

Appendix 6 Air Quality

Appendix 6.1: Dust Supplementary Assessment Tables

Define the Potential Dust Emission Magnitude

The initial step is to define the scale and nature of the works (for each activity), which determines the potential dust emission magnitude at that stage.

The following tables show the criteria to determine the potential dust emission magnitude during demolition, during earthworks, during construction and for track out respectively.

Table 1 Potential Dust Emission Magnitude During Earthworks

Magnitude	Example definitions
Large	total site area >10,000m ² potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) >10 heavy earth moving vehicles active at any one time formation of bunds >8m in height total material moved >100,000 tonnes
Medium	total site area 2,500m ² – 10,000m ² moderately dusty soil type (e.g. silt) 5-10 heavy earth moving vehicles active at any one time
Small	total site area <2,500m ² soil type with large grain size (e.g. sand) <5 heavy earth moving vehicles at any one time formation of bunds <4m in height total material moved <20,000 tonnes earthworks during wetter months

Table 2 Potential Dust Emission Magnitude During Construction

Magnitude	Example definitions
Large	total building volume >100,000m ³ on site concrete batching sandblasting
Medium	total building volume 25,000m ³ – 100,000 m ³

Magnitude	Example definitions
	potentially dusty construction material (e.g. concrete) on site concrete batching
Small	total building volume <25,000m ³ construction material with low potential for dust release (e.g. metal cladding or timber)

Table 3 Potential Dust Emission Magnitude due to Trackout

Magnitude	Example definitions
Large	>50 HDV (>3.5t) outward (one-way) movements in any one day (i.e. worst case day) potentially dusty surface material (e.g. high clay content) unpaved road length >100m
Medium	10-50 HDV (>3.5t) outward movements in any one day moderately dusty surface material (e.g. high clay content) unpaved road length 50m – 100m
Small	<10 HDV (>3.5t) outward movements in any one day surface material with low potential for dust release unpaved road length <50m
Note: These numbers are for vehicles that leave the site after moving over unpaved ground, where they will accumulate mud and dirt that can be tracked out onto the public highway.	

Define the Sensitivity of the Area

In order to determine the sensitivity of the area, different criteria are used for 'dust soiling', 'health effects of PM₁₀' and 'ecological effects'. First, the sensitivity of receptors is determined. The following tables show the criteria to determine the sensitivity of people and properties to dust soiling effects, the sensitivity of people to health effects of PM₁₀ and the sensitivity of receptors to ecological effects, respectively.

Table 4 Sensitivities of People to Dust Soiling Effects

Sensitivity of Receptor	Definition
High	Users can reasonably expect a enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present

Sensitivity of Receptor	Definition
	<p>continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</p> <p>Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.</p>
Medium	<p>Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or</p> <p>the appearance, aesthetics or value of their property could be diminished by soiling; or</p> <p>the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</p> <p>Indicative examples include parks and places of work.</p>
Low	<p>The enjoyment of amenity would not reasonably be expected; or</p> <p>property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or</p> <p>there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</p> <p>Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.</p>

Table 5 Sensitivities of People to the Health Effects of PM₁₀

Sensitivity of Receptor	Definition
High	<p>Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</p> <p>Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.</p>
Medium	<p>Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</p> <p>Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation.</p>

Sensitivity of Receptor	Definition
Low	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.

Table 6 Sensitivity of Area to Dust Soiling Effects on People and Property

Sensitivity of Receptor	Number of receptors	Distance from the source in metres			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 7 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 8 Sensitivity of the Area to Human Health Impacts

Sensitivity of receptor	Annual mean PM ₁₀	Number receptor	Distance from the source in metres				
			<20	<50	<100	<200	<350
High	>32 µg m ⁻³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
		>100	High	High	Medium	Low	Low

Sensitivity of receptor	Annual mean PM ₁₀	Number receptor	Distance from the source in metres				
			<20	<50	<100	<200	<350
	28-32 µg m ⁻³	10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg m ⁻³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg m ⁻³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	Medium	>32 µg m ⁻³	>10	High	Medium	Low	Low
1-10			Medium	Low	Low	Low	Low
28-32 µg m ⁻³		>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
24-28 µg m ⁻³		>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
<24 µg m ⁻³		>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	---	>1	Low	Low	Low	Low	Low

The last step is to determine the risk of dust effects from combining the sensitivity of the area to the scale and nature of the works.

