Appendix 11.1: Summary of on-site Emissions to Air

Table 11.1.1 Summary of all Identified Potential Emissions to Air (information supplied by Technip)

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
A1	HP Boiler Z-5100	HP Boiler is running on a mixture of natural gas (import from grid) and processing off-gas. Combustion used to generate high pressure steam. Continuous (Channelled) emissions: flue gas from boiler stack.	H_2O, CO_2, O_2, N_2, NOx, CO	36,239 - 73,000	Continuous (Channelled) - Major	CEMS	Y
A2	HP flare package Z-7010 / LP flare package Z-7160	Flared gas into atm. - Worst case flaring (volumetric) from Enclosed Ground Flare. Flaring when Ethylene to Jet Fuel Plant Trips (anticipated possibly once every 10 years for up to 30 mins)	H_2O, CO_2, O_2, N_2, NOx, CO	3,375,000	Intermittent (Channelled) - Major	PEMS	Y
		Flared gas into atm. - Start-up / Shut-down. Flaring at reduced load from enclosed ground flare for up to 48 hours.	H_2O, CO_2, O_2, N_2, NOx, CO	375,000	Intermittent (Channelled) - Major		
		Pilot lighters required to ensure constant ignition of flare. Continuous (Channelled) emissions: Flue Gas	H_2O, CO_2, O_2, N_2, NOx, CO	1,500	Continuous (Channelled) - Minor	PEMS	

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
A3	Z-7900/7910 - Road Vapour Recovery	Vent TBC	Non Condensible gas + VOC traces	-	Intermittent (Channelled) - Minor	TBC (Vendor)	N – emissions are minor and therefore not considered significant
A4	Jetty	Outside T.EN Scope (By others)	-		Not in scope - Lanzatech	Not in scope - Lanzatech	N – emissions not considered significant based on screening against LAQM.TG(22)
A5	Hydrogen Generation package Z-4300	Hydrogen Generation is from Electrolyser package. This converts Water to both Hydrogen and Oxygen. Hydrogen is used in the process. Continuous Channelled emission: Oxygen	O_2	>500	Continuous (Channelled) - Minor	None	
A6	Cooling Tower package Z-4700	Open loop cooling water system. Evaporated Water loss (drift losses) at the cooling towers. Plume emission.	H_2O	57,000	Continuous - Minor	None	N – emissions are minor and therefore not considered significant

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
A7	Waste Water Treatment Plant Z-6950	API Separator anticipated in WWT package. Potential for minor emission from vent(s). Diffuse emissions intermittent.	Ethanol, DEE,	-	Intermittent (Diffuse) - Minor	None	N - emissions are minor and therefore not considered significant
A8	BFW deaerator package Z-5020	Dearaetor on site. Steam used to remove dissolved gases from boiler feed water. Steam vent from unit. Dissolved gasses to atm (CO_2, O_2, H_2O) - Continuous		240	Continuous (channelled) - Minor	None	N - emissions are minor and therefore not considered significant
A9	Air Dryer Package	Dryer package for compressed air. Regeneration of package will involve Mainly wet air routed to atm - Intermittent	Air	-	Intermittent (Channelled) - Minor	None	N - emissions are minor and therefore not considered significant
A10	liquid N2 package Z-3750	Nitrogen Liquid Vaporizer package provided on site. Package Vaporizes liquid nitrogen (from tankers) to provide usable nitrogen on site. Only emergency venting of nitrogen (non anticipated for normal operation).	N/A - Negligible	-	Intermittent (Channelled) - Minor	None	N - emissions are minor and therefore not considered significant
A11A	Fresh caustic tank T-5501	Fresh Caustic Storage Tank Nitrogen Blanketed. Diffuse Emission: Nitrogen & Non Condensibles / Inerts	Minor	-	Intermittent (Diffuse) - Minor	None	N - emissions are minor and therefore not

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
							considered significant
A11B	Sulphuric acid Tank T-5801	Sulphuric Acid Storage tank on site with an atmospheric Breather arrangement. Light traces of SO2 - Intermittent Tank is provided with desiccant cannister on vent to ATM line to absorb SO_2 or nitrogen blanketing (TBC)	Minor	-	Intermittent (Diffuse) - Minor	None	N - emissions are minor and therefore not considered significant
A12	R-2130A/B / R-2350A/B	Start-up Vending where a mixture of Nitrogen	Steam/ N_2 air, CO, CO_2	1,000-6,000	Intermittent (Channelled) - Minor	None	N - emissions are minor and therefore not considered significant
A13	DMW package Z-5000	Degassing unit anticipated to be provided as part of Demin Water Generation Package. Continuous (Channelled) emission: Air & Inerts	Non Condensible / Interts	-	Continuous (Channelled) - Minor	None	N - emissions are minor and therefore not considered significant
A14	DMW storage tank T-5010	Demin Water Storage Tank Nitrogen Blanketed. Diffuse Emission: Nitrogen & Non Condensibles / Inerts	Non Condensible / Interts	-	Intermittent (Diffuse) - Minor	None	N - emissions are minor and therefore not considered significant

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
A16	FW Pump Diesel Gen	Diesel Generator to provide power to spare firewater pump(s). Tested 30 minutes every week. Intermittent Chanelled emission: Flue Gas	H_2O, CO_2, O_2, N_2, NOx, CO	6,640	Intermittent (Channelled) - Major	None	Y
A15	Emergency Diesel Generator	Diesel Generator to provide emergency electrical load. Tested 30 minutes every week. Intermittent Chanelled emission: Flue Gas	H_2O, CO_2, O_2, N_2, NOx, CO	8,300	Intermittent (Channelled) - Major	None	Y
A17	Emergency Diesel Generator	Diesel Generator to provide emergency electrical load. Tested 30 minutes every week. Intermittent Channelled emission: Flue Gas	H_2O, CO_2, O_2, N_2, NOx, CO	8,300	Intermittent (Channelled) - Major	None	Y
A18	Emergency Diesel Generator	Diesel Generator to provide emergency electrical load. Tested 30 minutes every week. Intermittent Channelled emission: Flue Gas	H_2O, CO_2, O_2, N_2, NOx, CO	8,300	Intermittent (Channelled) - Major	None	Y

Emission Point ID	Emission Source	Description	Parameters	Estimated Size of Release (if known) kg/h	Monitoring frequency (continuous, daily, weekly ect)	Monitoring methodology	Included in Dispersion Modelling
Various Locations	Bulk Storage Tanks	Various Storage Tanks on site: 1 x Utility Water Tank - Fixed Roof with Atmospheric Breather (No emissions) 1x Suspect Condensate Storage Tank - Fixed Roof with Atmospheric Breather (minor emissions - Diffuse) 4x Ethanol Storage Tanks - Internal Floating Roof Tanks. Vapour Space (above internal floating rood) Breather to atmosphere. Minor VOC emissions (Diffuse - intermittent) 1x Paraffins Reprocessing Tank - Internal Floating Roof Tank. Vapour Space (above internal floating rood) Breather to atmosphere. Minor VOC emissions (Diffuse - intermittent) 4x Jet Product Storage Tanks - Internal Floating Roof Tanks. Vapour Space (above internal floating rood) Breather to atmosphere. Minor VOC emissions (Diffuse - intermittent) 3x Diesel Product Storage Tanks - Internal Floating Roof Tanks. Vapour Space (above internal floating rood) Breather to atmosphere. Minor VOC emissions (Diffuse - intermittent)	Nitrogen + VOC's. Minor emission.	-	Intermittent (Diffuse) - Minor		N - emissions are minor and therefore not considered significant

Table 11.1.2 Details of On-site Fugitive Emissions to Air (information supplied by Technip)

Name	Substance Emitted	Source	Frequency (continuous/periodic/emergency)	Monitoring (continuous, daily, weekly ect)
General Pump Seals	VOCs	Pump seals (15 pumps normally running)	Continuous	Pump seals can be monitored for damage by use of a pressure transmitter
General Valve Seals	VOCs	Valve seals	Continuous	Regular maintenance reduces emissions.
Steam vent from HE-1822	VOCs	heat exchanger leak into LP steam system	Emergency (1 every 10 years)	Vent is continuously monitored and flow directed to flare should VOCs be detected.
T-6000A-D	Ethanol vapour	out breathing of tank	daily	Not required. Mitigated by internal floating roof in tank
T-6400 A-D	Jet A1 vapour	out breathing of tank	daily	Not required. Mitigated by internal floating roof in tank
T-6431A/B	Diesel Vapour	out breathing of tank	daily	Not required. Mitigated by internal floating roof in tank
T-4250	HC vapour	out breathing of tank	daily	Not required. Mitigated by internal floating roof in tank
T-6160	HC vapour	out breathing of tank	daily	Not required. Mitigated by internal floating roof in tank

Table 11.1.3: Emission Parameters for Major On-site Emission Sources used in Dispersion Modelling (information supplied by Technip)

Parameter	Units	A1 Boiler Stack (Normal Operation) - < 25 MW	A1 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1 Boiler Stack (Emergency Operation - MP Boiler not online & flaring during start-up) > 25MW	A2-1 HP / LP Flare (Full Flaring)	A2 HP / LP Flare (LP Flaring)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
Emission locations (OS Grid)	x,y	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan	Refer Plot Plan
Exhaust Temperature	Deg C	130	130	130	Approx 900 deg C	Approx 900 deg C	370	370	370	370
Stack diameter	m	1.0	1.0	1.0	Vendor Input: Enclosed ground Flare: Approx 30 burners in a 15 metre diameter radiation box. Burners are Ground level (2-4 meters). Max flame height can be up to 18 meters. For Air Dispersion can	Vendor Input: Enclosed ground Flare: Approx 30 burners in a 15 metr e diameter radiation box. Burners are Ground level (2-4 meters). Max flame height can be up to 18 meters. For Air Dispersion can treat as a 20 metre high stack (12.5	0.6	0.6	0.6	0.5
Stack Height (Estimate)	m	40	40	40			4	4	4	4
Exit velocity	m/s	15	15	30			15	15	15	15

Parameter	Units	A1 Boiler Stack (Normal Operation) - < 25 MW	A1 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1 Boiler Stack (Emergency Operation - MP Boiler not online & flaring during start-up) > 25MW	A2-1 HP / LP Flare (Full Flaring)	A2 HP / LP Flare (LP Flaring)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
					treat as a 20 metre high stack (12.5 metre diameter). Estimated gas velocity from stack is 30-40 m/s.	metrediameter). Estimated gas velocity from stack is 1-5 m/s.				
Volume flow (actual)	Am3/s	12	13	24	1675	125	4.5	4.5	4.5	3.6
Volume flow (Normal)	nm3/s	7	7	13	314	36	1.4	1.4	1.4	1.1
Operating Hours	hr	7760	1000	Emergency (30 mins every 10 years)	Plant trips depressuring case: 87 t/h for 5 minutes (6,028,262 Am^3/h). Then flow halves	Start-up Case (simplified). Assume 30-48 hours of flaring every 6 months (note time of flaring may reduce depending on design	Test 30 mins once per week.	Test 30 mins once per week.	Test 30 mins once per week.	Test 30 mins once per week.

