16 Material Assets

16.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers and assesses the likely significant impacts with regards to material assets associated with both the construction phase and operational phase of the proposed development. Measures to mitigate any likely significant adverse impacts of the proposed development on material assets are proposed within this chapter. Residual effects are also described.

The proposed development is described fully in **Chapter 4** ***Description of the Proposed Development***.

16.2 Assessment Methodology

16.2.1 General

Material assets are now defined in the Draft EPA Advice notes on current practice in the preparation of Environmental Impact Assessment Reports (EPA 2017) as *'built services and infrastructure'*: Refer to Section 3, page 32 of the EPA guidelines which state:

"The meaning of this factor is less clear than others. In Directive 2011/92/EU it included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils".

According to the EPA guidelines, the three main areas to focus on under the heading of material assets are:

- Built Services and infrastructure (including electricity, telecommunications, gas, water supply infrastructure and sewerage);
- Roads and Traffic;
- Waste Management.

Built services and infrastructure and waste management are addressed in this chapter.

New guidance on Materials and Waste in Environmental Impact Assessment by the Institute of Environmental Management & Assessment (IEMA) in the UK, dated from March 2020 has also been consulted in the preparation of this chapter.

The aim of this guidance document is to provide a framework for the identification, assessment and determination of the significance of effects associated with material assets in project development.

Where relevant, effects on particular material assets such as the road network and construction waste disposal facilities are considered in detail elsewhere in this EIAR.

Refer to **Chapter 7** ***Traffic & Transportation*** and **Chapter 5** ***Construction Activities*** respectively for further assessment of the impact of the proposed development on these assets.

Refer also to **Chapter 4** ***Description of the Proposed Development*** of this EIAR for a detailed description of the proposed design in relation to material assets.

The use of natural resources in the context of material assets (water supply, energy and materials) is addressed in this chapter. Projections of resource use were made, for both the construction and operational phases of the development, and the impact assessed. The use of natural resources in the context of other environmental factors such as Land and Soils and Hydrogeology (Chapter 14), Water (Chapter 15) and Biodiversity (Chapter 11) are addressed elsewhere in this EIAR. There are no quarries or mineral resources within the site boundary (Refer to **Chapter 14** ***Land and Soils*** of this EIAR for further details).

"Land Take" is also addressed in this chapter. Land take is defined in the EPA Draft Guidance (2017) as "removal of productive land from potential agriculture or other beneficial uses". "Land zoning" is primarily addressed in **Chapter 2** ***Policy & Planning Framework and Need for the Scheme*** but is also touched upon in this chapter. The effects of the proposed development on land in the context of *"landscape and visual"* are addressed in **Chapter 13** ***Landscape and Visual***. The use of natural resources in the context of land use and land take is also addressed in this chapter.

The assessment of cultural heritage is presented in **Chapter 12**, ***Archaeological, Architectural and Cultural Heritage***.

A desk study was carried out on the existing material assets associated with the site of the proposed development.

16.2.2 Guidance and Legislation

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

- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;
- Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Department of Housing, Planning, Community and Local Government (2017) Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems;

- Department of Housing, Planning, Community and Local Government (2017) Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition;
- Department of Housing, Planning and Local Government (2018) Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;
- Environmental Protection Agency (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017);
- European Commission (2012) Interpretation suggested by the Commission as regards the application of the EIA Directive to ancillary/associated works;
- European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- IEMA (2020) guide to: Materials and Waste in Environmental Impact Assessment; and
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003).

16.3 Receiving Environment

16.3.1 Land

16.3.1.1 Introduction

As described previously, “Land Take” is addressed in this chapter. Land take is defined in the EPA Draft Guidance (2017) as “removal of productive land from potential agriculture or other beneficial uses”. *“Land zoning”* is primarily addressed in **Chapter 2** ***Policy and Planning Framework and Need for the Scheme*** but is also touched upon in this chapter. The effects of the proposed development on land in the context of *“landscape and visual”* are addressed in **Chapter 13** ***Landscape and Visual***. The use of natural resources in the context of land use and land take is also addressed in this chapter.

16.3.1.2 Site Location

The existing Waste to Energy facility is located in Carranstown, Duleek, Co. Meath. Refer to **Figures 1.1** to **1.3**. The site is owned by Indaver. The facility is located 1.8km west of the M1, bounded to the south by the R152 regional road and surrounded by greenfield on all other sides.

Irish Cement is to the immediate north of the site and the rest of the surrounding land is used for industrial, agricultural and residential purposes. The village of Duleek is located approximately 2.7km south west of the site.

16.3.1.3 Land Use, Land Take and Zoning

The site of the existing facility is approximately 10 hectares and is all within Indaver ownership. Generally, the underlying topography of the facility site is a relatively even gradient, from a high point in excess of 39.0mOHD. at the eastern corner to a low point of just under 30.0mOD. adjacent to the western corner. The existing buildings largely occupy the lower parts of the facility site and the existing developed parts of the site represent approximately 3.5 hectares.

The facility is bounded by low hedgerows featuring occasional mature tree specimens. This reflects the general agricultural landscape around the facility site.

Whilst the site is located outside of any designated zoned lands in the Meath County Development Plan, it is however located in an area that has been subject to a number of decisions to permit the clustering of large-scale industrial activities including the existing Platin cement works in the area (Ref. PL17.PC0221) which includes an electricity substation and an existing limestone quarry (Ref.17.243795).

16.3.1.4 Wayleaves

There are three wayleaves in existence on the site. The first relates to the 70 bar natural gas transmission line which runs underground an traverses the site from the eastern corner of the site to the western side.

The second relates to the underground 10 kV powerline running from south-east part of the site down the southern site boundary before it follows the western site boundary all the way up to the northern boundary of the site. This line originally provided power for the construction phase in 2009 but is no longer connected to the site.

The third relates to the underground 38kV line which runs from the import/export compound on the site along the northern boundary of the site. These wayleaves are indicated on the existing site layout drawing **29043-CD-002** in **Appendix 5.2** of **Volume 3** and on **Figure 4.1**.