The following tables illustrate the matrix to determine the risk of dust effects during demolition, earthworks, construction and track out respectively. These tables are used for each of the potential dust effects: dust soiling, human health for PM₁₀ and ecological effects.

Table 9 Risk of Adverse Dust Effects – Earthworks

Sensitivity of area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 10 Risk of Adverse Dust Effects - Construction

Sensitivity of area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 11 Risk of Adverse Dust Effects - Trackout

Sensitivity of area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix 6.2: Traffic Data

Table 12 2017 Verification and Base Year

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2017 Base		
					AADT	HDV%	HDV
1N	1	A90 South Northbound	N	107	9,690	19.4	1,880
1S	1	A90 South Southbound	N	106	9,767	17.3	1,690
2N	2	A90 Central (south of B9120) Northbound	N	109	10,390	18.6	1,933
2S	2	A90 Central (south of B9120) Southbound	N	103	10,748	16.7	1,795
3N	3	A90 Central (north of B9120) Northbound	N	108	10,029	19.0	1,905
3S	3	A90 Central (north of B9120) Southbound	N	107	10,298	17.2	1,771
4N	5	A90 North Northbound	N	108	11,252	17.5	1,969
4S	5	A90 North Southbound	N	106	11,544	15.9	1,836
5	6	A937	N	101	3,780	7.7	290
7	8	C9K	N	61	89	1.0	1
6	7	B974	N	78	582	5.0	29
31	25	Oatyhill	N	0	0	0.0	0
9	10	High Street (south of speed limit)	N	68	2,405	5.8	140
10	11	High Street South (South of Blackiemuir Ave)	N	34	2,513	5.6	140
18	19	Blackiemuir Ave	N	44	1,570	4.5	71
19	20	Blackiemuir Ave (outside Market Rd)	N	39	2,068	4.5	93
20	21	B9120(West) outside speed limit	N	57	1,073	8.7	93
16	17	Market Road	N	48	751	2.9	21

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2017 Base		
					AADT	HDV%	HDV
11	12	High Street Central (Blackiemuir Ave to Co-Op)	N	27	3,179	4.2	132
12	13	High Street North (Co-Op to Station Rd)	N	27	3,691	3.7	138
21	22	Station Road	N	49	2,495	7.5	188
22	23	Fordoun Road (outside Market Rd)	N	46	1,975	9.7	192
23	24	Fordoun Road (outside speed limit)	N	66	1,975	9.7	192
13	14	Aberdeen Road South	N	32	4,341	4.6	202
14	15	Aberdeen Road Central	N	51	2,953	8.4	249
15	16	Aberdeen Rd (north of speed limit)	N	78	2,952	8.4	249
8	9	B9120 (East)	N	92	692	7.3	50
17	18	Garvock Road	N	52	1,562	3.1	48
21SD	22	Station Road	Y	5	2,495	7.5	188
17SD	17	Market Road	Y	5	751	2.9	21
15SD	16	Aberdeen Rd (north of speed limit)	Y	20	2,952	8.4	249

