Attachment 7.1.3.3 Receiving Environment Report

1.0 INTRODUCTION

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* and should be read in conjunction with Attachment 7.1.3.2 Impact Assessment.

2.0 STORMWATER EMISSIONS

2.1 Stormwater Drainage

Stormwater from the buildings and yards is collected via a series of points across the facility. These then discharge to an offsite drainage ditch along the eastern and southern boundaries of the site via 4 no. hydrocarbon interceptors at 3 no. discharge points (SW1 to SW3). The drainage ditch eventually discharges into the Shannon Eighter. The locations of the interceptors and discharge points are shown on Drawing 008.

The onsite stormwater drainage to the north east corner of the site is via a 225mm concrete pipe. The onsite stormwater drainage to the south of the site is via a 300mm concrete pipe. There is no existing flow monitoring or control.

In accordance with Best Available Techniques (BAT), clean stormwater will be kept separate from wastewater and there is no inherent risk of cross-contamination. Stormwater run-off is from buildings and car parks only and therefore there is no requirement to undertake regular sampling of the stormwater prior to discharge. Weekly visual inspections will be undertaken for both stormwater discharge points (via manholes at each location) in accordance with the facility's Licence.

A Class 1 full retention interceptor will be installed on the stormwater drainage line draining the area around the bulk diesel storage tank as is required.

2.2 Receiving Environment

The nearest watercourse is the Willsborough Stream, which is located close to the north western boundary of the AbbVie site. The Lisnalurg Stream, a tributary of the Willsborough, is located 280m to the west. The largely culverted Shannon Eighter Stream is >50m to the south of the site.

The site is not located within a Special Area of Conservation (cSAC) or Specially Protected Area (SPA). The nearest SAC and SPA is Cummeen Strand/Drumcliff Bay (Sligo Bay) located approximately 0.7 km away from the proposed development

From a review of the EPA on-line Database Envision, the most up-to-date status (River Waterbody WFD Status 2010-2012) of the Willsborough Stream is 'Good'. The Willsborough Stream is also classified as being 'Not at risk of not achieving good status'. EPA monitoring concludes that based on 2015 analysis of both upstream and downstream monitoring locations, the Willsborough Stream has a surface water quality of 'Good Status'.

EPA's Envision Database was also consulted to determine if any designated salmonid waters (S.I. 293/1988-European Communities (Quality of Salmonid Waters)

Regulations, 1988) existed close to the site or are located so that they may be adversely impacted by the proposed development or operation of the facility. The Willsborough Stream was previously not included in the register of salmonid waters included in those regulations.

A Stage 1 Flood Risk Assessment was undertaken as part of the Environmental Impact Assessment submitted with the planning application. This assessment has been carried out and is submitted as part of this planning application. The purpose of the assessment was to identify whether there may be any flooding or surface water management issues related to the proposed development site that may warrant further investigation. The results of that assessment were that there is no significant risk of flooding at the site.

Further information regarding the receiving environment can be found in Attachment 7.1.3.2 Emissions Impact Assessment, and in the Soil and Groundwater Baseline Assessment provided in Section 4.

2.3 Impact on Receiving Environment

The northern boundary of the proposed development is close to the Willsborough Stream and the site is also 50m from the other receiving surfacewater body, the Shannon Eighter, which runs along the south of the site. The following outlines the impact of the proposed emissions on these receiving environments.

2.3.1 Local Hydrology

The proposed development is an internal conversion within the existing AbbVie facility which has been in operation since early 2013 and was previously (1970's) the site of an Abbott Nutrition manufacturing plant. Stormwater discharge from the subject site exits the plant at the eastern boundary, entering a drainage ditch which drains into Shannon Eighter, and eventually into Sligo Bay.

The existing on-site stormwater drainage network currently covers the entire site (including the proposed location of the development) and collects rainwater runoff from site roads, car park areas and building roofs. Mostly internal modification will be undertaken for the proposed development, so the overall discharge will be similar to the current stormwater discharge in terms of flow and quality.