Parameter	Units	A1 Boiler Stack (Normal Operation) - < 25 MW	A1 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1 Boiler Stack (Emergency Operation - MP Boiler not online & flaring during start-up) > 25MW	A2-1 HP / LP Flare (Full Flaring)	A2 HP / LP Flare (LP Flaring)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
					(3,000,000 Am^3/h (up to 30 minutes). For event frequency assume once every 10-25 years.	discussions between LT and T.EN)				

Table 11.1.4 Emission Inventory for Major On-site Emission Sources used in Dispersion Modelling (information supplied by Technip)

Parameter	Units	A1-1 Boiler Stack (Normal Operation) - < 25 MW	A1-2 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1-3 Boiler Stack (Emergency Operation - MP Boiler not online & Flaring during start-up) > 25MW	A2-1 HP / LP Flare (Worst Case - Plant Trip)	A2-2 HP / LP Flare (Start-up / Shut Down)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
Continuous / Intermittent (Time)	-	Estimate 7760 hours per year	Estimate 1000 hours per year	Emergency / Intermittent (30 mins every 10 years)	Intermittent	Intermittent	Intermittent (30 minutes every 1 week predicted)	Intermittent (30 minutes every 1 week predicted)	Intermittent (30 minutes every 1 week predicted)	Intermittent (30 minutes every 1 week predicted)
NOx	mg/Nm^3	125	160	125	92.40	97.9	4119	4119	4119	4119
CO	mg/Nm^3	100	100	100	515.9	340.4	1089	1089	1089	1089
SO_2	mg/Nm^3	1.0	1.0	1.0	0	-	277	277	277	277
Dust (PM)	mg/Nm^3	5	8	5	0	-	50	50	50	50
Unburnt Hydrocarbons	mg/Nm^3	7.4	7.4	7.4	1386.0	915	12.5	12	12	12
VOCs	mg/Nm^3	0.8	0.8	0.8	154.00	101.6	139	139	139	139
H2O	% volume	17.96	21.02	17.96	14.66	17.33	26	26	26	26

Parameter	Units	A1-1 Boiler Stack (Normal Operation) - < 25 MW	A1-2 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1-3 Boiler Stack (Emergency Operation - MP Boiler not online & Flaring during start-up) > 25MW	A2-1 HP / LP Flare (Worst Case - Plant Trip)	A2-2 HP / LP Flare (Start-up / Shut Down)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
CO2	% volume	8.05	8.86	8.05	7.96	7.91	8	8	8	8
O2	% volume	3.1	2.14	3.1	23.86	23.73	4	4	4	4
N2	% volume	70.89	67.97	70.89	53.53	51.04	63	63	63	63
Actual Flow (exhaust)	M^3/h	42808	45123	85622	6028262	450310	16241	16241	16241	12993
Normalised Flow	Nm^3/h	24053	24509	48170	1129856	129892	5163	5163	5163	4130
Temperature	deg C	130 (Note 3)	130 (Note 3)	130 (Note 3)	900	900	370	370	370	370
Notes		1. Gas Fired from natural gas from grid (Particulate Matter not anticipated and SO2 negligible). 2. T.EN note	1. Conservatively assumed 30% liquid fuel firing. 2. No Sox anticipated in boiler	1. Gas Fired from natural gas from grid (Particulate Matter not anticipated and SO2 negligible).	1. EEMS methodology used for estimating exhaust gas composition (Flare - natural gas).	1. EEMS methodology used for estimating exhaust gas composition. To be refined	1. EDG assumed as 1MW (350 kg/h diesel fuel) in size. To be reviewed once	1. EDG assumed as 1MW (350 kg/h diesel fuel) in size. To be reviewed once Engineering is	1. EDG assumed as 1MW (350 kg/h diesel fuel) in size. To be reviewed once	1. FW pump assumed as 800 kw (250 kg/h diesel fuel). To be reviewed

Parameter	Units	A1-1 Boiler Stack (Normal Operation) - < 25 MW	A1-2 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1-3 Boiler Stack (Emergency Operation - MP Boiler not online & Flaring during start-up) > 25MW	A2-1 HP / LP Flare (Worst Case - Plant Trip)	A2-2 HP / LP Flare (Start-up / Shut Down)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
		that there is no limit on CO for ELV from the medium combustion plant directive. Vendor will advise CO in exhaust gas. CO value indicated is from previous experience (conservative value). Value may change depending on vendor feedback. Monitoring is required for CO. 3) Vendor to feedback	exhaust gas. 3) Vendor to feedback exhaust gas temperature. 130 deg C conservatively estimated. 4) SO2 assumes 6.4 ppm wt in fuel gas. EEMS methodology for gas fired heaters assumed for SO2, VOC and unburnt Hydrocarbons	2. T.EN note that there is no limit on CO for ELV from the medium combustion plant directive. Vendor will advise CO in exhaust gas. CO value indicated is from previous experience (conservative value). Value may change depending	To be refined during engineering / Vendor to advise. 2. Flare load preliminary (87 T/h hydrocarbon flaring). To be revalidated during FEED engineering. 3. Peak flaring assumed for 5 minutes. Then volumetric flowrate	during engineering / Vendor to advise. EEMS emission factors used on natural gas. To be updated during engineering.	Engineering is complete. 2. Exhaust temperature assumed. Air modelling team can update (Vendor will advise in due course) 3. Conservatively assumed Dust is at MCP limit for "combustio	complete. 2. Exhaust temperature assumed. Air modelling team can update (Vendor will advise in due course) 3. Conservatively assumed Dust is at MCP limit for "combustion plants with thermal input equal to or greater than 1 MW and less	Engineering is complete. 2. Exhaust temperature assumed. Air modelling team can update (Vendor will advise in due course) 3. Conservatively assumed Dust is at MCP limit for "combustio	once Engineering is complete. 2. Exhaust temperature assumed. Air modelling team can update (Vendor will advise in due course) 3. Conservatively assumed Dust is at MCP limit for

Parameter	Units	A1-1 Boiler Stack (Normal Operation) - < 25 MW	A1-2 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1-3 Boiler Stack (Emergency Operation - MP Boiler not online & Flaring during start-up) > 25MW	A2-1 HP / LP Flare (Worst Case - Plant Trip)	A2-2 HP / LP Flare (Start-up / Shut Down)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
		exhaust gas temperature. 130 deg C conservatively estimated. 4) SO2 assumes 6.4 ppm wt in fuel gas. EEMS methodology for gas fired heaters assumed for SO_2, VOC and unburnt Hydrocarbons 5) No limits on MCP. LCP lists dust as 5 mg/nm3 max.		on vendor feedback. Monitoring is required for CO. 3) Vendor to feedback exhaust gas temperature. 130 deg C conservatively estimated. 4) SO2 assumes 6.4 ppm wt in fuel gas. EEMS methodology for gas fired heaters assumed for SO_2, VOC	halves to 3,000,000 m3/h (actual), 565,000 m3/h (normal)		n plants with thermal input equal to or greater than 1 MW and less or equal to 5 MW.	or equal to 5 MW.	n plants with thermal input equal to or greater than 1 MW and less or equal to 5 MW.	"combustion plants with thermal input equal to or greater than 1 MW and less or equal to 5 MW.

Parameter	Units	A1-1 Boiler Stack (Normal Operation) - < 25 MW	A1-2 Boiler Stack (Normal Operation with liquid firing) < 25 MW	A1-3 Boiler Stack (Emergency Operation - MP Boiler not online & Flaring during start-up) > 25MW	A2-1 HP / LP Flare (Worst Case - Plant Trip)	A2-2 HP / LP Flare (Start-up / Shut Down)	A15 Emergency Diesel Gen 1 (Process Substation)	A17 Emergency Diesel Gen 2 (Utility Substation)	A18 Emergency Diesel Gen 3 (Admin Area Substation)	A16 Firewater Pump Engines
				and unburnt Hydrocarbons 5) No limits on MCP. LCP lists dust as 5 mg/nm^3 max.						

All emission limit values in the large/medium combustion plan directive are defined at a temperature of 273K, a pressure of 101.3 kPa and after correction for the water vapour content of the waste gases and at standardised O_2 content of 6% for medium combustion plants using solid fuels, 3% for medium combustion plants, other than egines and gs turbines, using liquid and gaseous fuels and 15% for engines and Gas turbines

NO_x and Dust values taken from the MCP (Boiler)

Table 11.1.5 Summary of Model Input Data for Dispersion Modelling

Parameter		A1-1	A1-2	A1-3	A2-1	A2-2	A15	A16	A17	A18
Stack height above ground level (m)		40	40	40	20	20	4	4	4	4
Stack diameter (m)		1	1	1	12.5	12.5	0.6	0.5	0.6	0.6
Exit Temperature (^{0}C)		130	130	130	900	900	370	370	370	370
Actual Flow Rate (Am^3/s)		11.9	12.5	23.8	833.3	125.1	4.5	3.6	4.5	4.5
Reference Flow Rate (Nm^3/s)		6.7	6.8	13.4	313.8	36.1	1.4	1.1	1.4	1.4
Exist velocity (m/s)		15.1	16.0	30.3	6.8	1.0	16.0	18.4	16.0	16.0
Operational Hours per annum		7760	1000	Emergency once every 10-15 yrs	Emergency once every 10-15 yrs	96	26	26	26	26
Emission Concentration (mg/Nm3)	NO_x	125	160	125	92	98	4119	4119	4119	4119
	CO	100	100	100	516	340	1089	1089	1089	1089
	SO_2	1.0	1.0	1.0	-	-	277	277	277	277

Parameter		A1-1	A1-2	A1-3	A2-1	A2-2	A15	A16	A17	A18
	Dust (PM)	5.0	8.0	5.0	-	-	50	50	50	50
	Unburnt Hydrocarbons (Benzene)	7.4	7.4	7.4	1386	915	12	12	12	12
	VOCs (1-3, Butadiene)	0.8	0.8	0.8	154	102	139	139	139	139
Short-term Emissions (g/s)	NO_x	0.835	1.069	0.835	29	3.5	5.907	4.726	5.907	5.907
	CO	0.668	0.668	0.668	162	12.3	1.561	1.249	1.561	1.561
	SO_2	0.007	0.007	0.007	-	-	0.398	0.318	0.398	0.398
	Dust (PM)	0.033	0.053	0.033	-	-	0.072	0.057	0.072	0.072
	Unburnt Hydrocarbons (Benzene)	0.049	0.049	0.049	435	33.0	0.018	0.0014	0.018	0.018
	VOCs (1-3, Butadiene)	0.006	0.006	0.006	48.3	3.7	0.199	0.159	0.199	0.199
Long-term Emissions (g/s)	NO_x	0.740	0.122	-	-	0.039	0.0176	0.014	0.0176	0.0176
	CO	0.592	0.076	-	-	0.135	0.0046	0.004	0.0046	0.0046
	SO_2	0.006	0.001	-	-	-	0.0012	0.0009	0.0012	0.0012

Parameter		A1-1	A1-2	A1-3	A2-1	A2-2	A15	A16	A17	A18
	Dust (PM)	0.030	0.006	-	-	-	0.0002	0.0002	0.0002	0.0002
	Unburnt Hydrocarbons (Benzene)	0.044	0.006	-	-	0.362	0.00005	0.00004	0.00005	0.00005
	VOCs (1-3, Butadiene)	0.005	0.001	-	-	0.040	0.00059	0.00047	0.00059	0.00059

Appendix 11.2: Legislative Framework, Policy and Guidance

International Air Quality Policy

EU Directive 2008

The EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for a number of pollutants and the dates by which these objectives should be met. The Air Quality Standards (Wales) Regulations 2010 and EU Exit 2019 Regualtions implements the requirements of the Directive into Welsh legislation. The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. These limit values are legally binding, and the UK may incur infringement action if it does not meet the required objective limits within the agreed time limits. The UK is currently exceeding the objective limits for NO_2 and PM_{10} within London and a number of other air quality zones within the UK.

Directive 2008/50/EC makes it clear that the ambient air quality standards shall not be enforced where there is no regular public access and fixed habitation:

'2. Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations:

- *any locations situated within areas where members of the public do not have access and there is no fixed installation;*
- *in accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply;*
- *on the carriageway of roads; and on the central reservations of roads except where there is normally pedestrian access to the central reservation.'*

National Air Quality Policy

The UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007, pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

The air quality objectives are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives

are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Of the pollutants included in the AQS, NO_2 and PM_{10} would be particularly relevant to this project as these are the primary pollutants associated with road traffic. The current statutory standards and objectives for NO_2 and PM_{10} in relation to human health are set out in **Table 11.2.1**.

The Local Air Quality Management in Wales Policy Guidance (PG(W)(17)) sets out guidance on the role and responsibilities of Welsh authorities and $PM_{2.5}$. The guidance states that 'Local Authorities in Wales should focus on monitoring and reporting NO_2 and PM_{10}. Monitoring and reporting of fine particulate matter ($PM_{2.5}$) is encouraged but not mandatory.' The objective limit for $PM_{2.5}$ is also set out in **Table 11.2.1**.

In relation to $PM_{2.5}$ the 2019 Clean Air Strategy includes a commitment to set 'new, ambitious, long-term targets to reduce people's exposure to $PM_{2.5}$' which the proposed Environment Bill 2019-2021 commits the Secretary of State to setting. New legal targets are set out in the recently published Environmental Improvement Plan (EIP) 2023, however these have yet to be set in legislation. For the purposes of this assessment the EU Directive Stage 2 limit value for $PM_{2.5}$ (as provided in **Table 11.2.1**) is considered to be appropriate to apply and consideration given to future potential changes. However, the new targets set out in the EIP are also provided in **Table 11.2.1** and given consideration within the assessment.

Table 11.2.1: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved by
Nitrogen Dioxide (NO_2)	200 μgm^{-3} not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 μgm^{-3}	Annual mean	31 December 2005
Sulphur Dioxide (SO_2)	266 μgm^{-3} not to be exceeded more than 35 times per year	15-minute mean	31 December 2005
	350 μgm^{-3} not to be exceeded more than 24 times per year	1-hour mean	31 December 2004
	125 μgm^{-3} not to be exceeded more than 3 times per year	24-hour mean	31 December 2004
Carbon Monoxide (CO)	10 mg/m^{-3}	8-hour	31 December 2003
Benzene (C6H6)	5 μgm^{-3}	Annual mean	31 December 2010
1,3-Butadiene (C4H6)	3.25 μgm^{-3}	Annual Mean	31 December 2003
Particulate Matter (PM_{10})	50 μgm^{-3} not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 μgm^{-3}	Annual mean	31 December 2004
Particulate Matter ($PM_{2.5}$)	25 $\mu g/m^3$	Annual Mean	31 December 2010
EU Directive $PM_{2.5}$	Stage 2 – 20 $\mu g/m^3$	Annual Mean	-
EIP $PM_{2.5}$	10 $\mu g/m^3$	Annual Mean	31 December 2040
	12 $\mu g/m^3$	Annual Mean	31 January 2028

The statutory standards and objectives apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2016 (LAQM.TG(22)) issued by DEFRA for Local Authorities on where the objectives apply, as detailed in **Table 11.2.2**. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 11.2.2: Locations Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care home etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
		Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
24 Hour Mean	All locations where the annual mean objective would apply together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Medium Combustion Plant (MCP) Directive

Pollutant emissions from combustion plant with a rated input between 1 and 50 megawatts (MW_{th}) are regulated through the Medium Combustion Plant Directive (MCPD)[1]. The MCPD was transposed into UK law in January 2018 through an amendment to the Environmental Permitting Regulations. All MCP are required to meet the relevant emission limits set out within the Directive.