Table 13 2023 Without Development

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 Without Development		
					AADT	HDV%	HDV
1N	1	A90 South Northbound	N	105.3	14,479	15.2	2201
1S	1	A90 South Southbound	N	104.4	14,241	14	1994
2N	2	A90 Central (south of B9120) Northbound	N	107.8	15,259	14.7	2243
2S	2	A90 Central (south of B9120) Southbound	N	100.4	16,234	13.1	2127
3N	3	A90 Central (north of B9120) Northbound	N	106.9	14,812	14.9	2207
3S	3	A90 Central (north of B9120) Southbound	N	104.6	15,844	13.2	2091
4N	5	A90 North Northbound	N	106.1	16,616	13.8	2293
4S	5	A90 North Southbound	N	103.6	17,396	12.5	2175
5	6	A937	N	100.9	5,120	6.2	318
7	8	C9K	N	61.5	164	1.8	3
6	7	B974	N	77.5	609	5.4	33
31	25	Oatyhill	N	0	0	0.0	0
9	10	High Street (south of speed limit)	N	67.2	2,751	6.1	167
10	11	High Street South (South of Blackiemuir Ave)	N	33.8	2,881	5.7	165
18	19	Blackiemuir Ave	N	44.3	2,150	4.0	85
19	20	Blackiemuir Ave (outside Market Rd)	N	39.8	2,298	4.3	98
20	21	B9120(West) outside speed limit	N	57.4	1,239	7.9	97
16	17	Market Road	N	48.0	1,081	2.3	25

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 Without Development		
					AADT	HDV%	HDV
11	12	High Street Central (Blackiemuir Ave to Co-Op)	N	26.8	3,764	4.1	155
12	13	High Street North (Co-Op to Station Rd)	N	26.2	4,564	3.6	164
21	22	Station Road	N	49	3,517	6.3	221
22	23	Fordoun Road (outside Market Rd)	N	47	2,773	8.0	223
23	24	Fordoun Road (outside speed limit)	N	65.8	1,252	9.8	123
13	14	Aberdeen Road South	N	32.3	5,284	4.8	253
14	15	Aberdeen Road Central	N	47.7	4,308	5.6	240
15	16	Aberdeen Rd (north of speed limit)	N	70.7	4,276	6.3	268
8	9	B9120 (East)	N	92.0	1,023	5.1	52
17	18	Garvock Road	N	52.3	2,018	2.8	58
21SD	22	Station Road	Y	5	3,517	6.3	221
17SD	17	Market Road	Y	5	1,081	2.3	25
15SD	16	Aberdeen Rd (north of speed limit)	Y	20	4,276	6.3	268

Table 14 2023 With Development

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
1N	1	A90 South Northbound	N	105.4	13,983	15.6	2,181
1S	1	A90 South Southbound	N	101.4	14,379	13.9	1,999
2N	2	A90 Central (south of B9120) Northbound	N	98.3	16,103	13.7	2,206
2S	2	A90 Central (south of B9120) Southbound	N	95.9	16,505	13	2,146
3N	3	A90 Central (north of B9120) Northbound	N	104.9	15,713	14	2,200
3S	3	A90 Central (north of B9120) Southbound	N	104.4	16,123	13.1	2,112
4N	5	A90 North Northbound	N	105.6	17,557	13	2,282
4S	5	A90 North Southbound	N	103.3	17,610	12.4	2,184
26NOFF	26	A937	N	63.7	869	9.9	86
26NON	26	C9K	N	76.4	2,992	3.4	102
26SOFF	26	B974	N	64.7	2,843	6.1	173
26SON	26	Oatyhill	N	76.8	719	6.4	46
N4	4	High Street (south of speed limit)	N	97.2	13,115	16	2,098
S4	4	High Street South (South of Blackiemuir Ave)	N	100.4	13,660	14.4	1,967
5	6	Blackiemuir Ave	N	100.9	6,923	4.8	334
7	8	Blackiemuir Ave (outside Market Rd)	N	61.7	9	0.0	0
6	7	B9120(West) outside speed limit	N	77.5	480	6.9	33
31	25	Market Road	N	0.0	0	0.0	0