No historic flooding of the site has been identified from the Office of Public Works (OPW) floodmaps.ie website. Soil maps were researched and indicated that the site was not underlain by alluvium soils therefore indicating that, historically flooding has not occurred onsite. Catchment Flood Risk Assessment and Management Preliminary Flood Risk Assessment (CFRAM PFRA) and Fluvial Flood Extent maps conclusively indicate that the site majority resides within Flood Zone C and is not at risk of flooding from any modelled flood event. No flooding has been recorded on the site since the facility has been built in 1970's.

Whilst there is no proposed stormwater attention it is determined that with regards to local hydrology the proposed development is a no-change scenario.

2.3.2 Surface Water Quality

Stormwater run-off from buildings and car parks will be kept separate from wastewater and there is no inherent risk of cross-contamination. The only Principle Pollution Substance of concern, with regards to S.I. No. 283/2013 - Environmental Protection Agency (Integrated Pollution Control) (Licensing) Regulations 2013, are any

hydrocarbons from car park run-off. Hydrocarbons will be captured by a hydrocarbon interceptor.

The only bulk raw chemical stored external to the facility will be diesel for the emergency generator. Diesel will be stored in a 10,000L double lined belly tank and will be transferred to the generator in single lined piping. A Class 1 full retention interceptor will be installed on the stormwater drainage line draining the area around the bulk diesel storage tank as is required.

The high high strength wastewater tank will also be stored external to the building and will be contained with a designated bund. The bund has been designed to conform to standard bunding specifications - BS8007:1987. It will be chemical resistant and equipped with liquid level detection. In the event of an overflow/spillage, the excess liquid will be pumped to the appropriate storage tank and tested. Integrity testing of the bund will be undertaken every 3 years in accordance with the requirements of the IE licence.

Tanks are designed in accordance with the requirements of the EPA Guidance Note on the Storage and Transfer of Materials for Scheduled Activities.

In an event of a chemical spill or oil spill to the storm water drainage system, there is an emergency response procedure (ERP) in place to deal with such an event.

The potential risk to the Shannon Eighter and to Sligo Bay is therefore not significant. A diesel spill resulting during transfer/delivery of the diesel or operation of the generator would be captured within the Class 1 full retention interceptor. A leak in the diesel tank would spill into the second lining and would avoid any spillage.

3.0 SEWER EMISSIONS

3.1 Wastewater Management

The emissions to sewer from the current facility is primarily sanitary, domestic foul and canteen wastewater (32.6m^3/day). The proposed development will include the addition of low strength wastewater to the emissions to sewer. Low Strength wastewater is process specific wastewater including flashpot condensate drains, utilities blowdowns and wastewater from non-product contact equipment. The maximum daily volume of this low strength wastewater will be 180m^3/day.

The proposed development will also include the addition of high high strength wastewater which is liquid waste from high containment areas or liquid waste which has been identified that may contain some toxin or other harmful substances. This will be stored separately in the high high strength wastewater bulk storage tank and will be tankered offsite for incineration. There will be no discharge of high high strength wastewater to sewer.

Low strength wastewater will initially be routed, primarily by gravity, to a bunded 10m^3 sump tank, from where it is then pumped to a bunded 30m^3 bulk storage tank, both within a sunken bund. Wastewater from the low strength wastewater tank will then be routed to a monitoring cabinet. Continuous monitoring of certain wastewater discharge parameters (e.g. pH, flow, temperature) will be performed at this monitoring station. This station will also be equipped with a composite grab sampler to allow for collection of compliance-related samples.

The low strength wastewater will be sampled and will generally be sent to the foul sewer (municipal waste water treatment) along with the sanitary, domestic foul and canteen wastewater. The facility includes for pH and temperature adjustment should there be a need for this before discharge. The waste can also be pumped into the high high strength wastewater tank or to a road tanker if there is ever a concern about the possibility of contamination of the waste. The locations of the low strength and high high strength wastewater sumps and tanks are shown on Drawing 006.