16.3.2 Built Services and Infrastructure

16.3.2.1 Road Infrastructure Access & Traffic

The R152 which serves the Indaver site is a single-carriageway road with a typical road width of 7m. At the Indaver site entrance, the route widens to approximately 10m to include a ghost island right-turning lane (approximately 100m long) and a deceleration lane (approximately 70m long) for traffic turning left into the site.

A speed limit of 80kph applies on the R152 in the vicinity of the site.

16.3.2.2 Drainage and Foul Water/Sewerage

The site is equipped with its own stormwater/surface water management system which controls and attenuates all surface water from all roofs and hardstanding areas on site. The attenuated run-off is discharged at a controlled rate to a local drainage ditch.

There is no process effluent from the facility with any wash waters or process effluent re-used in the process.

Foul water is collected in a domestic type effluent collection system and passed through a septic tank and secondary treatment system (Puraflo) before being discharged to the percolation area. The wastewater treatment area is located on the northern boundary of the site. A second smaller effluent collection and discharge system is provided at the gatehouse building.

Full details can be found in **Sections 4.3.2** and **4.3.4** of **Chapter 4** ***Description of the Proposed Development***.

16.3.2.3 Power/Electricity

In addition to the 38kV underground line serving the site for the import and export of electricity and referred to above in **Section 16.3.1.4** on wayleaves, there are 110kV overhead power lines that traverse the site. An exclusion zone underneath these lines has been maintained since the construction of the existing facility on site.

16.3.2.4 Water Supply

The site is connected to the public water main for domestic use only. The remainder of the water supplied for the process and firefighting is supplied from two groundwater wells. The existing water usage on site is approximately 9m^3/hr.

16.3.2.5 Gas Supply

In addition to the 70bar natural gas transmission main referred to above in **Section 16.3.1.4** on wayleaves, there is also a 4bar distribution main in the R152 Regional road. This serves domestic users along the R152 and the village of Duleek itself.

Neither gas line is supplying gas to the site for use.

16.3.2.6 Underground Services along the R152 Regional road

In addition to the 4 bar natural gas distribution main mentioned in **Section 16.3.2.5** above, the following services are also present:

- Public watermain 100mm diameter.
- 300 mm diameter storm water drain.
- Eircom/telecommunications lines (located on the eastern side of the R152 carriageway).

- Low voltage power in underground ducting (fed from the Indaver site) for street lighting along the footpath on the R152.

16.4 Characteristics of the Proposed Development

The characteristics of the proposed development in relation to material assets are as follows:

- Only lands within Indaver ownership will be required for the proposed development.
- No service diversions will be required in order to facilitate the development.
- The hydrogen generation unit proposed, will use 10MW of electricity (for approx. 1,000 hrs) that would otherwise be wasted to produce approximately 160 tonnes of hydrogen annually using water as a feedstock.
- Existing power and water supplies on site will be extended to the relevant elements of the proposed development in addition to an extension foul and surface water drainage system.
- Additional raw materials will be required as process inputs.
- Additional residues from waste processing will be generated during operation phase.
- There will be movement of materials on and off site during the construction phase.
- Utilisation of land for the construction and operation of the proposed development (land take).

16.5 Likely Significant Effects

This section describes the likely significant effects of the proposed development on material assets. Potential effects represent the worst-case scenario in the absence of mitigation.

16.5.1 'Do Nothing' Scenario

If the proposed development did not go ahead, the site would continue in its current use, processing up to 10,000 tonnes of hazardous waste and a total of 235,000 tonnes of waste annually. The potential to divert up to 15,000 tonnes of hazardous waste from export to thermal treatment within the state and up to 30,000 tonnes of additional hazardous residues for recovery would be lost.

The facility would continue to convert the thermal energy produced by the combustion of the waste into approximately 21 MW of electricity (MW_e), of which approximately 2.5 MW_e will be used by the plant itself, with the remainder, approximately 18.5 MW_e being exported to the local electrical distribution system.

However, the potential to generate a carbon-free fuel in the form of Hydrogen during periods of curtailment (approximately 1,000 hours per annum) from otherwise wasted heat and electricity would be lost.

Existing services would remain the same as current baseline in the do-nothing scenario.

16.5.2 Construction Phase

16.5.2.1 Land Use and Land Take

Land Use

The construction phase will have a slight negative effect on the lands required for the proposed development as it will no longer be available for grass or wildflower growth. This will be true also for the operational phase. When operational, an approximate area of 0.5 Ha of habitat will be lost. These areas however are not of high biodiversity value (Refer to **Section 11.7.3** of **Chapter 11** ***Biodiversity***) and the effect is not significant.

Given the current use of the site, it is not considered that the additional land use on site will result in a significant negative effect.

Land Take

As described previously, land take is defined in the EPA Draft Guidance (2017) as "removal of productive land from potential agriculture or other beneficial uses". The land required for the proposed development during construction (and operation) is within the existing operational site curtilage and fully within Indaver ownership.

Given the current use of the site and Indaver ownership of lands, it is not considered that the land-take will result in a significant negative effect.

There will also be no significant negative effects on adjacent land uses as a result of the proposed development.

16.5.2.2 Wayleaves

As discussed in **Section 16.3.1.4**, there are existing wayleaves on Indaver lands. The existing wayleaves for the 10kV and 38kV powerlines will remain during construction and therefore the effect will be neutral.

The existing wayleave on Indaver owned lands for the natural gas transmission pipeline will also remain during construction and therefore the effect will be neutral.

16.5.2.3 Road Infrastructure, Access and Traffic

Construction (and operational) traffic entering and leaving the Indaver site will use the R152 and M1. There will be sufficient capacity on the R152 for the

proposed development during the construction of the proposed development. Refer to **Chapter 7** ***Traffic & Transportation*** of this EIAR for further details.

