

Appendix A7.9 Dispersion Modelling Assessment Results

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Element	Existing 250 Flare Assessment
Assessment details	Meteorological Data Set This data shows the effect on the modelling predictions of using different years of meteorological data for the assessment.
Data sets	Casement Aerodrome 2013 - 2015

Air Quality Standard		Predicted incremental contribution, $\mu\text{g}/\text{m}^3$		
		2013	2014	2015
Particulate Matter, PM₁₀				
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 $\mu\text{g}/\text{m}^3$	0.35	0.35	0.24
Annual limit	40 $\mu\text{g}/\text{m}^3$	0.12	0.12	0.12
Particulate Matter, PM_{2.5}				
Annual limit	25 $\mu\text{g}/\text{m}^3$	0.12	0.12	0.12
Limit from 2020	20 $\mu\text{g}/\text{m}^3$	0.12	0.12	0.12
Carbon Monoxide, CO				
8-hour limit	10,000 $\mu\text{g}/\text{m}^3$	< 1	< 1	< 1
Sulphur dioxide, SO₂				
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 $\mu\text{g}/\text{m}^3$	129	128	116
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 $\mu\text{g}/\text{m}^3$	55	55	55
Annual limit	20 $\mu\text{g}/\text{m}^3$	6.9	6.5	6.7
Nitrogen Dioxide NO₂				
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 $\mu\text{g}/\text{m}^3$	2.8	2.8	2.7
Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$	0.35	0.35	0.35
Nitrogen oxides, NO_x				
Annual limit for protection of vegetation	30 $\mu\text{g}/\text{m}^3$	0.35	0.35	0.35

Table A7.9.1 Existing 250 Flare Dispersion Modelling Predictions

Element	Existing 250 Flare Assessment
Assessment details	Meteorological Data Set This data set compares the predictions for meteorological data from different Stations
Data sets	Dublin Airport and Casement Aerodrome 2015, 8M

Air Quality Standard		Predicted incremental contribution, $\mu\text{g}/\text{m}^3$	
		Dublin Airport 2015	Casement Aerodrome 2015
Particulate Matter, PM₁₀			
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 $\mu\text{g}/\text{m}^3$	0.29	0.24
Annual limit	40 $\mu\text{g}/\text{m}^3$	0.11	0.12
Particulate Matter, PM_{2.5}			
Annual limit	25 $\mu\text{g}/\text{m}^3$	0.11	0.12
Limit from 2020	20 $\mu\text{g}/\text{m}^3$	0.11	0.12
Carbon Monoxide, CO			
8-hour limit	10,000 $\mu\text{g}/\text{m}^3$	< 1	< 1
Sulphur dioxide, SO₂			
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 $\mu\text{g}/\text{m}^3$	131	116
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 $\mu\text{g}/\text{m}^3$	54.5	55
Annual limit	20 $\mu\text{g}/\text{m}^3$	11.2	6.7
Nitrogen Dioxide NO₂			
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 $\mu\text{g}/\text{m}^3$	2.8	2.7
Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$	0.23	0.35
Nitrogen oxides, NO_{x0.36}			
Annual limit for protection of vegetation	30 $\mu\text{g}/\text{m}^3$	0.23	0.35

Table A7.9.2 Existing 250 Flare Dispersion Modelling Predictions

Element	Existing 250 Flare Assessment
Assessment details	Stack Height This data set compares the modelling predictions for different stack heights
Data sets	Casement Aerodrome 2015

Air Quality Standard		Predicted incremental contribution, µg/m ³		
		8m	9m	11m
Particulate Matter, PM₁₀				
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 µg/m ³	0.24	0.21	0.15
Annual limit	40 µg/m ³	0.12	0.11	0.08
Particulate Matter, PM_{2.5}				
Annual limit	25 µg/m ³	0.12	0.11	0.08
Limit from 2020	20 µg/m ³	0.12	0.11	0.08
Carbon Monoxide, CO				
8-hour limit	10,000 µg/m ³	< 1	< 1	< 1
Sulphur dioxide, SO₂				
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 µg/m ³	116	81.3	40.4
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 µg/m ³	55	33.4	20.3
Annual limit	20 µg/m ³	6.7	6.2	4.4
Nitrogen Dioxide NO₂				
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 µg/m ³	2.7	1.7	0.85
Annual limit for protection of human health	40 µg/m ³	0.35	0.22	0.15
Nitrogen oxides, NO_x				
Annual limit for protection of vegetation	30 µg/m ³	0.35	0.22	0.15