Industrial Emissions Directive

The Industrial Emissions Directive (2010/75/EU)[2] came into force on the 6th January 2011, replacing the seven existing Directives, including the Waste Incineration Directive (WID) and Large Combustion Plant Directive (LDPD), implemented through the Environmental Permitting Regulations (EPR). The

1 The European Parliament and the Council of the European Union (2015) Directive 2015/2193/EU of the European Parliament and of the Council, available: http://eur-lex.europa.eu/legal-content/En/TXT/?uri=CELEX%3A32015L2193

2 Directive 2010/75/EU of the European Parliament & of the Council of 24th November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:en:PDF

IED has been transposed into UK law via the Environmental Permitting (England and Wales) (Amendment) Regulations 2013 (SI 2013 No, 390)[3], which came into force on 27th February 2013.

Combustion activities listed in Section 1.1, Part (A) 1 of Schedule 1 of the Environmental Permitting Regulations will normally require an environmental permit issued by Natural Resources Wales.

This section includes:

- *Combustion appliances with an aggregated rated thermal input of greater than 50MW, or*
- *Appliances with a rated thermal input of greater than 3MW which burn fuel manufactured from, or comprising, waste (unless they are carried on as part of a Part B activity, in which they will normally fall to the Local Authority for regulation)*

The Well-being of Future Generations (Wales) Act 2015
The Well-being of Future Generations Act (WFG Act) makes provision requiring public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales. The Act ensures that local authorities deliver sustainable development by considering long term effects as well as encouraging a more joined up approach.

Tackling Roadside Nitrogen Dioxide Concentrations in Wales
This document is the Welsh Government supplemental Plan to the 'UK plan for tackling roadside nitrogen dioxide concentrations 2017'. The Plan describes the impacts of air pollution in Wales, describing the locations of excess pollution, and sets out the roles and responsibilities of the various bodies within Wales. Actions to reduce NO_2 concentrations to within legal limits are also described.

Clean Air Plan for Wales: Healthy Air, Healthy Wales 2020
The aim of the Clean Air Plan for Wales is to improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and the economy. The Plan sets out a 10-year pathway to achieving cleaner air and is based upon four main themes:

- People – protecting the health and well-being of current and future generations;
- Environment – taking action to support the natural environment, ecosystems and biodiversity;
- Prosperity – working with industry to reduce emission, supporting a cleaner and more prosperous Wales; and
- Place – creating sustainable places through better planning, infrastructure and transport.

The Protection of Ecological Features
The Conservation of Habitats and Species Regulations was introduced to protect ecological sites in response to the European Directive 92/43/EEC regarding the designation of SAC and Directive 2009/147/EC relating to the designation of Special Protection Areas (SPA). The Regulations require the relevant competent authority to consider whether a development will have a significant effect on a European designated site (i.e. SPA or SAC). If a risk of significant effects is identified than an 'appropriate assessment' is required to determine the level of effect and whether this will result in a significant adverse effect on the identified qualifying features.

Further designation of land considered to be of 'special interest' in terms of flora, fauna, geological or physiographical features is afforded under the Wildlife and Countryside Act, where an area of interest is designated as a SSSI. The protection afforded to these areas is detailed within the

3 Environmental Permitting (England and Wales) (Amendment) Regulations 2013 – Statutory Instrument 2013 No.390

Countryside and Rights of Way (CROW) Act, which states that where a development is 'likely to damage' a SSSI then the appropriate conservation body must be consulted.

Critical levels (CLs) and critical loads (CLOs) are used for assessing the risk of air pollution impacts on ecosystems. CLs are defined by the United Nations Economic Commission for Europe (UNECE) as 'concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge'. The critical levels relevant to this assessment are set out in **Table 11.2.3**.

Table 11.2.3: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As
Oxides of Nitrogen (NO_x)	30 µg/m^3	Annual mean
Ammonia (NH_3)	3 µg/m^3	Annual mean
SO_2	10-20 µg/m^3	Annual mean

CLOs relate to the potential effects of pollutant deposition (over periods of decades) and are defined by UNECE as 'a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge'.

Empirical CLOs for nutrient nitrogen are set under the Convention on Long-Range Transboundary Air Pollution. They are based on empirical evidence such as observations from experiments and gradient studies. CLOs are assigned to habitat classes defined within the European Nature Information System (EUNIS) which enables consistency of habitat terminology and understanding. CLOs are given as ranges and reflect the variation in ecosystem response across Europe.

CLOs for use in impacts assessments, which were revised in June 2010, are provided on the Air Pollution Information System (APIS). The CLOs for the designated sites being considered within this assessment are set out in **Table 11.2.4** below. The worst-case (i.e. lowest) CLOs have been selected for each Site based on the most sensitive qualifying feature within each site.

Table 11.2.4: Relevant Critical Loads for each Designated Site

Habitat	Qualifying Features	Nutrient Nitrogen (kg N/ha/yr)	Nitrogen Acid Deposition **(keq/ha/yr)**	Sulphur Acid Deposition (keq/ha/yr)
Little Warren SINC	Coastal sand-dunes	5-15	0.892	4.08
Lower River AFAN SINC	Saltmarsh	10-20	4.0[3]	4[3]
Harbourside SINC	Calcareous Grassland used[1]	5-15	1.071	4
Watercourse SINC	Calcareous Grassland used[2]	5-15	1.071	4

Habitat	Qualifying Features	Nutrient Nitrogen (kg N/ha/yr)	Nitrogen Acid Deposition **(keq/ha/yr)**	Sulphur Acid Deposition (keq/ha/yr)
Tai-Bach AW	Broadleaf Woodland	10-15	0.357	2.58
Bryn Goytre AW	Broadleaf Woodland	10-15	0.357	0.67
Crymlyn Bog SAC	Calcareous fens, mires and bogs	5-15	0.321	0.393
Kenfig SAC	Alder Woodland, coastal dune heathland	5-15	0.892	4.08
Cefn Cribwr	Purple Moor-grass meadows, wet heathland	5-15	0.856	4

[1] habitat identified in Chapter 5 as Open Mosaic Habitat including stonecrop species, kidney vetch, yellow-wort. Calcareous grassland habitat used to represent this area

[2] habitat identified as a mix of coastal, urban and industrial in Chapter 5. Calcareous grassland used to represent this area

[3] no comparable acid deposition critical load is provided for this habitat, a soil based critical load of 4 is given on the APIS website

Planning Policy

National Planning Policy

Updated in February 2021, Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. This is supplemented by a series of Technical Advice Notes.

At the heart of the PPW is a presumption in favour of sustainable development to ensure that social, economic and environmental issues are balanced and integrated by the decision-maker when determining planning applications (paragraph1.2). Paragraph 1.2 states the 'the primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well- being of Wales...'

Paragraph 1.18 describes the importance of a plan-led approach in securing sustainable development and acknowledges the statutory presumption in favour of sustainable development.

Paragraph 1.20 states that 'those proposing development have a responsibility to provide sufficient information to enable the decision maker to make an informed judgement on whether the proposed development is sustainable.'

Decision markers are to be guided by the Key Planning Principles set out in Figure 4 of Chapter 2 page 17. The section on Maximising Environmental Protection and Limiting Environmental Impact is relevant here.

Specific guidance on air quality is provide in Chapter 6 in paragraph 6.7: Air Quality and Soundscape. In proposing new development 'planning authorities and developers must address any implication arising as a result of its association with, or location within air quality management areas, noise action planning priority areas or areas where there are sensitive receptors; not create areas of poor air quality or inappropriate soundscape and seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.'.

The policy stresses that good design, for example setting back buildings from roads to avoid canyon effects should be incorporated at an early consideration in the design and planning stage. Examples of further mitigation measures are provided and include:

- Traffic management and road safety;
- Ensuring progress towards a shift to low or zero emissions means of transport, such as electrical charging points;
- Supporting low or zero emission public transport;
- Providing active travel infrastructure; and
- Incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its disposal.

Planning Policy Wales (PPW) Technical Note 18: Transport National Planning Policy
The PPW Technical Advice Note (TAN)was adopted in March 2007 and is intended to be read in conjunction with PPW. It states that '*transport emissions contribute significantly to climate change and poor air quality'*…….. It continues '*when preparing development plans and when considering planning applications, planning authorities should take into account statutory air quality objectives, together with the results of air quality reviews and assessments and any Air Quality Management Area Action Plans that may have been prepared*.'

Local Planning Policy

Neath Port Talbot Local Development Plan 2011 - 2026
The NPTCBC Local Development Plan (LDP) was adopted January 2016 and sets out policies to guide development in the future. In dealing with air quality the plan sets out the following:

Policy SP 16: Environmental Protection

Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures:

1. *ensuring that proposals have no significant adverse effects on water, ground or air quality and so not significantly increase pollution levels;*
2. *giving preference to the development of brownfield sites over greenfield sites where appropriate and deliverable;*
3. *ensuring that developments do not increase the number of people exposed to significant levels of pollution.*

Policy EN8 Pollution and Land Stability

Proposals which would be likely to have an unacceptable adverse effect on health, biodiversity and/or local amenity or would expose people to unacceptable risk due to the following will not be permitted:

- *air pollution*

Proposals which would create new problems or exacerbate existing problems details above will not be acceptable unless mitigation measures are included to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level.

Policy EN 9 Developments in the Central Port Talbot Area

Developments in the central Port Talbot area that could result in breaches of air quality objectives during their construction phase will be required to be undertaken in accordance with a Construction Management Plan submitted as part of the planning process and agreed with the Council.

3.5.2 Neath Port Talbot Pollution Supplementary Planning Guidance (SPG)

The NPTCBC Pollution SPG was adopted in October 2016 and sets out information about pollution issues in Neath Port Talbot and provides details on relevant matters that should be taken into consideration when assessing proposed developments within the borough. In relation to air quality the SPG sets out details on how to assess air quality impacts associated with development plans and to meet the relevant planning policies set out within the Local Development Plan.

Air Quality Guidance

DEFRA Technical Guidance, LAQM.TG(22)
LAQM.TG(22) sets out detailed guidance on how air quality should be assessed and monitored by local authorities. The document provides useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

IAQM Land-Use Planning and Development Control: Planning for Air Quality
The Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts.

IAQM A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites
The Institute of Air Quality Management (IAQM) has published guidance on the assessment of the air quality impacts of development on designated nature conservation sites. The guidance discusses the policy and legal background underpinning the proposed methodology, including the impact of the Wealdon Judgement and the Netherlands Air Quality Judgement. The document outlines the way in which air quality consultants and ecologists should work together, highlighting the responsibilities for each when carrying out Habitats Regulations Assessment.

Appendix 11.3: Data used in Dispersion Modelling Exercise

Determining Modelling Scenarios for Point Source Emissions

A total of six significant point sources have been identified on the Site which need to be considered within the modelling scenario. Full details of these are provided in **Appendix 11.1**.

To assess long-term emissions during operation all the identified emission sources (with the exception of the emergency flare (A2-1)) have been included within the modelling scenario. This is considered to represent an extremely cautious approach to predicted impacts as it is unlikely that all the emissions sources would be operating simultaneously, for example the emergency generators (sources A15 to A18) would be tested once a week but successively, therefore only one would operate at a single time.

The gas fired boiler (emission source A1) would operate continuously during the year, operating for 7760 hours under normal operation (A1-1) and for 1000 hours with liquid firing (A1-2). As the emission are higher under liquid firing the model has assumed that source A1-2 is operating for the full 8760 hours to ensure a worst-case.