16.5.2.4 Storm Water Drainage, Foul Water/Sewerage

Management of surface water and domestic effluent generated on site during the construction phase is described in **Chapter 5** ***Construction Activities***. Foul water generated on-site during construction will removed off-site by tanker by a licensed contractor to an approved licensed facility. Storm water/surface water collected from construction activities will be attenuated and de-silted prior to release. There will be no significant effect on the existing storm water or foul sewage system during construction.

16.5.2.5 Power/Electricity

Electricity Supply for the Site

It is anticipated that the construction phase of the proposed development will require a peak load of 120kVA. Some of this supply to meet this demand will come from the power generated on site and the remainder of the power required will be supplied by the use of on-site diesel generators. Therefore, there will be no significant effect on the local network.

Diversions

There are no diversions of any underground or overground power lines required to facilitate the proposed development.

16.5.2.6 Water Supply

Water for the construction phase will be provided via the existing water distribution network on site. No additional or temporary connection to the public watermain on the R152 is required.

16.5.2.7 Gas Supply

As detailed previously, an existing underground 70bar transmission gas main is located within the site.

The gas main is not currently supplying gas to the site and no connection to this main is required for the existing or the proposed development. Gas Networks Ireland (GNI) have been consulted in relation to the proposed development and have no objection to any of the elements proposed.

There is also an existing 4 bar gas distribution main on the R152. An application to connect to this gas main for the supply of Hydrogen has been made to GNI.

If granted, this connection will be provided by GNI via an above ground installation (AGI) at the south eastern border of the site adjacent to the R152.

16.5.2.8 Underground services along the R152

With the exception of the connection to the 4 bar natural gas distribution main described in **Section 16.5.2.7** above, there is no other interference with the existing services already described in **Section 16.3.2.6**.

16.5.2.9 Surplus Material

The import and export of material is described in **Section 5.5** of **Chapter 5** ***Construction Activities*** of this EIAR.

As discussed in **Section 5.5.2**, it is estimated that almost 31,000 m^3 of surplus material will be removed from the site.

Off-site disposal options for surplus clean and inert excavated material include:

- reuse as a by-product on other sites subject to Article 27, under the Waste Directive Regulations 2011;
- recovery at suitable waste permit facilities or licensed soil recovery facilities in accordance with relevant waste legislation; or
- disposal at suitable authorised waste facilities.

Therefore, the effect of exporting of surplus material off-site will depend on the disposal option or combination of options available to the contractor at the time. The reuse of surplus material on other sites (subject to Article 27) will likely have a slight, positive effect on material assets (waste resources) as it diverts surplus clean material from permitted waste facilities. Recovery and disposal of surplus material will likely have a slight negative effect on waste resources.

The environmental effects on these facilities in accepting material will have been addressed during the application process as discussed below. This will ensure that any material proposed to be re-used or accepted at a waste facility will not have a negative effect on the receiving environment of that site or waste facility.

The potential construction traffic effects associated with offsite re-use/recovery/disposal have been addressed in **Section 7.4.1** of **Chapter 7** ***Traffic & Transportation***.

Re-use as a By-Product (Article 27)

Under Article 5 of the Waste Framework Directive, transposed into Irish legislation under Article 27 of the European Communities (Waste Directive) Regulations 2011, uncontaminated excavated soil and other naturally occurring materials, may be used on sites other than the one from which they were excavated provided the soil and stone material meets the criteria to be considered a by-product. The EPA guidance document, Guidance on Soil and Stone By-products2 (June, 2019). There are four by-product conditions that must be met in order for the material to regarded as a by-product:

a) further use of the soil and stone is certain;

b) the soil and stone can be used directly without any further processing other than normal industrial practice;

c) the soil and stone is produced as an integral part of a production process; and

d) further use is lawful in that the soil and stone fulfil all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

In practice, the EPA[1] has outlined that:

"Prior to works (i.e. prior to commencement of the development), an economic operator (being either the material producer, or with the express written consent of the material producer) notifies the EPA of the by-product decision. A register of by-product notifications will be maintained and will be available for public inspection online to include details of origin and destination sites for soil and stone by-product.

Notifications should be accompanied by the full complement of necessary documentation to demonstrate compliance with the four by-product conditions."

At the construction stage of the proposed development, should further use of soil and stone be certain and all other criteria can be fulfilled, the appointed contractor will be responsible for notifying the EPA of the by-product decision.

Recovery

The Licensed soil recovery facilities are usually worked out quarries that are undergoing restoration. They may also be sites where relatively large volumes of soil are being imported to raise natural ground levels. In both cases the soil recovery facilities are licensed to accept only uncontaminated natural soil and stone.

Unlike landfills, soil recovery facilities are not required to have an engineered basal liner, nor are they required to install an engineered cap following completion of restoration or land raising. As such there are no engineering controls to protect groundwater from contamination that may be present in soil used as backfill at these facilities.

Soil recovery facilities, depending on the volumes of material accepted, are permitted under the Third Schedule of the Waste Management (Facility and Registration) Regulations 2001 (SI No. 821 of 2007) as amended, or are required to operate under a Waste Licence granted by the EPA under Part V of the Waste Management Act 1996, as amended.

Depending on the volumes of material recovered, the facility will operate under one of three permits:

- Certificate of Registration (<25,000 tonnes total waste accepted annually);

[1] Available at https://www.epa.ie/pubs/advice/waste/product/Guidance_on_Soil_and_Stone_By_Product.pdf

- Waste Permit (>25,000 to <100,000t total waste accepted annually); or a
- Waste Licence (>100,000t 000 tonnes total waste accepted annually).

For a waste facility (not operated by the local authority) to obtain a Certificate of Registration or a Waste Permit, the application must be made directly to the local authority for which that facility sits. For facilities that apply to operate under a Waste Licence, applications are made to the EPA.

All waste facilities are required to prepare an EIA under Annex II of the EIA Directive 2011 (2011/92/EU) as amended by the 2014 Directive (2014/52/EU):

"11 (b) Installations for the disposal of waste (projects not included in Annex I)"

The EIAR must accompany the waste permit application to the local authority for Certificate of Registration or a Waste Permit, or the EPA for a Waste Licence application.

