Decommissioning of the site will comprise two distinct phases, namely decommissioning (de-stocking, cleaning and equipment removal) followed by demolition of the existing buildings and structures on the site.

Phase 1 activities will include:

- Cancellation of waste deliveries to the site,
- Incineration of all waste in stock on site followed by cessation of the incineration process,
- Removal off-site of all raw materials, other process materials and residues,
- Decontamination, using chemicals and or power washing, and decommissioning of all plant and equipment,
- Removal of sludge from tanks and interceptors,
- Cleaning of all remaining equipment, pipelines etc. and buildings,
- Removal of specialist equipment, spare parts, and storage tanks from site, and

- Retention of buildings, roads, hard-standings and site fencing.

The site surface water drainage system, site fire safety systems and security systems will remain in place until the decontamination and decommissioning activities have been substantially completed. This will ensure that the decontamination and decommissioning activities will not give rise to a significant risk of environmental pollution.

Circa 9,870 tonnes of materials and wash waters will be removed from site during the decontamination phase. This represents 494 No. truckloads of material to be removed from the site over a three month period of the decontamination phase, which is an average of approximately 8 trucks a day. All of these de-stocking, decontamination and cleaning operations will be carried out in areas that were designed for the unloading, storage and handling of the raw materials and wastes that they contained. Hence the potential for any environmental effects during these operations will be minimised.

Phase 2 activities will include:

- Electrical isolation of all power systems;
- Removal of power and signal cables;
- Recovery of any remaining internal plant and equipment;
- Main process building and equipment demolition;
- Ancillary building demolitions;
- Recovery and disposal of residual materials from the site.

The same mitigation measures as outlined for the construction phase designed to control noise, dust, traffic and surface water run-off will be implemented for the demolition phase to ensure that the impact on the local community is kept to a minimum during this phase.

Circa 50,000 tonnes of concrete, blockwork, paving, cladding and other building materials will be removed from site during the demolition phase. This represents 2,364 No. truckloads of material to be removed from the site over a five month period. At the peak of activity during this 5 month phase, approximately 29 trucks a day will be used to transport these materials off site.

Environmental monitoring will be undertaken for the entire duration of the decommissioning period to ensure that any potential environmental effects from the Phase 1 and Phase 2 decommissioning activities are minimised.

Both phases of decommissioning activities are expected to take six to nine months. Environmental monitoring, testing, validation and reporting will be undertaken for a further six to twelve months. Key Indaver staff will also be retained on site during this period including site security staff, until all of the decommissioning activities and environmental reporting have been completed.

There will be up to 30 staff and contractors' personnel on site during the six to nine months period but the average number on site will be less than this. The decommissioning activities will be undertaken within the hours of 08.00 to 18.00 from Monday to Friday.

The decommissioning activities will involve substantially fewer site activities, a substantially smaller workforce and consequently, substantially less truck and car traffic than the construction phase. Consequently, it is expected that the decommissioning will not have a significant impact on the environment or the nearest residential receptors.

The decommissioning activities are also outlined in **Section 4.18 of Chapter 4 *Description of the Proposed Development*** of this EIAR.

## 5.11 Construction Mitigation Measures

### 5.11.1 General

Every effort will be made to ensure that any detrimental environmental effects will be avoided, prevented or reduced during the construction phase of this project. Specific construction phase mitigation measures are described in the individual chapters and general mitigation measures are described below.

A construction environmental management plan (CEMP) has been prepared prior to construction commencing (Refer to **Appendix 5.1**). The CEMP will comprise all of the construction mitigation measures, which are set out in this EIAR, and any additional measures which are required by the conditions attached to the 2018 ABP decision and the future EPA decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, *Environmental Good Practice on Site Guide, 4<sup>th</sup> Edition* (CIRIA 2015).

The CEMP summarises the overall environmental management strategy that will be adopted and implemented during the construction phase of the proposed development. The purpose of the CEMP is to demonstrate how the proposed construction works can be delivered in a logical, sensible and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP sets out the mechanism by which environmental protection is to be achieved during the construction phase of the proposed development. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment (EIA) Report and Natura Impact Statement (NIS), having regard to consultations with a range of specialists and environmental organisations, in particular, the National Parks and Wildlife Service (NPWS). The CEMP supports the information already provided in this EIAR and must be read in conjunction with the information already provided in this EIAR.

### 5.11.2 Debris

The following are some of the measures that will be taken to ensure that the site and surroundings are maintained to a high standard of cleanliness:

- Daily inspections will be undertaken to monitor tidiness.

- A regular program of site tidying will be established to ensure a safe and orderly site.
- If necessary, scaffolding will have debris netting attached to prevent materials and equipment being scattered by the wind.
- Food waste will be strictly controlled on all parts of the site.
- Wheel wash facilities will be provided for vehicles exiting the project site. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility.
- In the unlikely event that mud is carried from the project site to the public road, it will be cleaned as required and will not be allowed to accumulate.
- Loaded lorries and skips will be covered if required.
- Surrounding roads used by trucks for access to and egress from the site will be inspected regularly and cleaned, using an approved mechanical road sweeper, when required.
- In the event of any fugitive solid waste escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the normal manner.

