Attachment 7.1.3.2 – Impact Assessment of Emissions/Discharges

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) was appointed by Indaver to complete a Receiving Environment Report for their proposed Resource Recovery Centre in Ringaskiddy, Co. Cork. This report is to accompany an application for an IE licence.

This report was completed in accordance with the *Environmental Protection Agency's (EPA) Licence Application Form Guidance – Industrial Emissions (IE), Integrated Pollution Control (IPC) and Waste.*

The majority of the information required for this section has already been provided as part of the Environmental Impact Assessment Report (EIAR), prepared in June 2019.

2.0 IMPACT TO AIR

2.1 Air Emissions

Major Air Emissions

There will be one main air emission source resulting from activities at the proposed site, referred to as:

- A2-1 Waste-to-energy plant stack flue (main emission source)

Drawing No. CD5005-Major Air Emission Points shows the location of this emission point. More details about the type and nature of the emissions are provided in Attachment 7.4.1 *Emissions to Atmosphere – Main and Fugitive Emissions*.

Minor and Potential Emissions

There are a number of minor and potential emissions to air from the facility as outlined in Attachment 7.4.2 *Emissions to Atmosphere – Minor and Potential.*

Fugitive and Odour Emissions

Dust and odour are the relevant pollutants with the potential for fugitive emissions associated with the proposed development.

With regard to fugitive dust emissions, the potential for fugitive dust will be minimised at source by the following prevention measures:

- All road and yard surfaces will be paved to minimise dust generation.
- Vehicles delivering waste material will be enclosed or covered to restrict the escape of dust.

- Waste storage, treatment and handling operations will take place within the confines of the waste tipping hall and bunker. The bunker will be large enough to allow acceptance of waste during periods of shutdown, so waste will never be stored externally.
- The storage, treatment and handling of any other solids and plant cleaning operations will be carried out in fully enclosed environments. No solids will be stored in the open at the site.

The controls above incorporated into the design and operation of the facility will prevent significant emissions of fugitive dust. Dust and particulate levels will be compliant with ambient air quality limit values and the German TA Luft standard for dust deposition at all locations beyond the site boundary.

No significant fugitive odour emissions are anticipated from the proposed development as the waste tipping hall and bunker will be maintained under negative pressure to prevent fugitive emissions and the air extracted from these spaces will be used as primary air in the combustion process. This will minimise the risk of odours escaping the building. If for any reason the waste-to-energy facility is shut down (typically for 1 or 2 weeks per year), the main fans for combustion air and flue gases will be kept in operation for as long as possible to maintain the tipping hall under negative pressure. When the main ID fan is switched off, then the air will continue to be extracted through a biofilter unit or activated carbon unit.

2.2 Abatement of Air Emissions

Air emissions from emission point A2-1 will be controlled through both process optimisation (e.g. waste acceptance procedures and management of furnace operations) and physical / chemical treatment (in the flue gas treatment system). These systems have been designed to ensure emissions from A2-1 are well below the limit values set out in the EU Industrial Emissions Directive 2010/75/EC.

As described in Section 2.6 of Attachment 4.8.1 (Operational Report) and Section 4.9 of Chapter 4 of the EIAR. the flue gas treatment system will be a ‘semi dry’ system comprising:

- a cooling section;
- a dry reactor;
- a bag house filter;
- an induced draught fan to maintain the flow through the treatment system;
- a stack 70m above ground level equipped with continuous emissions monitoring systems.

The facility will be controlled by an interface computer system which will monitor all the parameters and measurements required in order to have a good overview of facility performance. It will execute facility control loops, report low-level and high-level alarms and will control different levels of safety interlocking.

2.2 Impact on Air Quality

Impacts from Main Emissions

Air dispersion modelling was carried out using the United States Environmental Protection Agency's (USEPA) regulatory model AERMOD (version 18081). In addition to conducting the dispersion modelling using AERMOD, dispersion modelling with the CALPUFF model has also been undertaken for the proposed development. Full details of these modelling approaches can be found in Section 8.2 of Chapter 8 and Appendix 8.2 of the EIAR.

Appendix 8.1 of the EIAR provides a complete overview of the air dispersion modelling undertaken including the monitoring methodology, assessment and results. Details on the emission concentrations and mass emission rates used for air dispersion modelling of stack A2-1 can be found in Table A8.2 of Appendix 8.1 of the EIAR.

Modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards or guidelines for the protection of human health for all parameters under maximum and abnormal operation of the facility. The modelling results indicate that the long-term maximum concentrations occur near the southern and south-eastern boundaries of the facility. Maximum operations are based on the emission concentrations outlined in EU Directive 2010/75/EU.

An appropriate stack height has been selected to ensure that ambient air quality standards for the protection of human health will not be approached even under abnormal operating scenarios. The stack height determined by air dispersion modelling which will lead to adequate dispersion was 70 metres.

The spatial effect of the facility is limited with concentrations falling off rapidly away from the maximum peak. For example, the short-term concentrations due to process emissions at the nearest residential receptor will be less than 19% of the short-term ambient air quality limit values. The annual average concentration has an even more dramatic decrease in maximum concentration away from the facility with concentrations from emissions at the proposed facility accounting for less than 2% of the limit value (not including background concentrations) at worst case sensitive receptors near the facility.

Impacts from Greenhouse Gas (GHG) Emissions

The annual anthropogenic greenhouse gas (GHG) emissions from the operational site have been calculated and the predicted emissions have been compared with the estimated total GHG emissions in Ireland in 2020 based on compliance with the EU 2020 strategy[1]. The results are presented in Section 9.5.3 of Chapter 9 of the EIAR.

During the treatment of waste, the thermal energy generated by the burning of waste will be recovered and will give an electrical output of about 21MW. As

[1] European Commission (2010) *EUROPE 2020: A strategy for smart, sustainable and inclusive growth*

approximately 2.5MW is required for electrical demand within the plant, the net electrical output for export to the national grid will be 18.5MW. Thus, the export of 18.5MW will give a direct benefit in terms of GHG emissions which would have been released in the production of 18.5MW from power stations. This will undoubtedly result in displacement of an existing fuel/generation system, and the quantification or credit to be ascribed to the proposed development has been taken into account. In order to calculate the emissions displacement, a displacement intensity of 0.40 tonne CO_2 /MWh for all renewable generation is used[2].

The production of power for export to the National Grid reduces the impact of the site significantly such that the facility will emit approximately 0.097% of the estimated total GHG emissions in Ireland in 2020 based on the latest information from the EPA[3], when energy recovery is taken into account. Thus, is not considered to be significant in the context of aggregated national emission sources and the benefits associated with energy recovery and displacement of electricity derived from fossil fuel sources.

The proposed emergency generator at the site (A4-1) would also be a potential source of GHGs, however, as the emergency generator will only be in use during the rare occurrence of a power outage from the national grid, the likely emissions of GHGs from this source will be insignificant.

Impacts from Minor and Potential Emissions

Impacts on the receiving environment from the Boiler Blow Down Tank (A3-1) may be deemed insignificant by virtue of the composition of this emission i.e. steam (water vapour) which is not a regulated ambient air pollutant as it does not pose a risk to human health.

In relation to the HVAC exhausts from the proposed development, the two HVAC exhausts from the bottom ash building (A3-2 and A3-3) will emit air which has been passed through a HEPA filter (or similar as agreed with the EPA) prior to emission in order to ensure dust emissions are insignificant. The air emitted from the HVAC exhaust on the administration building (A3-5) will be passed through a HEPA filter to ensure particulate emissions are minimised.

Emissions from the solidification plant at point (A3-4) will pass through a water bath and associated wet dust collector to ensure levels of particulates as well as trace ammonia concentrations are minimised. This is a similar design to the Indaver Carranstown Waste-to-Energy facility.

Any odours present in the air of the process building and tipping hall will be treated by extraction and use as primary air in the combustion process. When the plant is in shutdown (1-2 weeks per annum) the extracted air will be treated by an activated carbon filter or biofilter (emission point A3-6) to remove any odours before being vented to the external environment. The potential for odour impact on the receiving environment is therefore insignificant.

[2] SEAI (2016) *Energy-Related Emissions in Ireland – CO_2 From Fuel Combustion*
[3] EPA (2019) *Ireland's Greenhouse Gas Projections 2018-2040*

The potential for particulate emissions from the three compressor exhausts (A3-7, A3-8 and A3-9) at the proposed facility will be insignificant as the intake air for the compressors is filtered.