Therefore, the environmental effects of accepting uncontaminated natural soil and stone will have been assessed. The EPA are in the process of preparing guidelines[2] for the waste acceptance criteria that incoming waste must meet before being accepted to the facility. This will ensure that only uncontaminated natural soil and stone will be accepted at the facility and protect the groundwater from contamination that may be present in soil used as backfill at these facilities.

Disposal

Under the scenario where material exported from site is unsuitable for re-use (under Article 27) or recovery, the disposal of material at a landfill may be a disposal option, subject to the material fulfilling certain criteria.

Landfills in Ireland operate under a Waste Licence issued by the EPA and must be constructed in accordance with strict technical requirements set out in the Council Directive 1999/31/EC on the landfill of waste.

As discussed above all waste facilities are required to prepare and submit an EIA, under Annex II of the EIA Directive 2011 (2011/92/EU) as amended by the 2014 Directive (2014/52/EU), to the EPA.

Under the Waste Licence, the EPA will set the type of waste that the landfill facility will be licensed to accept. The landfill will be licensed to accept either Inert, Non-hazardous or Hazardous waste. The criteria of these wastes are set out in Council Decision 2003/33/EC which establishes the criteria and procedures for the acceptance of waste at landfills (with regard to Article 16 of and Annex II to Directive 1999/31/EC). There are no landfills in Ireland licensed to accept hazardous waste material.

[2] EPA (2019) Update Note on the 'Waste Acceptance Criteria and Development of Soil Trigger Values for Soil Recovery Facilities' Guidance. Available at: https://www.epa.ie/pubs/consultation/soilrecoveryconsultation/Update%20on%20EPA%20Soil%20Waste%20Acceptance%20Criteria%20Guidance%20-%20Feb%202019.pdf

16.5.2.10 General Waste Management

Waste generated during the construction phase will be carefully managed under the Construction Waste Management Plan (CWMP) outlined in the Section 7 of the ***Construction Environmental Management Plan*** (CEMP), refer to **Appendix 5.1**, and in accordance with the accepted waste hierarchy which gives precedence to prevention, minimisation, reuse and recycling over disposal with energy recovery and finally disposal to landfill.

This hierarchy will be implemented by identifying opportunities to firstly prevent waste from being produced, and secondly minimise the amount of waste produced. Where prevention and minimisation will not be feasible, ways to reuse or recycle waste will be sought, preferably on-site to avoid the effects arising from transportation. If this is not feasible, opportunities to reuse or recycle the waste off-site will be investigated. If this is not feasible, then waste will be sent to an energy recovery facility, and only where there is no alternative, will waste be disposed of to landfill. To achieve this, existing waste management programmes and networks will be used such as the National Waste Prevention Programme, which is implemented by the Environmental Protection Agency.

Therefore, the management of general waste during construction will not have a significant effect on the waste resources.

Waste Arising

In general, construction waste materials may include general construction debris, scrap timber and steel, machinery oils and chemical cleaning solutions.

The practice of excessive purchase of materials and equipment to allow for anticipated wastage will be avoided.

As discussed above, surplus material will be generated during construction (Refer to **Section 5.5.2** of **Chapter 5** ***Construction Activities*** and in **Section 14.6.2** of **Chapter 14** ***Land and Soils*** of this EIAR).

In the unlikely event of any evidence of soil contamination being found during work on site, the appropriate remediation measures will be employed.

Any work of this nature would be carried out in consultation with, and with the approval of the Environmental Department of Meath County Council. The material would be transported to a permitted site via the national and regional road network.

16.5.2.11 Imported Materials

As discussed in **Section 5.5.1** of **Chapter 5** ***Construction Activities*** of this EIAR, almost 2,300m^3 of engineering fill and crushed stone will be imported onto 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.

In the context of capacity of the market in Ireland for construction materials, the requirements of the construction phase will not be significant. Therefore, the proposed development will not have a significant effect on the resources of construction materials for the construction of the proposed development.

16.5.3 Operational Phase

16.5.3.1 Land Use, Land Take and Zoning

The proposed development will be constructed on lands within the existing site boundary and is consistent with the existing land usage as outlined **Section 2.4.3.1** of **Chapter 2** ***Policy & Planning Framework and Need for the Scheme***.

The operation of the proposed development will not have a significant effect on land take. All operations will be on Indaver lands and will not require additional land.

The hydrogen gas connection pipeline to the natural gas grid from the Hydrogen Generation unit on site will be laid underground on Indaver lands to the above ground installation provided by GNI. The final connection to the natural gas distribution main in the R152 will be made by GNI. Significant negative effects from the grid connection on land use or land take will not arise.

16.5.3.2 Wayleaves

The existing wayleaves for the 38kV and 10kV powerlines as well as the 70 bar natural gas transmission line discussed in **Section 16.3.1.4** above will remain post construction when the site is in operation.

16.5.3.3 Road Infrastructure, Access and Traffic

During the operation of the proposed development, traffic entering and leaving the Indaver site will use the R152 and M1. There will be sufficient capacity on the existing R152 for the operation of the proposed development. Refer to **Chapter 7** ***Traffic & Transportation*** of this EIAR for further details.

16.5.3.4 Foul Water/Sewerage

As discussed in **Section 4.6.3** of **Chapter 4** ***Description of the Proposed Development***, untreated sanitary (foul) water will continue to be treated in on-site packaged treatment units. An additional treatment unit will be added to replace the holding tanks currently used for the foul effluent from the administration building and temporary portacabins in the contractors compound. A further unit will also be provided to take the effluent from the toilets that will be provided in the proposed new contractors compound (refer to drawing **29043-CD-016** in **Appendix 5.2** of **Volume 3** for details).

The new ERT/office building will tie into the existing treatment unit at the Northern boundary of the site. Therefore, the proposed development will not have a significant effect on the foul water resources on site.