### 5.11.3 Existing Services

The existing services running in and adjacent to the site and the road will be carefully located, identified and suitable working methods will be employed to ensure that these services are protected. Diversion or relocation of services will be undertaken in consultation with the owners of the services and will be undertaken in accordance with the relevant standards and codes of practice. Some protection measures such as cover slabs may be used for the services which will be left in place. Pipeline protection slabs will be used for works carried out in the vicinity of the gas transmission line, once it has been diverted. The section of the 450mm water main, which is located in the part of the road where the level is to be raised, will be replaced. This work will be undertaken in consultation with Cork County Council, which is acting as an agent for Irish Water.

Service users will be notified in advance of any temporary disruption or outages necessitated by the construction works. The disruption to services or outages will be carefully planned so the duration is minimised.

### 5.11.4 Invasive Non-native Plant Species Japanese Knotweed

Japanese knotweed is a highly invasive, non-native species which can out-compete native plant species and which can penetrate through small faults in tarmac and concrete and thus can damage roads, footpaths and structures.

At present, there are no specific legislative provisions that directly govern Japanese knotweed control or removal in Ireland.

Ecological surveys recorded a small stand of Japanese knotweed along the western boundary of the site and also outside the site's north-western boundary. Refer to **Figure 12.3** for details of where these stands are present at the site boundary and in the lands beyond the site boundary. This figure has been updated with the details of site visits and surveys completed since the 2016 EIS was prepared. The site layout of the proposed development has been designed not to directly impact on the stand of Japanese knotweed.

Since the completion of the EIS in 2016, Indaver have engaged a specialist company to actively monitor and treat these stands of Knotweed at the boundary to prevent any spread onto the Indaver site. Monitoring and treatment of the stands has been ongoing since 2017.

As part of the ongoing management of the infestation at the Indaver site boundary, the site was resurveyed in May of 2019 and treatment (spraying of plants where accessible from the Indaver site) will continue in the late summer/early autumn of 2019. The monitoring and treatment will continue up to the start of construction on site and thereafter until construction is complete as outlined in the CEMP in **Appendix 5.1** to this EIAR under **Section 8**.

There is also the potential for Japanese knotweed to be inadvertently brought onsite in imported fill or on the wheels/tracks of construction vehicles. The supplier of fill will be required to provide a guarantee that the fill to be imported does not contain Knotweed. In addition, the fill will be inspected for signs of knotweed, prior to importation to site. The inspection of topsoil brought into the site, will be carried out according to the Standard, BS3882:2015 *Specification for Topsoil*.

The contractor will be required to inspect vehicles before using them on site and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed.

The implementation of the above measures will minimise the risk of Knotweed being spread within the site or outside the site during the construction phase of the proposed development.

## 5.12 Construction Traffic

The impact of the generated traffic on the local road network during the construction of the proposed development is evaluated in **Chapter 7 Roads and Traffic** of this EIAR, and mitigation measures are proposed where necessary.

The appointed contractor will be required to develop a Construction Stage Traffic Management Plan in advance of commencing the works on site. This is a requirement of the planning permission (specified in Condition 7, parts (d), (e) and (f)) granted by An Bord Pleanála (ref 04.PL0045). The contents of the plan are outlined in section 10.3 of the CEMP attached as **Appendix 5.1** to this EIAR. The plan will be implemented at the commencement of the works. The plan will need to implement all relevant mitigation measures identified in this EIAR, together with any additional requirements imposed by conditions attached by the 2018 An Bord Pleanála decision to grant permission and the EPA decision. For example, the Construction Stage Traffic Management Plan will confirm the indicative traffic routes to the site which have been identified in the application documentation.

Points of access and egress for the site will be confirmed and management measures identified in the application documentation will be agreed with Cork County Council.

In order to ensure compliance by contractors and suppliers, the requirements of the EIAR, and all additional requirements imposed by conditions attached by An Bord Pleanála will be included in all contract tender documents and will be discussed in detail prior to awarding a contract. All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 Roads and Traffic**, for further details.

The plan will be regularly reviewed and updated to take into account the changing patterns of both the existing traffic and the construction traffic, following consultation with Cork County Council. The routing of any exceptional loads will require liaison with Cork County Council and the Garda Síochána.

During the road upgrade works and the coastal protection works, the traffic management plan will ensure that disruption to local traffic will be minimised.

The implementation of this plan will be monitored by the Indaver Site Management team during the course of the project and will also be reviewed at the main site meetings.

### 5.13 Construction Health and Safety

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2013 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the *Safety, Health and Welfare at Work (Construction) Regulations 2013*, a Health and Safety Plan will be prepared which will address health and safety issues from the design stages through to the completion of the construction and maintenance phases. This plan will be reviewed as the development progresses. The contents of the Health and Safety Plan will comply with the requirements of the Regulations.