Consultation with Irish Water has been undertaken on the capacity of the public foul sewer network to accept the proposed volume of wastewater.

3.2 Offsite Wastewater Treatment Plant

The existing wastewater treatment works at Sligo Wastewater Treatment Plant (WWTP) at Sligo Harbour has a capacity of 50,000 population equivalent (PE) and is currently receiving and treating a daily load of approximately 28,158 PE according to the 2017 Annual Environmental Report (AER). The maximum discharge volumes from the installation represent about 0.96 % of wastewater discharge volumes from the Sligo Wastewater Treatment Plant.

Wastewater to be discharged is relatively low strength and the loading associated with the proposed discharge, as a percentage of Sligo WWTP, is insignificant when compared with the overall plant loading. The main characteristics of the wastewater are presented below:

Description	Max values per day (kg unless otherwise noted)	Max Concentration (mg/l unless otherwise stated)
Flow	180 (m^3/day)	-
BOD	61	377
COD	97	599
Total phosphorous	11	68
Total Nitrogen	2	12
Chlorides	18	6000

Table 1. *Wastewater Characteristics*

Due to the nature of the process there will be very infrequent high concentrations of chloride in the wastewater stream. These peaks will occur only during re-generation of the water conditioning skids and the total contribution to the sewer will be minimal.

Small quantities of sulphate, detergents, and oils fats and greases (OFG) may also be present.

Pre-application discussions on the capacity of the WWTP were had with Irish Water during the design phase. The main issue at the Sligo WWTP as identified in the 2017 AER for the facility is Total Phosphorus as the facility was not in compliance with the discharge limits for Total Phosphorous in 2017. The Total Phosphorous concentration of the wastewater discharge from the AbbVie facility is anticipated to be 68 mg/L which, once diluted with the rest of the hydraulic load of the Sligo WWTP (at a dilution factor of 0.0096) will contribute 0.65 mg /L to the total influent to the facility. Irish Water have

advised that the receiving wastewater system will have the capacity to accept the proposed discharge.

3.3 Impact on Receiving Environment

As outlined in Attachment 7.3.2 Equivalent Level of Protection, the off-site wastewater treatment plant has sufficient capacity to treat the proposed wastewater discharges without having a significant impact on the receiving environment. The WWTP holds a discharge licence with ELVs that are compliant with the relevant sectorial BAT limits for pharmaceutical facilities.

It is anticipated that the Irish Water facility will be sufficient to appropriately treat all wastewater discharges from the facility including Principle Pollution Substance of concern (see S.I. No. 283/2013) relevant to the facility. Heavy metals in the wastewater streams will exist in trace quantities only (due to wastewater off metal equipment, etc) and therefore do not pose a risk to the receiving environment.

There is no potential for hazardous material to leave the facility through the wastewater streams as the high high strength wastewater will be directed to a separate storage tank and is tankered offsite for additional treatment, therefore it will never enter the drainage system which leads to the municipal foul sewer. There will also be a shutoff valve located downstream from the monitoring cabinet for potential breaches of the licence limits. If the licence limits are breached, the wastewater would be recirculated back to the 30m^3 tank. It should be noted that the shut-off valve can recirculate the wastewater only and is located downstream of the monitoring cabinet before the wastewater combines with the domestic sanitary wastewater for discharge to SE1.

4.0 AIR EMISSIONS

4.1 Ambient Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality “Air Quality Annual Monitoring Report 2015”, details the range and scope of monitoring undertaken throughout Ireland (EIS, 2017).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Ballytivnan is categorised as Zone C due to its proximity to Sligo town.

NO_2 monitoring was carried out at the Zone C monitoring stations of Kilkenny, Portlaoise and Mullingar in 2016. The NO_2 annual average in 2016 for the locations of Kilkenny and Portlaoise were 7 and 11 µg/m^3, respectively. This is significantly lower than the annual average limit value of 40 µg/m^3. The average results over the last five years at a range of Zone C locations suggests an upper average of no more than 13 µg/m^3 as a background concentration. Based on the above information, a conservative estimate of the current background NO_2 concentration in the region of the AbbVie facility is 13 µg/m^3.