16.5.3.5 Power/Electricity

The existing facility uses residual waste to generate electricity to replace non-renewable fossil fuels such as natural gas, coal and oil in the generation of electricity. The electricity produced by the waste-to-energy facility is enough to supply the power needs of approximately 30,000 households annually.

The increase in electrical demand to power the tank farm, bottom ash storage building, office accommodation and warehouse, workshop, ERT/office building will be small (200 kW_e approximately) when compared to the existing house load for the site of approximately 2.6 MW_e.

As discussed in **Section 4.5.4** of **Chapter 4** ***Description of the Proposed Development***, the hydrogen generation unit (HGU) will be utilised when the electricity produced by the facility is not required by the electricity grid. As outlined in **Section 9.4.2** of **Chapter 9** ***Climate Change***, this power is currently wasted and with the provision of the HGU, a useful and carbon free fuel in the form of Hydrogen gas can be produced.

Therefore, the proposed facility will have a significantly positive effect on material assets in terms of energy use, climate change and power generation.

16.5.3.6 Gas Supply

There will be no gas supply required for the operation of the proposed development.

16.5.3.7 Water Supply

As discussed in **Section 4.7.1** of **Chapter 4** ***Description of the Proposed Development***, the increased demand of approximately 3.5m^3 per hour for the proposed developments on site will be supplied from the existing groundwater abstraction wells on site. This is in addition to the current abstraction rate of approximately 9m^3/hr of water for the existing activities on site. **Table 16.1** below summarises this.

Table 16.1 Existing and Proposed Water Consumption

Water Usage	**m^3/hr**	**m^3/annum**
Existing Water Usage	8.88	71,398
Proposed HGU Usage	2.2	2,200
Pre-Treatment Plant Additional Capacity	1.1	9,000
Warehouse/Workshop/ERT/Office	0.2	1,629
Total Increase	3.5	12,829
Annual Max Usage	12.4	84,227

The majority of the increased water usage is associated with the HGU (2.2 m^3/h) and the treatment of an additional 30,000 tonnes per annum (1.1m^3/h) of flue gas treatment residues and boiler ash. The annualised effect of this increased water demand on the existing supply is an additional 18% per annum. As the water demand on the site is already at a low level, this increase is not considered significant.

Also, as discussed in **Section 14.3.2.5** of **Chapter 14** ***Land and Soils***, the current capacity of the two groundwater wells is approximately 600m^3 per day or 25m^3/h. The hourly demand will increase from 36% of the total production capacity of the wells to 50%. This demonstrates that the existing infrastructure on site has adequate capacity to provide water for the proposed development demand.

16.5.3.8 Other Raw Materials Usage

As outlined previously in **Section 4.5.2** of **Chapter 4** ***Description of the Proposed Development***, there will be a small increase in the use of other raw materials consumed in the waste to energy process. This has been estimated assuming that all of the additional waste to be treated in the waste to energy plant is solid waste which gives the most conservative estimate of this increase and is shown in **Table 16.2** below.

Table 16.2 Increased raw materials usage for waste to energy plant

Raw Material	Total Consumption 2019 Usage (tonnes)	Usage per tonne of waste input (kg/T)	Additional annual usage (based on 15,000 tonnes additional waste input)
Quicklime (CaO)	3,543	15.37	231
Dry Hydrated Lime ($Ca(OH)_2$)	1,352	5.86	88
Activated Clay+Carbon	318	1.38	21
Aqueous Ammonia	381	1.65	25
Fuel Oil	228	0.99	15

These increases are very small and the raw materials listed are not in short supply. In reality, the increases will be far less as the greater proportion of the 15,000 tonnes of additional hazardous waste processed will be contaminated water (aqueous waste). Hence, the impact of this increased raw materials usage is not considered significant

The HGU also requires potassium hydroxide as the electrolyte for the electrolysis of water to Hydrogen and Oxygen but this is not consumed in the process. The electrolyte may be topped up or changed out from time to time but this is not a regular occurrence. From the initial charge of approximately 100 tonnes of a 15 %

Potassium Hydroxide solution or Potassium Hydroxide pallets mixed with demineralised water of equivalent amount, usage thereafter is not considered significant.

16.5.3.9 Increased Residue Production

Based on the assumption outlined in **Section 16.5.3.8** above that all of the additional waste processed in the waste to energy plant is solid waste, and more re-agents are required for use in the flue gas treatment process, correspondingly the amount of residues produced should also increase. The calculated increases are set out in **Table 16.3** below and are based on the percentage per tonne of waste input figures for 2019 (refer also to **Tables 4.1** and **4.2** of **Chapter 4** ***Description of the Proposed Development***).

Table 16.3 Increase in residue production from waste to energy process

Residue/Re-agent	% per tonne waste input	Additional Tonnes per annum
Additional Bottom Ash	15.0%	2,250
Additional Boiler Ash	0.7%	105
Additional FGC Residues	4.0%	600
Ferrous Metals	1.2%	180
Non-Ferrous	0.2%	30

As a result of treating an additional 30,000 tonnes per annum of boiler ash, flue gas cleaning residues and similar residues accepted from third parties, 39,000 tonnes per annum of treated residues will be sent off-site for recovery.

16.5.3.10 Bottom Ash

As explained in **Section 4.1.1.1** of **Chapter 4** ***Description of the Proposed Development***, bottom ash is currently sent to three main landfill outlets for recovery as daily cover or as a road construction material on the landfill itself. This will continue for the additional bottom ash produced as a result of the proposed development.

It is the intention of Indaver to continue to identify potential uses for bottom ash. The reuse of this material would assist in Ireland's envisaged transition to a circular economy as laid down in stated European and national policy positions as all wastes including those that are unavoidable such as residues are regarded as being capable of being transformed into useful and valuable resources. Such reuse is also compatible with the principle of self-sufficiency as laid down in the Waste Framework Directive.