The diesel tanks (A3-10 to A3-13) and ammonia tank (A3-14) at the site will have minimal emissions (breathing and standing losses during normal operations) and will therefore have an insignificant impact on the receiving environment.

The diesel generator and the 3 no. fire water pumps (A4-1 to A4-4) will only operate during an emergency scenario and will therefore have an insignificant impact on the receiving environment by virtue of their limited operational hours in any one year.

Pressure relief valves or rupture discs (A4-4 to A4-11) on various tanks and plant will only operate in emergency overpressure situations and not under normal operations. Any emissions associated with these points will therefore have an insignificant impact on the receiving environment by virtue of their limited operational hours in any one year.

Impacts from Fugitive Emissions

No significant impacts to the receiving environment are expected as a result of fugitive dust or odour emissions as these emissions will be minimised at source.

3.0 IMPACT TO SURFACE WATER

The following outlines the impact of the proposed emissions on Cork Harbour.

3.1 Emissions to Stormwater

The surface water drainage network will collect and convey all the road and service yard run-off to Surface Water Holding Tank 01 (firewater retention tank) via a Class 1 full retention hydrocarbon interceptor. This firewater retention tank will have a capacity of 1,690m³.

A second drainage network will collect and convey the runoff from all roof areas and discharge it directly to Surface Water Holding Tank 02 (stormwater attenuation tank). This surface water attenuation tank will have capacity of 1,250m³.

The surface water attenuation tank and the fire water retention tank will be located beside each other beneath the staff car park, which is adjacent the administration and security building. Stormwater from Tank 01 will flow to Tank 02 and continuous monitoring will be in place as well as a cut off valve to prevent contaminated water from Tank 01 entering Tank 02.

Discharge from Tank 02 will be via an additional monitoring station and cut off valve into the storm sewer at SW-1. The discharge will enter the storm sewer along the road of which the outfall is into Cork Harbour at Gobby Beach.

3.2 Abatement of Stormwater Emissions

Refer to Section 4.14.3 of Chapter 4 of the EIAR for a description of drainage systems. Refer to Section 4.5.7 of Chapter 4 of the EIAR for a description of the firewater containment systems.

Tanker loading and unloading operations in the waste-to-energy facility will be undertaking in a dedicated tanker loading/unloading bay which will have a local collection system and holding tank to contain any spillage. Refer to Section 4.14.3 of Chapter 4 of the EIAR for a description of the measures which will be in place to control any spillage from tanker unloading operations.

Other mitigation measures as they refer to the management of chemicals onsite are referred to in Sections 3.0 and 4.0 of Attachment 4.8.3 *Soil & Groundwater Baseline.*

Mitigation measures to prevent impact on hydrology are described in Section 13.6.5 of Chapter 13 of the EIAR. Appendix 13.4 Flood Risk Assessment of the EIAR provides further detail. Conclusions on the flood risk assessment are summarised in Section 13.4.3.2 of Chapter 13 of the EIAR.

3.3 Potential Impacts to Surface Water Environment

3.3.1 Local Hydrology

Chapter 13 of the EIAR concludes that with the implementation of the mitigation measures proposed, the development will not result in significant negative effects on the hydrology of the area or the receiving waterbody (Cork Harbour).

3.3.2 Surface Water Quality

Chapter 13 of the EIAR concludes that with the implementation of the mitigation measures proposed, the development will not result in significant negative effects on the surface water quality of the area or the receiving waterbody (Cork Harbour). This is reiterated in Section 4.0 of Attachment 4.8.3 Soil and Groundwater Baseline.

Principle Polluting Substances of Concern

The relevant Principle Polluting Substances of concern, with regards to S.I. No. 283/2013 - Environmental Protection Agency (Integrated Pollution Control) (Licensing) Regulations 2013 will be hydrocarbons, ammonia and the aqueous waste. Management of these chemicals is addressed in Section 3.0 of Attachment 4.8.3 *Soil & Groundwater Baseline.*

3.3.3 Summary

Based on this assessment, the proposed development will not have a significant impact on the quality of the receiving surface water environment. There is a very low risk of significant volumes of Principle Pollution Substances being discharged from the facility via the stormwater network due to the stringent controls and procedures in place to prevent and minimise spills. The proposed development will also not have a significant impact on the hydrology of the area.