Continuous SO_2 monitoring was carried out at a number of Zone C locations over the period 2012 – 2016, Mullingar, Ennis and Portlaoise. Concentrations ranged from 1 –

5 µg/m^3, with no exceedances of the daily limit value of 125 µg/m^3 for the protection of human health. Long term annual average results suggest an upper limit of 3.4 µg/m^3 as a background concentration. Based on this EPA data a conservative estimate of the annual mean background SO_2 concentration in the region of the facility is 4 µg/m^3.

In summary, existing baseline levels of NO_2 and SO_2 based on extensive long-term data from the EPA are expected to be below ambient air quality limit values in the vicinity of the proposed development.

Air dispersion modelling was carried out using the United States Environmental Protection Agency's regulatory model AERMOD (Version 16216r) and the report is provided as Appendix A to Attachment 7-1-3-2. The air dispersion modelling input data consisted of information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and five full years of appropriate meteorological data. Using this input data, the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological year. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

4.2 Emissions to Air

The proposed major air emissions will be from 2 no. liquid petroleum gas fired boilers. Each boiler will have a stack height of 17.4m above ground level. A platform for EPA sampling and associated power points etc has been provided as per EPA guidance on sampling. In accordance with the Medium Combustion Plant Regulations 2017, monitoring of NO_x will be undertaken every 3 years. The locations of the boilers are shown on Drawing 004.

New minor emissions from preparatory and production vessels, emissions from fume hoods, autoclave vents, Lyo vents, production room vents, and low pressure hot water boilers are not considered to be significant and appropriate abatement (i.e. HEPA filters and 2 um filters as appropriate) will be employed to remove trace contaminants. Dual catalytic converters in series will be in place on the Isolator lines to convert H_2O2 to H_20 and O_2.

Potential emissions will include process and tank safety vents required during over pressure in the system. Emissions will be insignificant or trace levels only. The locations of minor and potential emission points are shown on Drawing 005.

There will also be an emergency diesel generator which will be tested periodically (4 – 6 hours per month) and will therefore result in minimal combustion emissions.

4.3 Impact on Ambient Air Quality

The results indicated that the ambient ground level concentrations of nitrogen oxides (as NO_2) and sulphur dioxides (as SO_2) would be below the annual and 1-hour ambient air quality standards. Emissions from the facility lead to an ambient NO_2 concentration (including background) which is 24% of the maximum 1-hour limit and 38% of the annual limit at the worst-case off-site location for the worst-case years modelled (2014 and 2015). Emissions from the facility lead to an ambient SO_2 concentration (including background) that is 21% of the maximum ambient 1-hour limit value (measured as a 99.7th%ile) and 23% of the 24-hour limit value (measured as a 99.2nd%ile) at the worst-case location off-site for the worst case years modelled (2013 and 2014).

The cumulative assessment with the neighbouring AbbVie facility also found results to be in compliance with the relevant ambient air quality limit values. Emissions from both facilities lead to an ambient NO_2 concentration (including background) which is 25% of the maximum ambient 1-hour limit value and 39% of the annual mean limit value at the worst-case off-site receptor for the worst-case years modelled (2014 and 2016). Emissions from both facilities lead to an ambient SO_2 concentration (including background) that is 25% of the maximum ambient 1-hour limit value (measured as a 99.7th%ile) and 23% of the 24-hour limit value (measured as a 99.2nd%ile) at the worst-case location off-site for the worst case years modelled (2013 and 2014).

Ambient levels of nitrogen oxides (as NO_2) and sulphur dioxides (as SO_2) from the facility were well below the air quality limit values for the protection of human health and it is predicted that air emissions from the installation will not have a significant impact on the local environment.