The manner in which this material may be treated and transported is dependent upon how this material is classified and characterised which may be hazardous or non-hazardous, and accordingly an assessment of each finding is outlined below. Commission Regulation (EU) No. 1357/2014 and Commission Decision

2014/955/EU is utilised to determine the manner in which bottom ash may be characterised as non-hazardous or hazardous. The bottom ash residues from the plant are currently characterised as non-hazardous.

Bottom Ash as Non-hazardous

Bottom ash from waste incineration in EU countries, including the UK, Netherlands and Belgium, is processed for use as an aggregate in construction of roads or other large-scale projects. This processed material is known as incinerator bottom ash aggregate (IBAA).

The Green Deal Programme agreed between the Dutch Waste Management Association and the Dutch government represents an example of such reuse and specifies that at least half of the bottom ash produced will be suitable for use as 'freely applicable building material' since 2017.

There are currently a number of proposed bottom ash recovery developments in Ireland including Beauparc, Co. Meath and Drehid, Co. Kildare. If these developments become operational in the future, then they would provide an alternative to the current options of sending this material to landfill for recovery or disposal and the export of the bottom ash for recovery.

Landfill Options in Ireland for Bottom Ash

Any landfills utilised for bottom ash for recovery or disposal must be suitably licensed by the Environmental Protection Agency (EPA) for recovery or disposal operations as laid down in Article 23 of the Waste Framework Directive.

In addition, all landfills are required to comply with the requirements of the EIA Directive and therefore were subject to the EIA process prior to the acceptance of any material including bottom ash. This Directive on Environmental Assessment aims to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the development of projects such as landfills with a view to reducing their environmental impact.

Similarly, the existing licensing process which all landfills in Ireland are subject to, requires compliance with an ongoing environmental monitoring regime in the form of stringent licence conditions. The issuing of such licences by competent authorities pursuant to the requirements laid down in the Waste Framework Directive stipulate that all necessary safety and precautionary measures, monitoring and control operations and closure and after-care provisions must be included in the granting of all such licences.

Such conditions set out the legal constraints under which landfills must operate in order to ensure that all operations are conducted in compliance with the requirements of the Waste Framework and Landfill Directives and do not cause environmental pollution.

Such conditions include those concerning:

- leachate management;

- groundwater and surface water management;
- landfill gas management;
- odour prevention and control, and
- nuisance monitoring.

This comprehensive monitoring regime will ensure that material such as bottom ash when sent to landfill for recovery or disposal will not have a material environmental impact.

Therefore, sending bottom ash to licensed landfills for recovery or disposal is not likely to have significant negative effects on the environment as stipulated by the requirements of the EIA Directive.

Available Landfill Options

Operational landfills, which would be suitable for the disposal or recovery of the additional bottom ash, include:

- Knockharley landfill, Co. Meath.
- Bord Na Mona landfill at Drehid, Co. Kildare.
- Ballynagran landfill, Co. Wicklow.

Knockharley landfill, in County Meath, operated by Knockharley Landfill Ltd, is licensed by the EPA, licence number W0146-02, to accept 88,000 tonnes per annum of non-hazardous waste into the void. The landfill currently accepts residues from the existing facility and has capacity to accept the additional bottom ash from the proposed development.

Knockharley landfill is located a short distance from the site on the N2 national primary route. The additional truck movements associated with the increase in bottom ash production have been modelled (refer to **Chapter 7** ***Traffic & Transportation***) and do not have a significant impact on the surrounding road network. The treatment of the bottom ash in Knockharley landfill is not likely to have a significant negative effect on the environment.

Drehid landfill, County Kildare, operated by Bord Na Móna Plc, is licensed by the EPA, licence number W0201-03, to accepted 120,000 tonnes per annum of non-hazardous waste. The landfill currently accepts residues from the existing facility and has capacity to accept the additional bottom ash from the proposed development.

The Drehid landfill is accessed from the M4 motorway via the R402 and the R403. Trucks carrying bottom ash to Drehid landfill would use the national road network, which has more than adequate capacity to accommodate the numbers of trucks. The disposal of the bottom ash in Drehid landfill is not likely have significant negative effect on the environment.

Ballynagran landfill is also used by the site currently but it is unclear as to whether this site will be available in the future for the additional quantities produced.

Export Options for Bottom Ash

In the alternative, bottom ash (including the additional bottom ash produced) may be exported to outlets in Europe which are already able to recover aggregates from bottom ash. To provide for this alternative, the bottom ash storage building has been proposed and is described in **Section 4.5.5** of **Chapter 4** ***Description of the Proposed Development***.

These outlets have also been subject to the requirements of the Waste Framework and EIA Directives and the EIA process of the relevant jurisdiction. As referred to above in the context of landfills, these outlets are also subject to a separate national licensing regime on an ongoing basis which is a constituent part of the European law framework as laid down in the Waste Framework Directive.

As the export of this material would involve movement to another EU country, the requirements of Regulation (EC) No 1013/2006 of 2006 on shipments of waste would also need to be adhered to.

Should this option be availed of, the bottom ash would be stored on site in the bottom ash storage building until there is enough for export in a bulk consignment. Covered trucks would bring the bottom ash from the site to Drogheda Port for loading into a vessel, typically over a two or three-day period in the same vehicles that would transport the material to a national treatment facility if it were available.

This scenario has been modelled in **Chapter 7** ***Traffic & Transportation*** and no significant effects are envisaged.

The export of bottom ash outside the Republic of Ireland has the potential for trans-boundary effects and these effects are discussed in more detail in **Section 18.5.2** of **Chapter 18** ***Cumulative Effects, Other Effects and Interactions***.

Bottom Ash Characterised as Hazardous

Should bottom ash be found to be a hazardous waste at some point in the future, the above treatment options are still suitable as they physical nature and composition of the bottom ash would not have changed. However, in this instance the facility accepting the waste would have to be licensed to accept this type of hazardous waste. Currently hazardous waste is exported from Ireland by ship for treatment in waste-to-energy facilities in Europe. The export of hazardous material outside the Republic of Ireland has the potential for trans-boundary effects and these effects are discussed in more detail in **Section 18.5.2** of **Chapter 18** ***Cumulative Effects, Other Effects and Interactions***.