In accordance with the Regulations, a “Project Supervisor Design Process” (PSDP) was appointed for the initial design phase associated with the planning application. The file from this process will be passed to a newly-appointed PSDP once a preferred bidder has been selected to construct the facility. A “Project Supervisor Construction Stage” will also be appointed prior to the start of construction on site.

The Project Supervisor Construction Stage (PSCS) will assemble the Safety File as the project progresses. The safety file will be incorporated into the overall technical record system at the end of project.

Safety on site will be of paramount importance. During the selection of the contractors and subcontractors, their safety records will be investigated. Only contractors with high safety standards will be selected.

Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site.

Safety briefings will be held regularly and prior to any onerous or special task. 'Toolbox talks' will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times.

At any time that a potentially unsafe practice is observed, the PSCS, Construction Manager or a member of the Indaver contract management team will have the right as well as the responsibility to halt the work in question, until a safe system of working is again put in place.

There will be an Indaver contract management team (comprising Indaver staff) on site for the duration of the construction phase. The team will supervise the construction of the works including monitoring the contractor's and the PSCS's performance to ensure that the proposed construction phase mitigation measures are implemented, and that construction effects and nuisance are minimised.

Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures. Tanks and drums of potentially polluting materials will be stored in secure containers or compounds which will be locked when not in use. Secure valves will be provided on oil and fuel storage facilities. Equipment and vehicles will be locked, have keys removed and be stored in secure compounds.

The contractor will maintain an incident and emergency response action plan which will cover all foreseeable risks, i.e. fire, flood, collapse etc. An Incident Response Plan (IRP) is located in **Section 9** of the CEMP in **Appendix 5.1**.

The objective of this IRP is to:

- Ensure the health and safety of workers and visitors along the site.
- Minimise any effects to the environment and ensure protection of the water quality and the aquatic species dependent on it.
- Minimise any effects on properties, services etc.
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment.

The primary function of the sites security team will be to ensure that no unauthorised entry to site occurs. There will be fencing around the sites to minimise the risk of vandalism and unauthorised access. This process will be made easier by all operatives possessing an ID card. ID Cards will only be issued to operatives that have attended the relevant site safety induction.

## 5.14 Residual Effects

It is anticipated that, with proper management, the construction phase of the development will not have significant long-term negative effects.

The residual construction effects of the construction phase are addressed in **Chapters 7 Roads and Traffic, 8 Air Quality, 9 Climate, 10 Noise and Vibration, 11 Landscape and Visual, 12 Biodiversity, 13 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession, 15 Material Assets, 14 Archaeological, Architectural and Cultural Heritage** and **17 Cumulative Effects, Other Effects and Interactions** of this EIAR.

The residual effects will last for the duration of the construction phase only and will include:

- temporary closure of access the area of Gobby Beach where coastal protection works will take place and a section of the car park for the three week duration of the placing of material on the beach. However, access to the rest of the beach will be maintained for the duration of the works
- disruption to road users and use of the temporary road for the twelve week duration of the road upgrade works. During the twelve week period, the car park may be temporarily closed for up to six weeks however access to the beach will be maintained for the duration of the works,
- additional noise from the site for the duration of the construction phase,
- additional traffic on the road network for the duration of the construction phase, and
- very short-term disruption and outages to services as new connections are made and/or services are relocated.

The long-term residual effects will include:

- disposal of surplus excavated material from the site to a permitted site (where a re-use for the material cannot be found, refer to **Section 5.5**),
- consumption of fuel, natural resources and construction materials such as steel, concrete and imported fill.

## 5.15 References

British Standard BS 5228 – 1 (2009 +A1 2014) (*Code of practice for noise and vibration control on construction and open sites – Noise*).

British Standard BS3882 (2015) *Specification for Topsoil*.

Construction Industry Research and Information Association, (2015) *Environmental Good Practice on Site*, CIRIA, London.

Construction Industry Research and Information Association, (2001) *Control of Water Pollution from Construction Sites, guidance for consultants and contractors*, CIRIA, London.

Department of Transport (2010) – Traffic Signs Manual

Kelly, J., Maguire, C.M. and Cosgrove, P.J. (2008) *Best Practice Management Guidelines Japanese knotweed Fallopia japonica*, Prepared for NIEA and NPWS as part of Invasive Species Ireland.

Murnane E., Heap A., Swain A. (2006) *Control of Water Pollution from Linear Construction Projects CIRIA*, London.

National Construction and Demolition Waste Council (2006), *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects*, NCDWC, Dublin.

National Roads Authority (2014) *Good Practice Guideline for the Treatment of Noise during the planning of National Road Schemes*, NRA, Dublin.

National Roads Authority (2008) *Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*, NRA, Dublin.

Safety, Health and Welfare at Work (Construction) Regulations 2013