All other emission sources (A2, A15, A16, A17 and A18) are intermittent therefore to predict the impact of the development against long-term (annual average) objective limits and critical levels (CL) the emissions data has been adjusted to ensure that the equivalent total mass emissions released for the intermittent periods are accounted for within the model. i.e. sources A15 to A18 would operate for 30 minutes once per week for testing. This equates to 26 hours per year. The emissions have therefore been adjusted by a factor of 0.30 (26/8760), in accordance with guidance produced by the Environment Agency (EA) [4i], which, although withdrawn, provides useful guidance on modelling of point source emissions and is regularly used to determine the approach to modelling such emissions. The guidance states:

"You should describe how the concentrations of releases vary over time to ensure that representative operational situations have been assessed. Also describe the plant load at which the emissions are applicable, e.g. batch or continuous, average load or peak load. It may be necessary to evaluate more than one operating scenario to ensure that the risks resulting from the worst-case situation have been assessed.

The emissions released from these different operational situations should be related to those that result in long term effects (e.g. continuous releases over a long-time period, or regular batch releases, that do not result in great variation in concentration) and those that result in short-term effects caused by intermittent or periodic peak emissions at relatively high concentrations released over a short period of time. "former H1 Annex f, p8.

"Different process options may lead to variations on the pattern of releases. For example, a process operated intermittently may give lower annual concentrations but an increased frequency of short-term peaks compared to one run continuously. Furthermore, although the long-term average concentration may have been rendered acceptable by generally good dispersion there may, on occasions, be unacceptable short-term peaks." former H1 Annex f, p15.

4 Environment Agency, H1 Environmental Risk Assessment Annex (f) Air Emissions, 2009

For assessing short-term concentrations (hourly, 8-hourly and 24-hourly), worst-case emission limits have been assumed for the purposes of the modelling assessment and the plant is assumed to be operating at full load, 100% of the time. This is clearly an extreme worst-case but allows for the fact that the plant may be operating during worst-case meteorological conditions.

Modelling of short-term emissions has also considered which point sources would be operating at the same time. A review of the operational processes indicates that the emergency generators (sources A15 to A18) would be tested successively, therefore under any scenario only one of these emissions sources would be operating at any time. Assuming all sources operate at the same time would represent an overly cautious predicting of short-term impacts.

Furthermore, although the flare would operate intermittently under the start up/shut down scenario (Source A2-2), this could occur at the same time as the emergency generators are being tested. This source also needs to be included within the operating scenario. However, the emergency flare scenario (Source A2-2) is only anticipated to operate once every 10-15 years and would not operate under these conditions if already operating in start-up/shut-down mode. This source has therefore been excluded from the modelling scenario.

On this basis the assessment of operational impacts against the long-term objectives and CLOs the following emission sources have been included within the model with relevant emissions adjusted for operating times:

- 25 MW gas fired boiler liquid firing scenario (source A1-2)
- Flare start up/shut down scenario (source A2-2)
- Emergency Generator 1 (source A16)

This is based on the understanding that the gas boiler (A1) would operate continuously through the year, the flare would then operate during start up/shut down, and the emergency generators would be tested successively. Therefore, at any one time only three emission sources would be operating on the Site. Source A15 has been selected as sources A15, A17 and A18 have the same emission rates, while source A16 has lower emission rates.

In addition to the above scenarios source A2 and A1 have emergency operating scenarios. It is expected that these would occur once every 10-15 years in significant emergency situations, therefore contribution to regular long-term and short-term pollution concentrations is unlikely to be significant. However, to assess potential impacts during an emergency situation both sources have been assessed individually in terms of short-term impacts.

Full emissions data for each emission sources are provided in **Appendix 11.1**.

Buildings Used on Modelling

Table 11.3.1: Buildings Used in Modelling

Building	Length (m)	Width (m)	Diameter (m)	Height (m)
Admin	38	18	-	15
Workshop/Warehouse	48	18	-	10
Sub1000	28	20	-	10

Building	Length (m)	Width (m)	Diameter (m)	Height (m)
Sub2000	35	30	-	10
Sub3000	30	30	-	10
Z5100	7.3	3.6	-	4.4
Z3750	26	33	-	12
T5010	-	-	16.2	14.5
T5450	-	-	17.2	17.4
T4520	-	-	21.5	17
T4600	-	-	24	20
Z3520	12	6	-	4
Z4700	31	10	-	6.9
T6400A/B/C/D	-	-	22	20
T6000A/B/C/D	-	-	18.5	20
Z6950	11	5.5	-	4
Z7450	12	12	-	4
Flare Building	30	30	-	20

Appendix 11.4: Receptors used in Dispersion Modelling

Table 11.4.1: Human Receptors used in Dispersion Modelling as shown in Figure 11.1

Receptor Number	Receptor Location	OS Grid Reference	Receptor Height (m)
R1	Port Talbot Sea Cadets	276020, 189023	1.5
R2	YMCA Watersports	275926, 188983	1.5
R3	AFAN Boad Club	225544, 188865	1.5
R4	Aberavon Green Stars RFC	275326, 188909	1.5
R5	27 Mariners Point	275285, 188866	1.5
R6	46 Mariners Point	275129, 188802	1.5
R7	40 Darwin Road	275290, 189103	1.5
R8	23 Darwin Road	275380, 189221	1.5
R9	1 Darwin Road	275488, 189325	1.5
R10	Tywyn Primary School	274953, 189426	1.5
R11	Neath Port Hospital	275485, 190334	1.5
R12	40 Harveys Crescent	275575, 189550	1.5
R13	21 Glenavan Street	275716, 189716	1.5
R14	3 Green Park Street	276035, 189784	1.5
R15	123 Water Street	276177, 189962	1.5
R16	St Marys Church	276307, 190124	1.5
R17	25 Station Road	276736, 189750	1.5
R18	53 Talbot Road	276951, 189411	1.5
R19	Central Infants School	277289, 189282	1.5
R20	26 West End	277070, 189010	1.5
R21	1 West End	277146, 188902	1.5
R22	Eastern Primary School	277604, 188855	1.5
R23	29 St Albans Terrace	277429, 188696	1.5
R24	Special Needs Activity Club	277575, 188553	1.5
R25	13 Pentre Wern	277714, 188201	1.5
R26	Margam RC Church	277885, 188299	1.5
R27	37 Tal-y-Wern	277827, 187950	1.5

Receptor Number	Receptor Location	OS Grid Reference	Receptor Height (m)
R28	19 Rhodfa Glan-y-Mar	277066, 187869	1.5
R29	Brambil School	278587, 187478	1.5
R30	8 Knox Street	278131, 187306	1.5
R31	Maes Y Bryn Residential Home	277540, 189664	1.5
R32	Velindre Community School	277094, 190823	1.5
C1	36 Byass Street	278232, 187107	4.5
C2	Min-y-Dan	278277, 187083	4.5

Table 11.4.2: Ecological Receptors used in Dispersion Modelling as shown in Figure 11.1

Receptor Number	Receptor Location	Receptor Height (m)
LE1 – Little Warren SINC	275099, 188796	0
LE2 – Lower River AFAN SINC	275395, 188810	0
LE3 – Harbourside SINC	276559, 189421	0
LE4 – Watercourses SINC	276932, 188187	0
LE5 – Tai-Bach AW	277871, 188473	0
LE6 – Bryn Goytre AW	277823, 189755	0
E1 - Kenfig SAC	277572, 183291	0
E2 - Kenfig SAC	277921, 183428	0
E3 - Kenfig SAC	278644, 183288	0
E4- Kenfig SAC	279117, 183410	0
E5- Kenfig SAC	280197, 182693	0
E6 - Crymlyn Bog SAC	271757, 194132	0
E7 - Crymlyn Bog SAC	271008, 193807	0
E8 Crymlyn Bog SAC	270164, 193613	0
E9 Crymlyn Bog SAC	269386, 193389	0
E10 Crymlyn Bog SAC	268529, 193240	0
E11 Cefn Cribwr SAC	284119, 181971	0
Roadside Transect (Kenfig SAC)		
KF1 Rdside	280530, 182489	0

Receptor Number	Receptor Location	Receptor Height (m)
KF1 10m	280519, 182486	0
KF1 20m	280510, 182483	0
KF1 30m	280500, 182479	0
KF1 50m	280482, 182472	0
KF1 70m	280463, 182465	0
KF1 90m	280444, 182458	0
KF1 110m	280424, 182453	0
KF2 Rdside	280608, 182514	0
KF2 10m	280617, 182517	0
KF2 20m	280627, 182521	0
KF2 30m	280635, 182526	0
KF2 50m	280653, 182535	0
KF2 70m	280671, 182545	0
KF2 90m	280688, 182555	0
KF2 110m	280705, 182565	0

Appendix 11.5: Traffic Data

Table 11.5.1: Traffic Data used in Air Quality Assessment

Road Name	2022 Base		2022 Base + Construction		2022 base + committed development		2022 Base + Committed + operational development	
	AADT	%HDV	AADT	%HDV	AADT	%HDV	AADT	%HDV
Harbour Way	**9152**	7	**9618**	9	-	-	-	-
M4	**74172**	8	-	-	74868	8	74942	8

Table 11.5.2: Traffic Data Screened out for Assessment

Road Name	Construction Trips[1]				Operational Trips					
	AADT	HGV	Above screening criteria	Relevant receptors	AADT	HGV	Above screening criteria for human receptors	Relevant receptors (human)	Above screening criteria for ecological receptors	Relevant Receptors (ecological)
M4 – south of Port Talbot	346	168	No	No	74	20	no	no	No	Yes – trips have been considered as part of detailed modelling
Margham Rd – south	408	203	Just above 200 HGV	No	82	21	no	no	No	No

Road Name	Construction Trips[1]				Operational Trips					
	AADT	HGV	Above screening criteria	Relevant receptors	AADT	HGV	Above screening criteria for human receptors	Relevant receptors (human)	Above screening criteria for ecological receptors	Relevant Receptors (ecological)
of Harbour Way			screening criteria							
Margham Rd – north of Harbour Way	58	37	Just above the 25 HGV screening criteria	Receptors are over 50 m from roadside and baseline levels are <75% of objectives therefore impacts would not cause a breach of objectives and would be negligible, screened out.	6	0	no	yes	no	no
Harbour Way – south of Site	466	240	Exceeds 200 HGV for outside an AQMA, however nearby residential fall within the AQMA, HGV significantly exceeds	Yes, residential receptors within the AQMA – detailed modelling of receptors undertaken	88	21	no	Yes	No	No

Road Name	Construction Trips[1]				Operational Trips					
	AADT	HGV	Above screening criteria	Relevant receptors	AADT	HGV	Above screening criteria for human receptors	Relevant receptors (human)	Above screening criteria for ecological receptors	Relevant Receptors (ecological)
			25 HGV criteria for within an AQMA							
Harbour Way – north of Site	388	0	No	Yes	110	9	no	Yes	No	no
A4241	229	0	No	No	77	9	no	yes	No	no
A48 Heilbronn Way	202	0	No	Yes	69	9	no	yes	No	no
A48 Pentyla-Baglan Rd	167	0	No	Yes	59	9	no	yes	No	no

[1] *construction effects not considered in relation to ecological receptors as effects will be short-term and CL and CLOs relate to long-term exposure only.*

I*AQM screening criteria for assessment of impacts on human receptors:*

A change in LGV of more than 100 per day within or adjacent to an AQMA, a change of more than 500 per day elsewhere

A change in HGV of more than 25 per day within or adjacent to an AQMA, a change of more than 100 per day elsewhere

Road Name	Construction Trips[1]				Operational Trips					
	AADT	HGV	Above screening criteria	Relevant receptors	AADT	HGV	Above screening criteria for human receptors	Relevant receptors (human)	Above screening criteria for ecological receptors	Relevant Receptors (ecological)

IAQM screening criteria for assessment of impacts on ecological receptors:

A change of more than 1000 vehicles per day or more than 200 HGV per day on a road within 200 m of a designated site both alone or in-combination

However, NPTCBC advisors have raised concerns over the effectiveness of this criteria for screening out significant effects therefore impacts have been assessed in detail even where this criteria are met

Appendix 11.6: Construction Traffic Impacts

11.6.1: Annual Mean NO_2 Concentrations Predicted Due to Construction Traffic Emissions

Receptor	2022 Base	2022 Base + Construction Traffic	Change due to Proposed Development as a % of AQAL	Magnitude of Impact
C1	15.4	15.5	<1	Negligible
C2	15.2	15.3	<1	Negligible

Table 11.6.2: Annual Mean PM_{10} Concentrations Predicted Due to Construction Traffic Emissions

Receptor	2022 Base	2022 Base + Construction Traffic	Change due to Proposed Development as a % of AQAL	Magnitude of Impact
C1	14.1	14.1	<0.1	Negligible
C2	14.0	14.0	<0.1	Negligible

Table 11.6.3: Annual Mean $PM_{2.5}$ Concentrations Predicted Due to Construction Traffic Emissions

Receptor	2022 Base	2022 Base + Construction Traffic	Change due to Proposed Development as a % of AQAL	Magnitude of Impact
C1	8.8	8.8	<0.1	Negligible
C2	8.8	8.8	<0.1	Negligible