16.5.3.11 Boiler Ash and Flue Gas Cleaning Residues

Circa 105 tonnes of additional boiler ash and 600 tonnes of additional flue gas cleaning residues will be produced annually from the waste-to-energy plant operations as part of the proposed development. Refer to **Table 16.3** above.

When pre-treated (after mixing with water) these residues will amount to a total of approximately 917 tonnes per annum. More significantly, an additional 39,000

tonnes per annum of pre-treated residues will be produced by the existing on-site pre-treatment facility as described in **Section 16.5.3.9** above.

It is expected that the 30,000 tonnes of boiler ash, flue gas cleaning residues and similar material from third party facilities that is accepted as part of the proposed development for pre-treatment will be similar in composition to the boiler ash and flue gas cleaning residues from the existing facility.

The total amount of additional pre-treated residues from both waste to energy plant and that accepted from third parties will be sent for recovery to salt mines licensed to accept this type of waste.

Export of Boiler Ash and Flue Gas Cleaning Residues

Salt mines are suitable environments for containing boiler ash and flue gas cleaning residues. The impervious nature of salt rock offers a long-term geological barrier and a geo-technically stable environment to guarantee that the residues are permanently isolated from the environment. The absence of water in the underground salt mine's environment removes any risk of leaching of, for example, heavy metals from residues. Hence the recovery of this material by backfilling in the saltmines is not likely to have significant negative effect on the environment.

Boiler ash and flue gas cleaning residues from the existing facility are currently shipped (un-treated) to the Hattorf and Wintershall Reutilisation Facility, which is an underground salt mine in Germany. The facility has been approved for the reutilisation by the relevant authorities in Germany.

In 2017 a similar salt mine facility in Northern Ireland attained planning consent and an environmental permit to operate as a recovery facility for hazardous residues from waste to energy facilities.

This facility in Carrickfergus, Co. Antrim has been accepting pre-treated boiler ash and flue gas cleaning residues from the existing waste-to-energy facility since October 2018 and the facility is also suitable for receiving the additional residues from the proposed development. It is intended that the boiler ash and flue gas cleaning residues from the proposed development will be sent to this facility, which has capacity to accommodate the material.

As the material is already pre-treated and is in a solid monolithic form, as described in **Section 4.5.6** of **Chapter 4** ***Description of the Proposed Development***, the transport of the pre-treated material will not have a significant negative effect on the environment.

At times when this recovery facility may not available, for example, during a maintenance outage, the un-treated flue gas cleaning residues will be exported for treatment and final recovery to German salt mines in specialised road tank vehicles.

The salt mines in Germany and Northern Ireland are required to comply with the requirements of the EIA Directive and therefore were subject to the EIA process prior to the acceptance of any waste material.

This Directive on Environmental Assessment aims to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the development of projects such as salt mines accepting hazardous waste with a view to reducing their environmental impact.

Similarly, the existing licensing process which all of these salt mines are subject to, requires compliance with an ongoing environmental monitoring regime in the form of stringent licence conditions.

The issuing of such licences by competent authorities pursuant to the requirements laid down in the Waste Framework Directive stipulate that all necessary safety and precautionary measures, monitoring and control operations and closure and after-care provisions must be included in the granting of all such licences.

Such conditions set out the legal constraints under which salt mines must operate in order to ensure that all operations are conducted in compliance with the requirements of the Waste Framework and Landfill Directives and do not cause environmental pollution.

Therefore, the potential treatment of the boiler ash and flue gas cleaning residues is not likely to have significant negative effect on the environment.

The export of boiler ash and flue gas cleaning residues outside the Republic of Ireland has the potential for trans-boundary effects and these are discussed in further detail in **Section 18.5.3** in **Chapter 18** ***Cumulative Effects, Other Effects and Interactions***.

Transport Regulations for Exporting Waste

The regulation of the transport of the boiler ash and flue gas cleaning residues will be subject to Trans Frontier Shipment (TFS) licence which is a licence which must be approved by the origin/destination/transit authorities consenting to the movement/transit and acceptance of wastes between EU member states. The regulation governing this is EU Regulation 1013/2006. This licence tracks waste from origin to destination and ensures that each authority is aware of the status of the waste until final recovery when the individual TFS notification annex consigned with each shipment is signed off as having been received and treated by the receiver. This completed licence is then circulated back to Indaver as the producer as well as all relevant authorities.

Shipping to German Saltmines

Van Den Bosch is an international logistics services provider which transports boiler ash and the flue gas cleaning residues for Indaver. Van Den Bosch confirmed that in the 51 years of its history none of its containers has ever fallen overboard and no ship has sunk with its containers on board.

If the boiler ash and flue gas cleaning residues come in contact with water, they will solidify. Thus, if there was a shipping accident, and the container entered the sea and was holed, the boiler ash and flue gas residues would solidify on contact with water. The solidified boiler ash and flue gas residues could then be removed from the seabed along with the tanker.

16.5.3.12 Ferrous and Non-Ferrous Metal Recovery

An additional 210 tonnes per annum of ferrous and non-ferrous metals will be recovered for recycling at an appropriately licensed or permitted facility.

The same facilities that are currently utilised by the existing plant will be utilised for this additional material. Before granting the licence or permit, the competent authority will have already considered the effects on the environment of the facility accepting this material through the licence or permit application process. Consequently, the recovery or recycling of the additional ferrous and non-ferrous metals is not likely to have significant negative effect on the environment. The recovery or recycling of the ferrous and non-ferrous metals is expected to have a minor positive effect on the environment.

16.5.3.13 General Waste Management

As is the case with the existing facility, adequate provision will be made for the separation of waste at source for the various elements of the proposed development. Office and canteen waste generated on site will be recycled where appropriate or treated on-site in the waste-to-energy facility.