4.0 IMPACT TO SEWER

4.1 Emissions to Sewer

There will be no process effluents or other industrial wastewater discharges associated with the proposed development. The only wastewater from the proposed development will be domestic sewage from toilets, changing and kitchen areas which will discharge via the foul drainage system and will be pumped directly to the Irish Water sewer located east of Ringaskiddy Village, which will then be pumped to the Shanbally Wastewater Treatment Plant (WWTP) as stated in Section 4.15.3 of Chapter 4 of the EIAR.

4.2 Potential Impacts to Sewer

Irish Water have confirmed that the WWTP has sufficient capacity to treat the domestic effluent produced at the Indaver Ringaskiddy Waste to Energy facility.

The foul sewer line will connect to the existing Irish Water sewer line along the L2545. All pipework within the foul sewer has been designed to be self-cleansing with a minimum velocity of 0.75 m/s at half pipe flow. The drainage lines will be constructed and tested in accordance with the requirements of the Greater Dublin Regional Code of Practice for Drainage Works.

As such, it is not anticipated that there will be significant impacts from the effluent emissions on the sewer.

4.3 Impact on Receiving Environment

During the operation of the proposed development, sanitary wastewater will be pumped directly to the Irish Water sewer located east of Ringaskiddy Village, which will then be pumped to the Shanbally WWTP where it will be appropriately treated so as to avoid any significant adverse impact on the environment.

5.0 NOISE IMPACTS

5.1 Noise Emissions

The primary potential noise sources associated with the waste-to-energy facility are associated with:

- process and building services plant (fixed installations);
- vehicle movements on site (mobile plant);
- car parking on site, and;
- additional vehicles on public roads.

Section 10.5.3.3 of Chapter 10 of the EIAR address the predicted noise effects relating to these key sources from the operation of the facility.

The locations of the noise sources (from the proposed development) are shown on Drawing No. CD5008-Noise Source Locations.

There are no expected vibration sources associated with the operational phase.

5.2 Abatement Measures

Practicable noise control measures will be employed to ensure that noise from process and building services plant do not exceed the operational noise limits set out in Table 10.15 of Chapter 10 of the EIAR.

The inclusion of an acoustic attenuators to the aero condenser structure will be required to meet, as a minimum, the insertion loss values included in Table 10.18 of Chapter 10 of the EIAR.

In addition to the measures outlined above, the following forms of noise control techniques will be employed as standard to ensure operational plant noise levels are kept to a minimum:

- plant will be sited as far away from noise-sensitive locations as is practicable;
- duct mounted attenuators will be installed on the atmosphere side of all air moving plant;
- splitter attenuators will be installed providing free ventilation to internal plant areas;
- anti-vibration mounts will be installed on all reciprocating plant.

Additional measures for mitigating the noise from additional vehicles on public roads are not required.

This is set out in Section 10.6.2 of Chapter 10 of the EIAR.

5.3 Impact from Noise Emissions

A noise model of the proposed facility was developed to assess the noise contribution from all noise generating operating sources and internal traffic movements. The methodology used, and the results of the noise model are described in *Chapter 10 Noise and Vibration* of the EIAR.

Section 10.5.3.2 of Chapter 10 of the EIAR outlines the approach taken to determine the operational noise criteria against which the modelled noise levels would be compared.

Section 10.5.3.3 of Chapter 10 of the EIAR outlines the findings of the noise model. In order to assess the noise levels arising from the operational phase, the following scenarios were modelled:

- **Scenario 1**: Daytime operation with 'peak' HGV on-site movements (9 HGVs per hour);
- **Scenario 2**: Evening operation with 'peak' HGV on-site movements (2 HGVs per hour);
- **Scenario 3**: Night-time operation with 'peak' HGV on-site movements (11 HGVs per hour, i.e. between 06:00 and 07:00hrs);
- **Scenario 4:** Night-time operation with no HGV movements (normal operation).

For the purposes of this appraisal, noise levels were predicted at the nearest noise-sensitive locations.