In terms of climatic impacts, on-site emissions of greenhouse gases are not expected to be significant for two reasons. Firstly, one of the sources of greenhouse gas emissions from the proposed development would be from the generator to be located on site, however, this will only be in use during emergency operations i.e. when there is a power outage from the national grid. Thus, given the likely very low usage of the emergency generator, the likely on-site emissions of greenhouse gases will not be significant.

Secondly, the current CO_2 emission factor for electricity from the National Grid is 0.393 tonnes CO_2/MWh which is significantly lower than the 2008 emission factor (0.533 t/MWh). It is expected that this emission factor will decrease even more over the coming years as the current government target is to obtain a penetration rate for renewables of 40% in gross electricity consumption by 2020 including 3550 MW of wind power. Thus, the indirect generation of greenhouse gases due to the electricity requirements of the site is likely to decrease in the future (EIS, 2017).

Other Principle Pollution Substance of concern (see S.I. No. 283/2013) including Volatile Organic Compounds (VOCs) are not relevant to the facility as solvents are only used in small quantities for cleaning of surfaces. Solvents used in cleaning, Isopropyl Alcohol (IPA), will stored in sealed wipes packaging and sealed bottles in the Warehouse until used. IPA impregnated wipes and spray bottles will be used for cleaning work spaces and used wipes / cloths will be put in flammable waste containers for disposal.

5.0 NOISE EMISSIONS

Once operational, the main noise sources will be the building services and process plant associated with the facility. Due consideration has been given to these issues at the detailed design stage to ensure that the new development will operate within acceptable noise limits at the nearest noise sensitive locations (NSL). The locations of the new noise sources (from the proposed development) are shown on Drawing 011.

Where practical, low noise generating plant items have been selected and noisy plant items have been located within buildings. All existing rooftop air handling units (AHUs) have been installed with appropriate acoustic design as standard, and acoustic attenuation provided where required. A noise management plan including noise monitoring will be outlined in the facility's Environmental Management System (EMS).

Annual noise monitoring is proposed for the licence as is standard for pharmaceutical facilities. The following restrictions are anticipated at the nearest NSL:

- Daytime (07:00 to 19:00hrs) 55dB $L_{Ar,15min}$
- Evening (19:00 to 23:00hrs) 50dB $L_{Ar,15min}$
- Night time (23:00 to 07:00hrs) 45dB $L_{Aeq,15min}$

A detailed noise prediction model has been developed for the proposed facility and it has been calculated that operational noise will be within the relevant day time and night time limits at the nearest noise sensitive receptors. The results of the noise model are presented in Attachment 7.1.3.2.

The impact of noise from additional vehicular traffic on public roads was also assessed as part of the Environmental Impact Assessment Report (EIAR) and it is expected that effects will be unlikely at any of the noise sensitive locations.

In summary, for most noise sensitive locations, the noise or vibration effects will be not significant. At some locations there may be slight effects; however, these are not expected to affect the sensitivities of the receiving environment and will be compliant with the relevant day time and night time limits.

A follow up noise survey will be undertaken in 2019 following installation of the new plant to confirm compliance with the relevant limits.

6.0 EMISSIONS TO GROUND

There are no proposed emissions to ground. The facility will be fully hard paved and control measures will be in place to prevent uncontrolled discharges.
The existing and proposed development will be served by the onsite stormwater drainage network which is outlined in Section 2.1 above.

Groundwater monitoring is proposed as discussed in the impact assessment. The locations of the groundwater monitoring points are shown on Drawing 009.

7.0 CONCLUSIONS

Following a review of the emissions from the proposed AbbVie facility site it can be concluded that site operations will not have a negative impact on the receiving environment, specifically from air, stormwater and wastewater emissions.

8.0 REFERENCES

Environmental Impact Services (2018) Environmental Impact Assessment Report for Internal Works & Change in Activity at AbbVie Ireland, NL B.V Ballytivnan, Sligo. May 2018.

Annual Environmental Report (2017), D0014-01, Sligo (Sligo Wastewater Treatment Plant).