Appendix 11.7: Point Source Impacts on Human Receptors

Table 11.7.1: Annual Mean (Long-term) NO2 Concentrations Predicted from Point Source Emissions (µg/m$_3$) (includes emissions from sources A1-1 (normal), A1-2 (start-up), A2-2 (start up/shut down), A15, A16, A17 and A18 emergency generators)

Table 11.8.1:

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R1	0.2	0.2	15.2	0.4	Negligible
R2	0.1	0.1	15.1	0.4	Negligible
R3	0.1	0.1	15.1	0.3	Negligible
R4	0.1	0.1	15.1	0.2	Negligible
R5	0.1	0.1	15.1	0.2	Negligible
R6	0.1	0.1	15.1	0.2	Negligible
R7	0.1	0.1	15.1	0.2	Negligible
R8	0.1	0.1	15.1	0.2	Negligible
R9	0.1	0.1	15.1	0.1	Negligible
R10	<0.1	<0.1	15.0	0.1	Negligible
R11	<0.1	<0.1	15.0	0.1	Negligible
R12	0.1	0.1	15.1	0.1	Negligible
R13	0.1	0.1	15.1	0.1	Negligible
R14	0.1	0.1	15.1	0.1	Negligible
R15	0.1	0.1	15.1	0.1	Negligible
R16	0.1	0.1	15.1	0.1	Negligible
R17	0.1	0.1	15.1	0.2	Negligible
R18	0.2	0.2	15.2	0.4	Negligible
R19	0.2	0.2	15.2	0.5	Negligible
R20	0.4	0.4	15.4	0.9	Negligible
R21	0.4	0.4	15.4	1.0	Negligible
R22	0.2	0.2	15.2	0.5	Negligible
R23	0.3	0.3	15.3	0.7	Negligible
R24	0.2	0.2	15.2	0.4	Negligible
R25	0.1	0.1	15.1	0.3	Negligible

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R26	0.1	0.1	15.1	0.2	Negligible
R27	0.1	0.1	15.1	0.1	Negligible
R28	0.1	0.1	15.1	0.2	Negligible
R29	<0.1	<0.1	15.0	0.3	Negligible
R30	0.1	0.1	15.1	0.1	Negligible
R31	0.1	0.1	15.1	0.1	Negligible
R32	<0.1	<0.1	15.0	0.1	Negligible

Max. PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

Max. PC NO_2 - calculated based on a conversion factors of 1 applied to NO_x – this is worst-case used for screening. Current guidance recommends a conversion of 0.7 between NO_x: NO_2

PEC – includes PC plus background

Background NO_2 assumed as 2019 concentrations of 15µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

Table 11.7.2: Annual Mean (Long-term) PM_{10} Concentrations Predicted from Point Source Emissions (µg/m^3) (includes emissions from sources A1-1 (normal), A1-2 (start-up), A2-2 (start up/shut down), A15, A16, A17 and A18 emergency generators)

Receptor	Max. PC PM_{10}	PM_{10} PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R1	0.1	21.1	<0.1	Negligible
R2	0.1	21.1	<0.1	Negligible
R3	0.1	21.1	<0.1	Negligible
R4	0.1	21.1	<0.1	Negligible
R5	0.1	21.1	<0.1	Negligible
R6	0.1	21.1	<0.1	Negligible
R7	<0.1	21.0	<0.1	Negligible
R8	<0.1	21.0	<0.1	Negligible
R9	<0.1	21.0	<0.1	Negligible
R10	<0.1	21.0	<0.1	Negligible
R11	<0.1	21.0	<0.1	Negligible
R12	<0.1	21.0	<0.1	Negligible

Receptor	Max. PC PM_{10}	PM_{10} PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R13	<0.1	21.0	<0.1	Negligible
R14	0.1	21.1	<0.1	Negligible
R15	0.1	21.1	<0.1	Negligible
R16	<0.1	21.0	<0.1	Negligible
R17	0.1	21.1	<0.1	Negligible
R18	0.2	21.2	<0.1	Negligible
R19	0.2	21.2	<0.1	Negligible
R20	0.3	21.3	<0.1	Negligible
R21	0.4	21.4	<0.1	Negligible
R22	0.2	21.2	<0.1	Negligible
R23	0.2	21.2	<0.1	Negligible
R24	0.2	21.2	<0.1	Negligible
R25	0.1	21.1	<0.1	Negligible
R26	0.1	21.1	<0.1	Negligible
R27	0.1	21.1	<0.1	Negligible
R28	0.1	21.1	<0.1	Negligible
R29	<0.1	21.0	<0.1	Negligible
R30	0.1	21.1	<0.1	Negligible
R31	0.1	21.1	<0.1	Negligible
R32	<0.1	21.0	<0.1	Negligible

Max. PC PM_{10} – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background PM_{10} assumed as 2019 concentrations of 21µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

Table 11.7.3: Annual Mean (Long-term) $PM_{2.5}$ Concentrations Predicted from Point Source Emissions (µg/m³) (includes emissions from sources A1-1 (normal), A1-2 (start-up), A2-2 (start up/shut down), A15, A16, A17 and A18 emergency generators)

Receptor	Max. PC $PM_{2.5}$	$PM_{2.5}$ PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R1	<0.1	11.0	<0.1	Negligible
R2	<0.1	11.0	<0.1	Negligible
R3	<0.1	11.0	<0.1	Negligible
R4	<0.1	11.0	<0.1	Negligible
R5	<0.1	11.0	<0.1	Negligible
R6	<0.1	11.0	<0.1	Negligible
R7	<0.1	11.0	<0.1	Negligible
R8	<0.1	11.0	<0.1	Negligible
R9	<0.1	11.0	<0.1	Negligible
R10	<0.1	11.0	<0.1	Negligible
R11	<0.1	11.0	<0.1	Negligible
R12	<0.1	11.0	<0.1	Negligible
R13	<0.1	11.0	<0.1	Negligible
R14	<0.1	11.0	<0.1	Negligible
R15	<0.1	11.0	<0.1	Negligible
R16	<0.1	11.0	<0.1	Negligible
R17	<0.1	11.0	<0.1	Negligible
R18	<0.1	11.0	<0.1	Negligible
R19	<0.1	11.0	<0.1	Negligible
R20	<0.1	11.0	<0.1	Negligible
R21	<0.1	11.0	<0.1	Negligible
R22	<0.1	11.0	<0.1	Negligible
R23	<0.1	11.0	<0.1	Negligible
R24	<0.1	11.0	<0.1	Negligible
R25	<0.1	11.0	<0.1	Negligible
R26	<0.1	11.0	<0.1	Negligible
R27	<0.1	11.0	<0.1	Negligible
R28	<0.1	11.0	<0.1	Negligible
R29	<0.1	11.0	<0.1	Negligible

Receptor	Max. PC $PM_{2.5}$	$PM_{2.5}$ PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R30	<0.1	11.0	<0.1	Negligible
R31	<0.1	11.0	<0.1	Negligible
R32	<0.1	11.0	<0.1	Negligible

Max. PC $PM_{2.5}$ – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background $PM_{2.5}$ assumed as 2019 concentrations of 11µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

Table 11.7.4: Annual Mean (Long-term) 1,3-Butadiene (VOC) Concentrations Predicted from Point Source Emissions (µg/m^3) (includes emissions from sources A1-1 (normal), A1-2 (start-up), A2-2 (start up/shut down), A15, A16, A17 and A18 emergency generators)

Receptor	Max. PC VOC	VOC PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R1	<0.1	0.1	<0.1	Negligible
R2	<0.1	0.1	<0.1	Negligible
R3	<0.1	0.1	<0.1	Negligible
R4	<0.1	0.1	<0.1	Negligible
R5	<0.1	0.1	<0.1	Negligible
R6	<0.1	0.1	<0.1	Negligible
R7	<0.1	0.1	<0.1	Negligible
R8	<0.1	0.1	<0.1	Negligible
R9	<0.1	0.1	<0.1	Negligible
R10	<0.1	0.1	<0.1	Negligible
R11	<0.1	0.1	<0.1	Negligible
R12	<0.1	0.1	<0.1	Negligible
R13	<0.1	0.1	<0.1	Negligible
R14	<0.1	0.1	<0.1	Negligible
R15	<0.1	0.1	<0.1	Negligible
R16	<0.1	0.1	<0.1	Negligible
R17	<0.1	0.1	<0.1	Negligible
R18	<0.1	0.1	<0.1	Negligible
R19	<0.1	0.1	<0.1	Negligible

Receptor	Max. PC VOC	VOC PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R20	<0.1	0.1	<0.1	Negligible
R21	<0.1	0.1	<0.1	Negligible
R22	<0.1	0.1	<0.1	Negligible
R23	<0.1	0.1	<0.1	Negligible
R24	<0.1	0.1	<0.1	Negligible
R25	<0.1	0.1	<0.1	Negligible
R26	<0.1	0.1	<0.1	Negligible
R27	<0.1	0.1	<0.1	Negligible
R28	<0.1	0.1	<0.1	Negligible
R29	<0.1	0.1	<0.1	Negligible
R30	<0.1	0.1	<0.1	Negligible
R31	<0.1	0.1	<0.1	Negligible
R32	<0.1	0.1	<0.1	Negligible

Max. PC VOC – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background VOC taken from Defra maps

Table 11.7.5: Annual Mean (Long-term) Benzene Concentrations Predicted from Point Source Emissions (µg/m^3) (includes emissions from sources A1-1 (normal), A1-2 (start-up), A2-2 (start up/shut down), A15, A16, A17 and A18 emergency generators)

Receptor	Max. PC Benzene	Benzene PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R1	0.1	0.2	<0.1	Negligible
R2	0.1	0.2	<0.1	Negligible
R3	0.1	0.2	<0.1	Negligible
R4	<0.1	0.2	<0.1	Negligible
R5	<0.1	0.2	<0.1	Negligible
R6	<0.1	0.2	<0.1	Negligible
R7	<0.1	0.2	<0.1	Negligible
R8	<0.1	0.2	<0.1	Negligible
R9	<0.1	0.2	<0.1	Negligible
R10	<0.1	0.2	<0.1	Negligible
R11	<0.1	0.2	<0.1	Negligible
R12	<0.1	0.2	<0.1	Negligible
R13	<0.1	0.2	<0.1	Negligible
R14	<0.1	0.2	<0.1	Negligible
R15	<0.1	0.2	<0.1	Negligible
R16	<0.1	0.2	<0.1	Negligible
R17	<0.1	0.2	<0.1	Negligible
R18	0.1	0.2	<0.1	Negligible
R19	0.1	0.2	<0.1	Negligible
R20	0.1	0.2	<0.1	Negligible
R21	0.1	0.2	<0.1	Negligible
R22	<0.1	0.2	<0.1	Negligible
R23	<0.1	0.2	<0.1	Negligible
R24	<0.1	0.2	<0.1	Negligible
R25	<0.1	0.2	<0.1	Negligible
R26	<0.1	0.2	<0.1	Negligible
R27	<0.1	0.2	<0.1	Negligible
R28	<0.1	0.2	<0.1	Negligible
R29	<0.1	0.2	<0.1	Negligible

Receptor	Max. PC Benzene	Benzene PEC	PC as % of AQAL	Significance based on EPUK/IAQM criteria
R30	<0.1	0.2	<0.1	Negligible
R31	<0.1	0.2	<0.1	Negligible
R32	<0.1	0.3	<0.1	Negligible

Max. PC Benzene – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background Benzene taken from Defra maps

Table 11.7.6: 99.8th Percentile (short-term) NO_2 Concentrations Predicted from Point Source Emissions (µg/m³) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R1	62.2	21.8	51.8	10.9	Small	NS	Below AEGL 1
R2	41.0	14.4	44.4	7.2	Negligible	NS	Below AEGL 1
R3	34.0	11.9	41.9	6.0	Negligible	NS	Below AEGL 1
R4	28.1	9.8	39.8	4.9	Negligible	NS	Below AEGL 1
R5	30.9	10.8	40.8	5.4	Negligible	NS	Below AEGL 1
R6	31.3	11.0	41.0	5.5	Negligible	NS	Below AEGL 1
R7	19.4	6.8	36.8	3.4	Negligible	NS	Below AEGL 1
R8	22.3	7.8	37.8	3.9	Negligible	NS	Below AEGL 1
R9	28.6	10.0	40.0	5.0	Negligible	NS	Below AEGL 1
R10	17.4	6.1	36.1	3.1	Negligible	NS	Below AEGL 1
R11	21.0	7.4	37.4	3.7	Negligible	NS	Below AEGL 1
R12	31.7	11.1	41.1	5.5	Negligible	NS	Below AEGL 1
R13	34.0	11.9	41.9	6.0	Negligible	NS	Below AEGL 1
R14	38.8	13.6	43.6	6.8	Negligible	NS	Below AEGL 1
R15	22.2	7.8	37.8	3.9	Negligible	NS	Below AEGL 1
R16	16.7	5.8	35.8	2.9	Negligible	NS	Below AEGL 1
R17	28.5	10.0	40.0	5.0	Negligible	NS	Below AEGL 1
R18	61.1	21.4	51.4	10.7	Small	NS	Below AEGL 1
R19	69.0	24.2	54.2	12.1	Small	NS	Below AEGL 1
R20	106.2	37.2	67.2	18.6	Small	NS	Below AEGL 1
R21	98.9	34.6	64.6	17.3	Small	NS	Below AEGL 1
R22	89.4	31.3	61.3	15.6	Small	NS	Below AEGL 1
R23	74.9	26.2	56.2	13.1	Small	NS	Below AEGL 1
R24	70.7	24.7	54.7	12.4	Small	NS	Below AEGL 1
R25	65.8	23.0	53.0	11.5	Small	NS	Below AEGL 1
R26	49.0	17.2	47.2	8.6	Negligible	NS	Below AEGL 1
R27	42.8	15.0	45.0	7.5	Negligible	NS	Below AEGL 1
R28	40.2	14.1	44.1	7.0	Negligible	NS	Below AEGL 1
R29	20.4	7.1	37.1	3.6	Negligible	NS	Below AEGL 1