The results of the modelled operational scenarios 1 and 2 for daytime and evening periods are included in Table 10.20 of Chapter 10 of the EIAR. The results indicated that the operational noise levels during daytime and evening periods are all comfortably below the relevant noise criteria at the nearest noise sensitive locations. Both scenarios included continuous operational plant and the 'peak' on-site vehicle movements. During periods where no traffic accesses the site or during 'off peak' traffic periods, noise levels will in turn be reduced.

The results of the modelled operational scenarios for night-time periods (scenarios 3 and 4) are included in Table 10.21 of Chapter 10 of the EIAR. The results of the assessment indicate that the operational noise levels during night-time periods are all comfortably at or below the night-time noise criterion of 45dB $L_{Aeq,T}$ adopted for the facility at the nearest residential noise sensitive locations.

Further details can be found in Section 10.5 of Chapter 10 of the EIAR. An assessment of the cumulative effects of the proposed development in terms of noise and vibration taking into account the existing environment coupled with the proposed resource recovery centre, can be found in Section 10.7 of Chapter 10 of the EIAR.

In summary, the noise and vibration effects will not be significant at noise sensitive locations near the development. The assessment has concluded that due to the distance between the proposed development and the nearest sensitive buildings, the proposed site layout and the recommended noise mitigation measures, the facility can operate within the relevant day, evening and night-time noise limit values.

6.0 IMPACTS TO GROUND

There are no direct discharges proposed to groundwater or to the soil environment during operation of the facility. As such, the only significant impact that could only occur is due to accidental emissions such as localised accidental leakages from cars/vehicles in the car park areas on-site or accidental leakage or spillage of process materials or wastes, particularly during unloading or loading operations.

6.1 Containment Measures

The relevant substances under European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), of which is giving effect to Directive 2006/118/EC, are hydrocarbons and ammonia. Aqueous wastes may also fall into this category depending on the makeup of the waste at any given time.

Further details of the containment measures proposed for these substances are provided in Sections 3.0 and 4.0 of Attachment 4-8-3 *Soil and Groundwater Baseline Report* as well as Section 13.6.2 of Chapter 13 of the EIAR.

6.2 Impacts to Ground and Groundwater

It is very unlikely that any of the liquids stored onsite will become entrained in the stormwater run-off based on the contingency systems (double skinned or bunded tanks) and mitigation systems (Class 1 hydrocarbon interceptors, automated monitoring and cut off valves) incorporated into the process design. As such, the site operations are unlikely to have a significant impact on the quality of the receiving environment.

Roads, hard standings, and yard areas within area of the licenced installation will be paved and surface water run-off from such areas and from the roofs of the buildings will be collected in the surface water drainage system. This will reduce the infiltration of surface water into the groundwater and have a minor impact on the groundwater flow regime under this part of the site.

During operation, an environmental management plan (EMP) will be in place to ensure compliance with licencing requirements. This will include full and adequate containment and management of potential contaminants.

Operation of the plant will be according to BAT (Best Available Technology) principles and in compliance with the licence for the site to ensure that inputs to, and any subsequent contamination of, soil and water environments does not occur during normal and/ or emergency conditions (material spillage or fire event situations). Site-specific emergency response measures will be in place and all relevant personnel will be trained accordingly.

As such, it is not anticipated that the site operations will have a significant detrimental impact on the groundwater quality, and it is determined that the measures proposed are sufficient to comply with the requirements of the Council Directives 80/68/EEC and 2006/118/EC for the protection of groundwater.

7.0 IMPACTS ON BIODIVERSITY

7.1 Potential Impacts to Biodiversity

Chapter 12 of the EIAR considered the impacts of both construction and operations on the surrounding terrestrial and marine habitats and the potential for the proposed development to impact upon specific species. The EIAR concluded that the proposed mitigation measures are sufficient to prevent adverse impacts on the local biodiversity (with the exception of localised residual impacts resulting from the loss of common habitats on the site itself due to the development).

The EIAR also concluded that the emissions from the facility will have a negligible impact on the marine ecology and the important bird populations within the Cork Harbour.

7.2 Natura Impact Statement (NIS)

A NIS was completed for the proposed development in order to assess whether the mitigation measures proposed as part of the development including the design of the facility were sufficient to prevent significant adverse impacts occurring to designated sites as a result of the development. This assessment concluded that the proposed development will not have an adverse impact on the integrity of any Natura 2000 sites including the Cork Harbour Special Protection Area.

8.0 REFERENCES

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