Table A7.9.3 Existing 250 Flare Dispersion Modelling Predictions

Element	Proposed 600 Flare Assessment
Assessment details	Meteorological Data Set This data compares the modelling predictions using different years of meteorological data
Data sets	Casement Aerodrome 2013 - 2015

Air Quality Standard		Predicted incremental contribution, µg/m³		
		2013	2014	2015
Particulate Matter, PM₁₀				
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 µg/m³	0.38	0.38	0.38
Annual limit	40 µg/m³	0.12	0.12	0.12
Particulate Matter, PM_{2.5}				
Annual limit	25 µg/m³	0.12	0.12	0.12
Limit from 2020	20 µg/m³	0.12	0.12	0.12
Carbon Monoxide, CO				
8-hour limit	10,000 µg/m³	< 1	< 1	< 1
Sulphur dioxide, SO₂				
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 µg/m³	75	75	73.1
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 µg/m³	27.3	22.8	22.8
Annual limit	20 µg/m³	7	6.7	7
Nitrogen Dioxide NO₂				
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 µg/m³	1.4	1.4	1.4
Annual limit for protection of human health	40 µg/m³	0.1	0.1	0.1
Nitrogen oxides, NO_x				
Annual limit for protection of vegetation	30 µg/m³	0.1	0.1	0.1

Table A7.9.4 Proposed 600 Flare Dispersion Modelling Predictions

Element	Proposed 600 Flare Assessment
Assessment details	Meteorological Data Set This data compares the modelling predictions using meteorological data from different stations
Data sets	Dublin Airport and Casement Aerodrome 2015

Air Quality Standard		Predicted incremental contribution, $\mu\text{g}/\text{m}^3$	
		Dublin Airport 2015	Casement Aerodrome 2015
Particulate Matter, PM_{10}			
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 $\mu\text{g}/\text{m}^3$	0.35	0.38
Annual limit	40 $\mu\text{g}/\text{m}^3$	0.20	0.12
Particulate Matter, $\text{PM}_{2.5}$			
Annual limit	25 $\mu\text{g}/\text{m}^3$	0.20	0.12
Limit from 2020	20 $\mu\text{g}/\text{m}^3$	0.20	0.12
Carbon Monoxide, CO			
8-hour limit	10,000 $\mu\text{g}/\text{m}^3$	< 1	< 1
Sulphur dioxide, SO_2			
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 $\mu\text{g}/\text{m}^3$	88.6	73.1
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 $\mu\text{g}/\text{m}^3$	21.9	22.8
Annual limit	20 $\mu\text{g}/\text{m}^3$	8.4	7
Nitrogen Dioxide NO_2			
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 $\mu\text{g}/\text{m}^3$	1.5	1.4
Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$	0.1	0.1
Nitrogen oxides, $\text{NO}_{x0.36}$			
Annual limit for protection of vegetation	30 $\mu\text{g}/\text{m}^3$	0.1	0.1

Table A7.9.5 Proposed 600 Flare Dispersion Modelling Predictions

Element	Proposed 600 Flare Assessment
Assessment details	Stack Height This data compares the predictions for different stack heights
Data sets	Casement Aerodrome 2015

Air Quality Standard		Predicted incremental contribution, µg/m ³		
		9m	10m	11m
Particulate Matter, PM₁₀				
24-hour limit not to be exceeded more than 35 times/year (90.4 th %ile)	50 µg/m ³	0.38	0.38	0.38
Annual limit	40 µg/m ³	0.3	0.2	0.12
Particulate Matter, PM_{2.5}				
Annual limit	25 µg/m ³	0.3	0.20	0.12
Limit from 2020	20 µg/m ³	0.3	0.20	0.12
Carbon Monoxide, CO				
8-hour limit	10,000 µg/m ³	< 1	< 1	< 1
Sulphur dioxide, SO₂				
Hourly limit - not to be exceeded more than 24 times/year (99.7 th %ile)	350 µg/m ³	171.1	130.1	73.1
Daily limit - not to be exceeded more than 3 times/year (99.2 th %ile)	125 µg/m ³	45.9	32.3	22.8
Annual limit	20 µg/m ³	15.2	11.5	7
Nitrogen Dioxide NO₂				
Hourly limit - not to be exceeded more than 18 times/year (99.8 th %ile)	200 µg/m ³	2.1	2.1	1.4
Annual limit for protection of human health	40 µg/m ³	0.17	0.17	0.1
Nitrogen oxides, NO_x				
Annual limit for protection of vegetation	30 µg/m ³	0.17	0.17	0.1

Table A7.9.6 Proposed 600 Flare Dispersion Modelling Predictions