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R30	24.9	8.7	38.7	4.4	Negligible	NS	Below AEGL 1
R31	42.2	14.8	44.8	7.4	Negligible	NS	Below AEGL 1
R32	10.4	3.6	33.6	1.8	Negligible	NS	Below AEGL 1

Max. PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

Max. PC NO_2 - calculated based on a conversion factors of 0.35 applied to NO_x

PEC – includes PC plus 2 x annual mean background of 15µg/m^3 (i.e. 30 µg/m^3)

Background NO_2 assumed as 2019 concentrations of 15µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

NS = not significant

S = Significant

Table 11.7.7: 8-Hour Rolling CO Concentrations Predicted from Point Source Emissions (mg/m^3) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC CO	CO PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	<0.1	0.298	<0.1	Negligible	NS
R2	<0.1	0.298	<0.1	Negligible	NS
R3	<0.1	0.298	<0.1	Negligible	NS
R4	<0.1	0.298	<0.1	Negligible	NS
R5	<0.1	0.298	<0.1	Negligible	NS
R6	<0.1	0.298	<0.1	Negligible	NS
R7	<0.1	0.298	<0.1	Negligible	NS
R8	<0.1	0.298	<0.1	Negligible	NS
R9	<0.1	0.298	<0.1	Negligible	NS
R10	<0.1	0.298	<0.1	Negligible	NS
R11	<0.1	0.298	<0.1	Negligible	NS
R12	<0.1	0.298	<0.1	Negligible	NS
R13	<0.1	0.298	<0.1	Negligible	NS
R14	<0.1	0.298	<0.1	Negligible	NS
R15	<0.1	0.298	<0.1	Negligible	NS
R16	<0.1	0.298	<0.1	Negligible	NS
R17	<0.1	0.298	<0.1	Negligible	NS
R18	<0.1	0.298	<0.1	Negligible	NS
R19	<0.1	0.298	<0.1	Negligible	NS
R20	<0.1	0.298	<0.1	Negligible	NS
R21	<0.1	0.298	<0.1	Negligible	NS
R22	<0.1	0.298	<0.1	Negligible	NS
R23	<0.1	0.298	<0.1	Negligible	NS
R24	<0.1	0.298	<0.1	Negligible	NS
R25	<0.1	0.298	<0.1	Negligible	NS
R26	<0.1	0.298	<0.1	Negligible	NS
R27	<0.1	0.298	<0.1	Negligible	NS
R28	<0.1	0.298	<0.1	Negligible	NS
R29	<0.1	0.298	<0.1	Negligible	NS

Receptor	Max. PC C*O*	CO PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R30	<0.1	0.298	<0.1	Negligible	NS
R31	<0.1	0.298	<0.1	Negligible	NS
R32	<0.1	0.298	<0.1	Negligible	NS

Max. PC CO – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus 2 x annual mean background x 0.7 (0.298 mg/m^3)

Background CO taken from Defra Maps

NS = not significant

S = Significant

Table 11.7.8: 15-minute 99.8th Percentile SO_2 Concentrations Predicted from Point Source Emissions (µg/m³) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	5.0	9.9	1.9	Negligible	NS
R2	3.0	7.9	1.1	Negligible	NS
R3	2.5	7.4	0.9	Negligible	NS
R4	1.9	6.8	0.7	Negligible	NS
R5	2.6	7.6	1.0	Negligible	NS
R6	3.4	8.4	1.3	Negligible	NS
R7	1.3	6.2	0.5	Negligible	NS
R8	1.6	6.5	0.6	Negligible	NS
R9	2.2	7.2	0.8	Negligible	NS
R10	1.0	6.0	0.4	Negligible	NS
R11	1.5	6.5	0.6	Negligible	NS
R12	2.8	7.8	1.1	Negligible	NS
R13	2.9	7.8	1.1	Negligible	NS
R14	2.6	7.5	1.0	Negligible	NS
R15	1.4	6.4	0.5	Negligible	NS
R16	1.0	5.9	0.4	Negligible	NS
R17	2.3	7.2	0.9	Negligible	NS
R18	5.1	10.1	1.9	Negligible	NS
R19	5.8	10.8	2.2	Negligible	NS
R20	9.3	14.2	3.5	Negligible	NS
R21	9.3	14.2	3.5	Negligible	NS
R22	8.2	13.2	3.1	Negligible	NS
R23	5.5	10.4	2.1	Negligible	NS
R24	4.8	9.7	1.8	Negligible	NS
R25	5.3	10.2	2.0	Negligible	NS
R26	4.2	9.2	1.6	Negligible	NS
R27	3.4	8.4	1.3	Negligible	NS
R28	2.8	7.7	1.0	Negligible	NS
R29	1.6	6.6	0.6	Negligible	NS

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R30	2.1	7.0	0.8	Negligible	NS
R31	2.6	7.6	1.0	Negligible	NS
R32	0.8	5.7	0.3	Negligible	NS

Max. PC SO_2 – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus 2 x annual mean background x 1.34 (4.93 µg/m^3)

Background SO_2 taken from PT2 monitoring site

NS = not significant

S = Significant

Table 11.7.9: 1-hour 99.7th Percentile SO_2 Concentrations Predicted from Point Source Emissions (µg/m^3) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	3.7	7.4	1.1	Negligible	NS
R2	2.5	6.1	0.7	Negligible	NS
R3	1.5	5.2	0.4	Negligible	NS
R4	1.4	5.1	0.4	Negligible	NS
R5	1.4	5.1	0.4	Negligible	NS
R6	1.6	5.3	0.5	Negligible	NS
R7	1.0	4.7	0.3	Negligible	NS
R8	1.3	5.0	0.4	Negligible	NS
R9	1.2	4.9	0.3	Negligible	NS
R10	0.8	4.5	0.2	Negligible	NS
R11	1.1	4.8	0.3	Negligible	NS
R12	1.9	5.6	0.5	Negligible	NS
R13	1.9	5.6	0.6	Negligible	NS
R14	1.7	5.4	0.5	Negligible	NS
R15	1.1	4.8	0.3	Negligible	NS
R16	0.8	4.5	0.2	Negligible	NS
R17	1.6	5.2	0.4	Negligible	NS
R18	3.5	7.2	1.0	Negligible	NS
R19	4.2	7.9	1.2	Negligible	NS
R20	6.3	10.0	1.8	Negligible	NS
R21	6.6	10.2	1.9	Negligible	NS
R22	3.2	6.9	0.9	Negligible	NS
R23	4.3	7.9	1.2	Negligible	NS
R24	3.1	6.8	0.9	Negligible	NS
R25	3.1	6.8	0.9	Negligible	NS
R26	2.3	6.0	0.7	Negligible	NS
R27	2.2	5.8	0.6	Negligible	NS
R28	1.7	5.4	0.5	Negligible	NS
R29	1.0	4.7	0.3	Negligible	NS

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R30	1.5	5.2	0.4	Negligible	NS
R31	2.8	6.5	0.8	Negligible	NS
R32	0.4	4.1	0.1	Negligible	NS

Max. PC SO_2 – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus 2 x annual mean background (3.68 µg/m^3)

Background SO_2 taken from PT2 monitoring site

NS = not significant

S = Significant

Table 11.7.10: 24-hour 99.2nd Percentile SO_2 Concentrations Predicted from Point Source Emissions (µg/m³) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	1.1	3.2	0.8	Negligible	NS
R2	0.9	3.1	0.7	Negligible	NS
R3	0.7	2.9	0.6	Negligible	NS
R4	0.5	2.7	0.4	Negligible	NS
R5	0.5	2.7	0.4	Negligible	NS
R6	0.5	2.6	0.4	Negligible	NS
R7	0.3	2.5	0.3	Negligible	NS
R8	0.4	2.5	0.3	Negligible	NS
R9	0.4	2.5	0.3	Negligible	NS
R10	0.2	2.4	0.2	Negligible	NS
R11	0.2	2.4	0.2	Negligible	NS
R12	0.4	2.5	0.3	Negligible	NS
R13	0.4	2.6	0.3	Negligible	NS
R14	0.4	2.6	0.3	Negligible	NS
R15	0.2	2.4	0.2	Negligible	NS
R16	0.3	2.5	0.3	Negligible	NS
R17	0.4	2.6	0.3	Negligible	NS
R18	0.8	3.0	0.7	Negligible	NS
R19	3.3	5.5	2.6	Negligible	NS
R20	4.9	7.1	3.9	Negligible	NS
R21	3.3	5.5	2.7	Negligible	NS
R22	1.0	3.2	0.8	Negligible	NS
R23	0.9	3.1	0.7	Negligible	NS
R24	0.6	2.8	0.5	Negligible	NS
R25	0.5	2.7	0.4	Negligible	NS
R26	0.7	2.8	0.5	Negligible	NS
R27	0.4	2.6	0.3	Negligible	NS
R28	0.3	2.5	0.3	Negligible	NS
R29	0.2	2.4	0.2	Negligible	NS

Receptor	Max. PC SO_2	SO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R30	0.4	2.6	0.3	Negligible	NS
R31	2.2	4.4	1.8	Negligible	NS
R32	0.2	2.3	0.1	Negligible	NS

Max. PC SO_2 – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus 2 x annual mean background * 0.59 (2.17 µg/m^3)

Background SO_2 taken from PT2 monitoring site

NS = not significant

S = Significant

Table 11.7.11: 24-hour 90.4th Percentile PM_{10} Concentrations Predicted from Point Source Emissions (µg/m³) (includes emissions from sources A1-2 (start-up), A2-2 (start-up/shut-down) and A16)

Receptor	Max. PC PM_{10}	PM_{10} PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	0.1	24.9	0.2	Negligible	NS
R2	0.1	24.9	0.2	Negligible	NS
R3	0.1	24.8	0.1	Negligible	NS
R4	<0.1	24.8	0.1	Negligible	NS
R5	<0.1	24.8	0.1	Negligible	NS
R6	<0.1	24.8	0.1	Negligible	NS
R7	<0.1	24.8	0.1	Negligible	NS
R8	<0.1	24.8	0.1	Negligible	NS
R9	<0.1	24.8	<0.1	Negligible	NS
R10	<0.1	24.8	<0.1	Negligible	NS
R11	<0.1	24.8	0.1	Negligible	NS
R12	<0.1	24.8	0.1	Negligible	NS
R13	<0.1	24.8	0.1	Negligible	NS
R14	<0.1	24.8	0.1	Negligible	NS
R15	<0.1	24.8	<0.1	Negligible	NS
R16	<0.1	24.8	0.1	Negligible	NS
R17	0.1	24.8	0.2	Negligible	NS
R18	0.1	24.9	0.2	Negligible	NS
R19	0.1	24.9	0.3	Negligible	NS
R20	0.2	25.0	0.3	Negligible	NS
R21	0.2	24.9	0.1	Negligible	NS
R22	0.1	24.9	0.2	Negligible	NS
R23	0.1	24.9	0.1	Negligible	NS
R24	0.1	24.9	0.1	Negligible	NS
R25	0.1	24.8	0.1	Negligible	NS
R26	<0.1	24.8	0.1	Negligible	NS
R27	0.1	24.8	0.1	Negligible	NS
R28	<0.1	24.8	0.1	Negligible	NS
R29	<0.1	24.8	<0.1	Negligible	NS

Receptor	Max. PC PM_{10}	PM_{10} PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R30	<0.1	24.8	0.1	Negligible	NS
R31	<0.1	24.8	0.1	Negligible	NS
R32	<0.1	24.8	<0.1	Negligible	NS

Max. PC PM_{10} – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus 2 x annual mean background * 0.59 (24.8 µg/m^3)

Background SO_2 taken from PT2 monitoring site

NS = not significant

S = Significant

Table 11.7.12: 1-hour 98.8th Percentile NO_2 Concentrations Predicted due to Emergency Gas Boiler (Source A1-3) (µg/m³) – operation expected once every 10-15 years