16.6 Mitigation and Monitoring Measures

16.6.1 Construction Phase

No additional mitigation measures are required.

The proposed development will be constructed and operated in accordance with good practice in energy and resource conservation, and efficiency.

A ***Construction Environmental Management Plan*** (CEMP) has been prepared, refer to **Appendix 5.1**, and summarises the overall environmental management strategy that will be adopted and implemented during the construction phase including the responsible and efficient management of material assets including water and waste. Under the CEMP, the contractor will appoint a Construction Waste Co-Ordinator who will be responsible for implementing the construction waste management plan (CWMP). Refer to Section 7 of the CEMP in **Appendix 5.1** of this EIAR for details of the CWMP.

16.6.2 Operational Phase

No additional mitigation measures are required.

During operation of the proposed development, energy efficient power systems will be employed, water conservation measures will be implemented, and wastes will be avoided, minimised or recycled where economically feasible.

Wastes arising on site, for example from the administration building and maintenance activities, will be sent off site to be recycled where practical, and treated in the Waste-to-Energy facility if not. A beneficial reuse will be sought for the bottom ash. Metals will be recovered from the bottom ash.

The additional boiler ash and flue gas residues accepted and produced at the site will be pre-treated for recovery off-site.

16.7 Potential Cumulative Effects

The potential for cumulative effects as a result of the construction and operation of the proposed development and the following projects has been assessed where relevant in the following sections.

16.7.1 Irish Cement Ltd. (Planning Ref. LB150375)

The development will consist of the installation of a Flue Dust Portland Cement Silo at Kiln 3. The development will include the provision of a silo of circa 40m in height and 12m in diameter, together with filter, access gantries, bucket elevator and truck loading facility all on an application site of circa 0.75 hectares located within Platin Cement Works. Permission was granted in June 2015. The current timeline for construction is unknown.

There is no potential for any significant negative direct nor indirect cumulative impacts to arise from the Indaver Site Sustainability Project in combination with the project above.

16.7.2 Irish Cement Ltd. (Planning Ref. PL17.PA0050)

This planning application was for a 10-year permission to facilitate further replacement of fossil fuels and allow for the introduction of alternative raw materials in the manufacturing of cement at Platin Cement Works, Platin, Co. Meath. The proposed development is for the use of an additional 480,000 tonnes per annum of alternative fuels and alternative raw materials. Permission was granted in April 2018. The current timeline for construction is unknown.

There is no potential for any significant negative direct nor indirect cumulative impacts to arise from the Indaver Site Sustainability Project in combination with the project above.

16.7.3 SSE Generation Ireland Ltd. (PL17.303678)

This planning application refers to an air-insulated switchgear 110kV and for a transmission substation (Ref. 17.303678). The substation application was submitted to An Bord Pleanála as a Strategic Infrastructure development in February 2019 and was granted permission in January 2020.

It is noted that the substation scheme above appears to be an enabling component for a separate planning application for an open cycle gas turbine (OCGT) power plant, which was submitted to Meath County Council and permission granted in July 2019, but was subsequently appealed to An Bord Pleanála, where it was ultimately refused in December 2019. The OCGT plant therefore does not have a grant of planning.

Given the grant of permission received by the 110kV substation there is potential for this scheme to proceed as a standalone project.

There is no potential for any significant negative direct nor indirect cumulative impacts to arise from the Indaver Site Sustainability Project in combination with the project above.

16.7.4 Highfield Solar Ltd. (Planning Ref. PL17.303568 and PL17.248146)

These two applications (for a scheme titled 'Garballagh Lower Solar Farm') comprise an application for the development of a Solar Farm (17.248146) and a separate application for an electrical substation and associated 110kV and MV infrastructure required (17.303568) to connect the ground-mounted solar PV generation to the electrical transmission system, including underground cabling and all associated ancillary site development work.

Both applications were granted planning permission by An Bord Pleanála (in March 2019 and July 2019, respectively). Construction is underway; however, the estimated opening date is unknown.

It is reasonable to assume that this scheme will be constructed and operational prior to the development of the proposed Site Sustainability Project.

Therefore, there is no potential for any significant negative direct nor indirect cumulative impacts to arise from the Indaver Site Sustainability Project in combination with the projects above.

16.7.5 Summary of Cumulative Effects

Refer to **Chapter 18** ***Cumulative Effects, Other Effects and Interactions***, for a detailed description of each project/development listed above.

It is anticipated that the scale of the construction materials market in Ireland and the utilities capacity in the area are such that there will not be any significant negative direct or indirect cumulative impacts on material assets as a result of the proposed development.

16.8 Residual Effects

When the proposed development is in operation it will have a beneficial residual impact in the reduction in the quantity of hazardous waste being exported to Europe for disposal. The operation of the waste-to-energy facility will have residual effects in relation to the consumption of resources as outlined in **Tables 16.1** and **16.2**.

Boiler ash and flue gas residues will be sent to a salt mine in Ireland for recovery (after pre-treatment on site) or exported to landfill or to a salt mine in Germany, if no suitable facility is available in Ireland by the time the plant is commissioned.

The proposed development will also have a number of positive residual effects on material assets. The bottom ash that is generated as a result of the incineration process is reused in many EU countries for use in road construction.

Indeed, export of bottom ash for processing to other EU countries may be a route to achieve this if no facility is available in Ireland. Landfilling of these solid residues will only take place, if no viable market can be found. If these residues can be successfully used, it will have a positive effect in that it will reduce the requirement for the use of virgin materials.

The proposed development will have a beneficial residual impact as it will reduce the quantity of hazardous waste being exported to Europe for disposal.

It will produce approximately 160 tonnes of Hydrogen fuel per annum from what would be otherwise and currently wasted energy that the electricity grid cannot accept approximately 1,000 hours per annum.

This beneficial residual impact also has an additional beneficial climate change impact as the hydrogen fuel produced replaces the need for other fossil fuel usage as outlined in **Section 9.5.3** of **Chapter 9** ***Climate***.

16.9 References

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