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R1	2.7	0.9	30.9	0.5	Negligible	NS	Below AEGL 1
R2	2.4	0.8	30.8	0.4	Negligible	NS	Below AEGL 1
R3	1.7	0.6	30.6	0.3	Negligible	NS	Below AEGL 1
R4	1.4	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R5	1.3	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R6	1.1	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R7	1.2	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R8	1.3	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R9	1.4	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R10	1.0	0.3	30.3	0.2	Negligible	NS	Below AEGL 1
R11	0.9	0.3	30.3	0.2	Negligible	NS	Below AEGL 1
R12	1.3	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R13	1.3	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R14	1.3	0.5	30.5	0.2	Negligible	NS	Below AEGL 1
R15	1.2	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R16	1.1	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R17	1.6	0.5	30.5	0.3	Negligible	NS	Below AEGL 1
R18	2.0	0.7	30.7	0.3	Negligible	NS	Below AEGL 1
R19	1.7	0.6	30.6	0.3	Negligible	NS	Below AEGL 1
R20	2.8	1.0	31.0	0.5	Negligible	NS	Below AEGL 1
R21	2.9	1.0	31.0	0.5	Negligible	NS	Below AEGL 1
R22	1.7	0.6	30.6	0.3	Negligible	NS	Below AEGL 1
R23	2.3	0.8	30.8	0.4	Negligible	NS	Below AEGL 1
R24	1.9	0.7	30.7	0.3	Negligible	NS	Below AEGL 1
R25	1.8	0.6	30.6	0.3	Negligible	NS	Below AEGL 1
R26	1.2	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R27	1.6	0.6	30.6	0.3	Negligible	NS	Below AEGL 1
R28	1.3	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R29	0.7	0.3	30.3	0.1	Negligible	NS	Below AEGL 1

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R30	1.2	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R31	1.1	0.4	30.4	0.2	Negligible	NS	Below AEGL 1
R32	0.5	0.2	30.2	0.1	Negligible	NS	Below AEGL 1

Max. PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

Max. PC NO_2 - calculated based on a conversion factors of 0.35 applied to NO_x

PEC – includes PC plus 2 x annual mean background of 15µg/m^3 (i.e. 30 µg/m^3)

Background NO_2 assumed as 2019 concentrations of 15µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

NS = not significant

S = Significant

Table 11.7.13: Short-term Process Contributions for SO_2, CO and PM_{10} Predicted due to Emergency Gas Boiler (Source A1-3) (µg/m^3) – operation expected once every 10-15 years

Receptor	8-Hr CO PC as % of AQAL	15-min SO_2 PC as % of AQAL	1-hr SO_2 PC as % of AQAL	24-hr SO_2 PC as % of AQAL	24-hr PM_{10} PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R2	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R3	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R4	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R5	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R6	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R7	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R8	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R9	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R10	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R11	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS

Receptor	8-Hr CO PC as % of AQAL	15-min SO_2 PC as % of AQAL	1-hr SO_2 PC as % of AQAL	24-hr SO_2 PC as % of AQAL	24-hr PM_{10} PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R12	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R13	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R14	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R15	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R16	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R17	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R18	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R19	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R20	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R21	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R22	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R23	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R24	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R25	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R26	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R27	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R28	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R29	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R30	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R31	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS
R32	<0.1	<0.1	<0.1	<0.1	<0.1	Negligible	NS

PC presented at maximum relevant percentile from five meteorological years as % of the AQAL

NS = not significant

Receptor	8-Hr CO PC as % of AQAL	15-min SO_2 PC as % of AQAL	1-hr SO_2 PC as % of AQAL	24-hr SO_2 PC as % of AQAL	24-hr PM_{10} PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact

S = Significant

Table 11.7.14: Percentile Process Concentrations Predicted due to Emergency Gas Boiler at the Point of Maximum Concentration (Source A1-3) (µg/m^3) – operation expected once every 10-15 years

Pollutant	OS Grid Reference of Point of Maximum Concentration	PC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL (For NO_2)
99.8th Percentile of 1-hr NO_2	276728, 188506	2.8	1.4	Negligible	NS	<AEGL1
90.4th Percentile of 24-hr PM_{10}	276802, 188621	0.1	0.1	Negligible	NS	-
99.8th Percentile of 15-min SO_2	276728, 188506	0.1	<0.1	Negligible	NS	-
99.7th Percentile of 1-hr SO_2	276748, 188506	0.1	<0.1	Negligible	NS	-
99.2nd Percentile of 24-hr SO_2	276829, 188566	0.1	<0.1	Negligible		-

Table 11.7.15: 1-hour 98.8th Percentile NO_2 Concentrations Predicted due to Emergency Flare (Source A2-1) (µg/m³) – operation expected once every 10-15 years

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R1	100.3	35.1	65.1	17.6	Small	NS	Below AEGL 1
R2	79.7	27.9	57.9	13.9	Small	NS	Below AEGL 1
R3	37.8	13.2	43.2	6.6	Negligible	NS	Below AEGL 1
R4	25.5	8.9	38.9	4.5	Negligible	NS	Below AEGL 1
R5	24.8	8.7	38.7	4.3	Negligible	NS	Below AEGL 1
R6	20.4	7.1	37.1	3.6	Negligible	NS	Below AEGL 1
R7	22.1	7.7	37.7	3.9	Negligible	NS	Below AEGL 1
R8	22.4	7.8	37.8	3.9	Negligible	NS	Below AEGL 1
R9	23.6	8.3	38.3	4.1	Negligible	NS	Below AEGL 1
R10	12.8	4.5	34.5	2.2	Negligible	NS	Below AEGL 1
R11	9.0	3.2	33.2	1.6	Negligible	NS	Below AEGL 1
R12	20.2	7.1	37.1	3.5	Negligible	NS	Below AEGL 1
R13	18.9	6.6	36.6	3.3	Negligible	NS	Below AEGL 1
R14	19.2	6.7	36.7	3.4	Negligible	NS	Below AEGL 1
R15	15.6	5.5	35.5	2.7	Negligible	NS	Below AEGL 1
R16	12.6	4.4	34.4	2.2	Negligible	NS	Below AEGL 1
R17	16.9	5.9	35.9	3.0	Negligible	NS	Below AEGL 1
R18	21.0	7.3	37.3	3.7	Negligible	NS	Below AEGL 1
R19	16.1	5.6	35.6	2.8	Negligible	NS	Below AEGL 1
R20	26.0	9.1	39.1	4.6	Negligible	NS	Below AEGL 1
R21	24.0	8.4	38.4	4.2	Negligible	NS	Below AEGL 1
R22	12.6	4.4	34.4	2.2	Negligible	NS	Below AEGL 1
R23	14.4	5.0	35.0	2.5	Negligible	NS	Below AEGL 1
R24	11.9	4.2	34.2	2.1	Negligible	NS	Below AEGL 1
R25	9.0	3.1	33.1	1.6	Negligible	NS	Below AEGL 1
R26	8.1	2.8	32.8	1.4	Negligible	NS	Below AEGL 1
R27	8.0	2.8	32.8	1.4	Negligible	NS	Below AEGL 1
R28	6.7	2.3	32.3	1.2	Negligible	NS	Below AEGL 1
R29	4.7	1.6	31.6	0.8	Negligible	NS	Below AEGL 1

Receptor	Max. PC NO_x	Max. PC NO_2	NO_2 PEC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL
R30	5.8	2.0	32.0	1.0	Negligible	NS	Below AEGL 1
R31	9.9	3.4	33.4	1.7	Negligible	NS	Below AEGL 1
R32	5.8	2.0	32.0	1.0	Negligible	NS	Below AEGL 1

Max. PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

Max. PC NO_2 - calculated based on a conversion factors of 0.35 applied to NO_x

PEC – includes PC plus 2 x annual mean background of 15µg/m^3 (i.e. 30 µg/m^3)

Background NO_2 assumed as 2019 concentrations of 15µg/m^3 recorded at the PT2 Industrial site to ensure a worst-case

NS = not significant

S = Significant

Table 11.7.16: Short-term Process Contributions for CO Predicted due to Emergency Flare (Source A2-1) (µg/m^3) – operation expected once every 10-15 years

Receptor	8-Hr CO PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R1	0.1	Negligible	NS
R2	0.1	Negligible	NS
R3	0.1	Negligible	NS
R4	0.1	Negligible	NS
R5	0.1	Negligible	NS
R6	0.1	Negligible	NS
R7	<0.1	Negligible	NS
R8	<0.1	Negligible	NS
R9	<0.1	Negligible	NS
R10	<0.1	Negligible	NS
R11	<0.1	Negligible	NS
R12	<0.1	Negligible	NS
R13	<0.1	Negligible	NS
R14	<0.1	Negligible	NS
R15	<0.1	Negligible	NS
R16	<0.1	Negligible	NS
R17	0.1	Negligible	NS

Receptor	8-Hr CO PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact
R18	0.1	Negligible	NS
R19	0.1	Negligible	NS
R20	0.2	Negligible	NS
R21	0.1	Negligible	NS
R22	<0.1	Negligible	NS
R23	<0.1	Negligible	NS
R24	<0.1	Negligible	NS
R25	<0.1	Negligible	NS
R26	<0.1	Negligible	NS
R27	<0.1	Negligible	NS
R28	<0.1	Negligible	NS
R29	<0.1	Negligible	NS
R30	<0.1	Negligible	NS
R31	0.1	Negligible	NS
R32	<0.1	Negligible	NS

PC presented at maximum relevant percentile from five meteorological years as % of the AQAL

NS = not significant

S = Significant

Table 11.7.17: Percentile Process Concentrations Predicted due to Emergency Flare at the Point of Maximum Concentration (Source A1-3) (µg/m^3) – operation expected once every 10-15 years

Pollutant	OS Grid Reference of Point of Maximum Concentration	PC	PC as % of AQAL	Magnitude of Impact (EPUK/IAQM)	Significance of Impact	comparison Against AEGL (For NO_2)
99.8th Percentile of 1-hr NO_2	276237, 188714	269.6	135	Large	Potentially Significant	<AEGL1

Appendix 11.8: Impacts on Ecological Receptors

Table 11.8.1: Annual mean (Long-term) NO_x Concentrations Predicted at Designated Conservation Sites due to On-site Point Source Emissions (µg/m^3)

Receptor	NO_x PC	Background NO_x	NO_x **PEC**	Impact as % of CL (30µg/m^3)	Significance
LE1 Little Warren SINC	0.07	10.5	10.5	0.2	NS
LE2 Lower River AFAN SINC	0.1	10.5	10.6	0.3	NS
LE3 Harbourside SINC	0.15	17.5	17.6	0.5	NS
LE4 Watercourses SINC	0.32	11.2	11.5	1.1	>1%, however PC is less than 100% of CL, and the PEC is less than 70% of the CL – Impact considered to be NS[1]
LE5 Tai Bach AW	0.10	14.6	14.7	0.3	NS
LE6 Bryn Goytre AW	0.08	15.5	15.6	0.3	NS
E1 Kenfig SAC	0.01	6.3	6.3	<0.1	NS
E2 Kenfig SAC	0.01	6.3	6.3	<0.1	NS
E3 Kenfig SAC	0.02	6.3	6.3	0.1	NS
E4 Kenfig SAC	0.02	6.3	6.3	0.1	NS
E5 Kenfig SAC	0.02	6.3	6.3	0.1	NS
E6 Crymlyn Bog	0.004	12.8	12.8	<0.1	NS
E7 Crymlyn Bog	0.005	12.8	12.8	<0.1	NS
E8 Crymlyn Bog	0.004	12.8	12.8	<0.1	NS
E9 Crymlyn Bog	0.003	12.8	12.8	<0.1	NS
E10 Crymlyn Bog	0.003	12.8	12.8	<0.1	NS
E11 Cefn Cribwr	0.007	12.2	12.2	<0.1	NS

PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background NO_x taken from APIS website

[1] see paragraphs 11.113 and 11.114 in **Chapter 11: Air Quality**.

Table 11.8.2:Annual mean (Long-term) SO_2 Concentrations Predicted at Designated Conservation Sites due to On-site Point Source Emissions (µg/m³)

Receptor	SO_2 PC	Background SO_2	SO_2 **PEC**	Impact as % of CL (10µg/m³)	Significance
LE1 Little Warren SINC	0.001	3.01	3.0	<0.1	NS
LE2 Lower River AFAN SINC	0.001	3.01	3.0	<0.1	NS
LE3 Harbourside SINC	0.002	3.3	3.3	<0.1	NS
LE4 Watercourses SINC	0.006	3.4	3.4	<0.1	NS
LE5 Tai Bach AW	0.001	4.2	4.2	<0.1	NS
LE6 Bryn Goytre AW	0.001	3.6	3.6	<0.1	NS
E1 Kenfig SAC	0.007	1.2	1.2	0.1	NS
E2 Kenfig SAC	0.007	1.2	1.2	0.1	NS
E3 Kenfig SAC	0.009	1.2	1.2	0.1	NS
E4 Kenfig SAC	0.009	1.2	1.2	0.1	NS
E5 Kenfig SAC	0.007	1.2	1.2	0.1	NS
E6 Crymlyn Bog	0.004	2.0	2.0	<0.1	NS
E7 Crymlyn Bog	0.004	2.0	2.0	<0.1	NS
E8 Crymlyn Bog	0.003	2.0	2.0	<0.1	NS
E9 Crymlyn Bog	0.002	2.0	2.0	<0.1	NS
E10 Crymlyn Bog	0.002	2.0	2.0	<0.1	NS
E11 Cefn Cribwr	<0.001	2.8	2.8	<0.1	NS

PC SO_2 – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background SO_2 taken from APIS website

Table 11.8.3: Nitrogen Deposition Predicted at Designated Conservation Sites due to On-site Point Source Emissions (kg/ha/yr)

Receptor	N-Deposition PC	Background N-Deposition	N-Deposition PEC	Impact as % of CLO	Significance
LE1 Little Warren SINC	0.01	8.5	8.5	0.2	NS
LE2 Lower River AFAN SINC	0.01	8.5	8.5	0.1	NS
LE3 Harbourside SINC	0.02	8.9	8.9	0.4	NS
LE4 Watercourses SINC	0.05	8.6	8.7	0.9	NS
LE5 Tai Bach AW	0.03	15.0	15.1	0.3	NS
LE6 Bryn Goytre AW	0.02	15.4	15.4	0.2	NS
E1 Kenfig SAC	0.002	8.5	8.5	<0.1	NS
E2 Kenfig SAC	0.002	8.5	8.5	<0.1	NS
E3 Kenfig SAC	0.003	8.5	8.5	<0.1	NS
E4 Kenfig SAC	0.003	8.5	8.5	<0.1	NS
E5 Kenfig SAC	0.003	8.5	8.5	<0.1	NS
E6 Crymlyn Bog	0.001	9.4	9.4	<0.1	NS
E7 Crymlyn Bog	0.001	9.4	9.4	<0.1	NS
E8 Crymlyn Bog	0.001	9.4	9.4	<0.1	NS
E9 Crymlyn Bog	0.001	9.4	9.4	<0.1	NS
E10 Crymlyn Bog	0.0004	9.4	9.4	<0.1	NS
E11 Cefn Cribwr	0.001	10.6	10.6	<0.1	NS

PC N-Deposition – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background N-Deposition taken from APIS website

Table 11.8.4:Acid Deposition Predicted at Designated Conservation Sites due to On-site Point Source Emissions (keq/ha/yr)

Receptor	N Acid-Deposition PC	S Acid Deposition PC	Total Acid Deposition	Background Acid Deposition	Acid Deposition PEC	Impact as % of CLO	Significance
LE1 Little Warren SINC	0.0007	0.0001	0.0009	0.8	0.8	0.1	NS
LE2 Lower River AFAN SINC	0.0010	0.0002	0.0012	0.6	0.6	<0.1	NS
LE3 Harbourside SINC	0.0016	0.0003	0.0019	0.6	0.6	0.1	NS
LE4 Watercourses SINC	0.0033	0.0007	0.0040	0.6	0.6	0.3	NS
LE5 Tai Bach AW	0.0021	0.0003	0.0024	1.1	1.1	0.6	NS
LE6 Bryn Goytre AW	0.0016	0.0003	0.0019	1.1	1.1	0.6	NS
E1 Kenfig SAC	0.0001	0.001	0.00095	0.7	0.7	<0.1	NS
E2 Kenfig SAC	0.0001	0.001	0.00096	0.7	0.7	<0.1	NS
E3 Kenfig SAC	0.0002	0.001	0.00119	0.7	0.7	<0.1	NS
E4 Kenfig SAC	0.0002	0.001	0.00129	0.7	0.7	<0.1	NS
E5 Kenfig SAC	0.0002	0.001	0.00105	0.7	0.7	<0.1	NS
E6 Crymlyn Bog	0.00004	0.0004	0.00046	0.8	0.8	<0.1	NS
E7 Crymlyn Bog	0.00005	0.0004	0.00048	0.8	0.8	<0.1	NS
E8 Crymlyn Bog	0.00004	0.0003	0.00035	0.8	0.8	<0.1	NS
E9 Crymlyn Bog	0.00004	0.0003	0.00029	0.8	0.8	<0.1	NS

E10 Crymlyn Bog	0.00003	0.0003	0.00029	0.8	0.8	<0.1	NS
E11 Cefn Cribwr	0.00007	0.00001	0.00008	0.9	0.9	<0.1	NS

PC NO_x – the maximum Process Contribution predicted from the five meteorological years assessed (2018 to 2022)

PEC – includes PC plus background

Background Acid Deposition taken from APIS website

Table 11.8.5:Annual Mean NO_x Predicted at Designated Conservation Sites due to Operational Traffic Emissions (µg/m^3)

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL	Significance
KF1 rd	19.8	19.9	19.9	<0.1	0.1	NS	0.1	0.4	NS
KF1 10m	18.1	18.2	18.2	<0.1	0.1	NS	0.09	0.3	NS
KF1 20m	17.2	17.2	17.2	<0.1	0.1	NS	0.08	0.3	NS
KF1 30m	16.4	16.4	16.4	<0.1	0.1	NS	0.07	0.2	NS
KF1 50m	15.3	15.4	15.4	<0.1	0.1	NS	0.06	0.2	NS
KF1 70m	14.7	14.7	14.7	<0.1	0.1	NS	0.06	0.2	NS
KF1 90m	14.2	14.2	14.2	<0.1	0.1	NS	0.05	0.2	NS
KF1 110m	13.8	13.8	13.9	<0.1	0.1	NS	0.05	0.2	NS
KF2 rd	26.8	26.9	27.0	<0.1	0.1	NS	0.18	0.6	NS
KF2 10m	24.0	24.1	24.2	<0.1	0.1	NS	0.15	0.5	NS
KF2 20m	21.9	22.0	22.0	<0.1	0.1	NS	0.13	0.4	NS
KF2 30m	20.5	20.6	20.7	<0.1	0.1	NS	0.11	0.4	NS
KF2 50m	18.6	18.6	18.7	<0.1	0.1	NS	0.09	0.3	NS
KF2 70m	17.2	17.3	17.3	<0.1	0.1	NS	0.08	0.3	NS
KF2 90m	16.3	16.4	16.4	<0.1	0.1	NS	0.07	0.2	NS
KF2 110m	15.6	15.7	15.7	<0.1	0.1	NS	0.07	0.2	NS

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL	Significance

[1] the PC associated with on-site point source emissions as predicted at receptor E5 have been included in the Do-something scenario to ensure a cumulative impact of the whole development

Do-minimum scenario – includes emissions from existing traffic and trips associated with committed development

Do-something scenario – includes emissions from existing traffic, committed development, operational traffic emissions and on-site point source emissions

Background NO_x taken from APIS website

Table 11.8.6:Annual Mean NH_3 Predicted at Designated Conservation Sites due to Operational Traffic Emissions (µg/m^3)

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL	Significance
KF1 rd	1.2	1.2	1.2	<0.1	<0.1	NS	<0.1	0.1	NS
KF1 10m	1.2	1.2	1.2	<0.1	<0.1	NS	<0.1	0.1	NS
KF1 20m	1.2	1.2	1.2	<0.1	<0.1	NS	<0.1	0.1	NS
KF1 30m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF1 50m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF1 70m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF1 90m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF1 110m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF2 rd	1.4	1.4	1.4	<0.1	<0.1	NS	<0.1	0.2	NS
KF2 10m	1.4	1.4	1.4	<0.1	<0.1	NS	<0.1	0.1	NS
KF2 20m	1.3	1.3	1.3	<0.1	<0.1	NS	<0.1	0.1	NS
KF2 30m	1.3	1.3	1.3	<0.1	<0.1	NS	<0.1	0.1	NS
KF2 50m	1.2	1.2	1.2	<0.1	<0.1	NS	<0.1	0.1	NS
KF2 70m	1.2	1.2	1.2	<0.1	<0.1	NS	<0.1	0.1	NS
KF2 90m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
KF2 110m	1.1	1.1	1.1	<0.1	<0.1	NS	<0.1	<0.1	NS
Do-minimum scenario – includes emissions from existing traffic and trips associated with committed development									

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL	Significance
Do-something scenario – includes emissions from existing traffic, committed development, operational traffic emissions and on-site point source emissions									
Background NO_x taken from APIS website									

Table 11.8.7:Nitrogen Deposition Predicted at Designated Conservation Sites due to Operational Traffic Emissions (kg/ha/yr)

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL0	Significance
KF1 rd	11.64	11.67	11.67	<0.1	0.1	NS	<0.1	0.6	NS
KF1 10m	11.15	11.17	11.18	<0.1	0.1	NS	<0.1	0.5	NS
KF1 20m	10.87	10.88	10.89	<0.1	0.1	NS	<0.1	0.4	NS
KF1 30m	10.63	10.64	10.65	<0.1	0.1	NS	<0.1	0.4	NS
KF1 50m	10.33	10.34	10.35	<0.1	0.1	NS	<0.1	0.3	NS
KF1 70m	10.13	10.14	10.14	<0.1	0.1	NS	<0.1	0.3	NS
KF1 90m	9.99	9.99	10.00	<0.1	<0.1	NS	<0.1	0.2	NS
KF1 110m	9.88	9.89	9.89	<0.1	<0.1	NS	<0.1	0.2	NS
KF2 rd	13.70	13.75	13.75	<0.1	0.1	NS	<0.1	0.9	NS
KF2 10m	12.88	12.92	12.93	<0.1	0.1	NS	<0.1	0.8	NS
KF2 20m	12.25	12.28	12.29	<0.1	0.1	NS	<0.1	0.7	NS
KF2 30m	11.86	11.89	11.89	<0.1	0.1	NS	<0.1	0.6	NS
KF2 50m	11.28	11.30	11.31	<0.1	0.1	NS	<0.1	0.5	NS
KF2 70m	10.89	10.91	10.91	<0.1	0.1	NS	<0.1	0.4	NS
KF2 90m	10.62	10.63	10.64	<0.1	<0.1	NS	<0.1	0.4	NS
KF2 110m	10.41	10.43	10.43	<0.1	<0.1	NS	<0.1	0.3	NS

[1] includes emissions associated with on-site point sources plus operational traffic providing an in combination assessment

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CL0	Significance
Background taken from APIS website									

Table 11.8.8: Acid Deposition Predicted at Designated Conservation Sites due to Operational Traffic Emissions (kg/ha/yr)

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CLO	Significance
KF1 rd	0.97	0.98	0.98	<0.1	0.2	NS	<0.1	0.4	NS
KF1 10m	0.94	0.94	0.94	<0.1	0.2	NS	<0.1	0.3	NS
KF1 20m	0.92	0.92	0.92	<0.1	0.2	NS	<0.1	0.3	NS
KF1 30m	0.90	0.90	0.90	<0.1	0.2	NS	<0.1	0.3	NS
KF1 50m	0.88	0.88	0.88	<0.1	0.2	NS	<0.1	0.2	NS
KF1 70m	0.87	0.87	0.87	<0.1	0.2	NS	<0.1	0.2	NS
KF1 90m	0.86	0.86	0.86	<0.1	0.2	NS	<0.1	0.2	NS
KF1 110m	0.85	0.85	0.85	<0.1	0.1	NS	<0.1	0.2	NS
KF2 rd	1.12	1.12	1.13	<0.1	0.2	NS	<0.1	0.2	NS
KF2 10m	1.06	1.10	1.07	<0.1	0.2	NS	<0.1	0.5	NS
KF2 20m	1.02	1.02	1.02	<0.1	0.2	NS	<0.1	0.4	NS
KF2 30m	0.99	0.99	0.99	<0.1	0.2	NS	<0.1	0.4	NS
KF2 50m	0.95	0.95	0.95	<0.1	0.2	NS	<0.1	0.3	NS
KF2 70m	0.92	0.92	0.92	<0.1	0.2	NS	<0.1	0.3	NS
KF2 90m	0.90	0.90	0.90	<0.1	0.2	NS	<0.1	0.3	NS
KF2 110m	0.89	0.89	0.89	<0.1	0.2	NS	<0.1	0.2	NS

[1] includes emissions associated with on-site point sources plus operational traffic providing an in combination assessment

Receptor	2022 Existing Scenario	2022 Do-Minimum	2022 Do-Something[1]	Impact due to Proposed Development			In-combination Effects		
				Change due to Development	Impact as % of CL	Significance	Change due to All Development	Change as % of CLO	Significance
Background taken from APIS website									

[i] Environment Agency, H1 Environmental Risk Assessment Annex (f) Air Emissions, 2009