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
9	10	High Street Central (Blackiemuir Ave to Co-Op)	N	67.3	2,888	6.1	175
10	11	High Street North (Co-Op to Station Rd)	N	33.9	3,042	5.8	177
18	19	Station Road	N	44.2	2,241	3.8	86
19	20	Fordoun Road (outside Market Rd)	N	39.9	2,360	4.2	99
20	21	Fordoun Road (outside speed limit)	N	57.5	1,305	7.5	98
16	17	Aberdeen Road South	N	48.1	1,092	2.0	21
11	12	Aberdeen Road Central	N	26.9	3,903	4.3	169
12	13	Aberdeen Rd (north of speed limit)	N	26.7	4,556	3.9	177
21	22	B9120 (East)	N	49.1	3,538	6.2	220
22	23	Garvock Road	N	47.0	2,881	7.7	221
23	24	New Overbridge	N	67.5	1,366	8.9	122
13	14	West Dumbbell	N	32.3	5,300	4.9	260
14	15	West Dumbbell	N	47.7	4,293	5.4	232
15	16	West Dumbbell	N	70.9	4,274	6.1	261
8	9	West Dumbbell	N	92.1	1,051	4.9	51
17	18	East Dumbbell	N	52.3	1,960	2.9	56
27	27	East Dumbbell	N	45.9	4,812	3.9	188
28NW	28	East Dumbbell	N	22.9	4,245	3.6	153
28NE	28	East Dumbbell	N	22.7	1,254	4.2	53
28SE	28	Station Road	N	27.0	3,561	3.8	135

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
28SW	28	Garvock Road	N	16.3	4,433	5.0	222
29NW	29	Aberdeen Rd (north of speed limit)	N	25.9	1,252	4.2	53
29NE	29	A937	N	19.8	4,094	5.5	225
29SE	29	C9K	N	16.4	4,280	4.3	184
29SW	29	B974	N	21.2	3,562	3.8	135
21SD	22	Oatyhill	Y	5.0	3,538	6.2	220
17SD	18	High Street (south of speed limit)	Y	5	1,960	2.9	56
15SD	16	High Street South (South of Blackiemuir Ave)	Y	20.0	4,274	6.1	261

Table 15 2030 Without Development

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2030 Without Development		
					AADT	HDV%	HDV
1N	1	A90 South Northbound	N	104.6	16,329	14.4	2,351
1S	1	A90 South Southbound	N	103.3	15,445	13.8	2,131
2N	2	A90 Central (south of B9120) Northbound	N	107.2	17,027	13.9	2,367
2S	2	A90 Central (south of B9120) Southbound	N	99.6	17,870	12.7	2,269
3N	3	A90 Central (north of B9120) Northbound	N	106.4	16,408	14.2	2,330
3S	3	A90 Central (north of B9120) Southbound	N	103.5	17,419	12.9	2,247
4N	5	A90 North Northbound	N	105.4	18,806	13.1	2,464
4S	5	A90 North Southbound	N	102.2	19,260	12.2	2,350
5	6	A937	N	100.9	5,719	5.6	323
7	8	C9K	N	61.5	338	1.2	4
6	7	B974	N	77.3	578	6.1	35
31	25	Oatychill	N	0	0	0.0	0
9	10	High Street (south of speed limit)	N	64.7	3,034	5.6	170
10	11	High Street South (South of Blackiemuir Ave)	N	34	3,194	5.3	171
18	19	Blackiemuir Ave	N	44.1	2,393	4.0	95
19	20	Blackiemuir Ave (outside Market Rd)	N	40.0	2,404	4.2	100
20	21	B9120(West) outside speed limit	N	57.4	1,352	7.4	100
16	17	Market Road	N	48.1	1,296	1.9	25

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2030 Without Development		
					AADT	HDV%	HDV
11	12	High Street Central (Blackiemuir Ave to Co-Op)	N	26.2	4,291	3.9	167
12	13	High Street North (Co-Op to Station Rd)	N	25.6	5,271	3.5	185
21	22	Station Road	N	49.5	4,899	5.5	269
22	23	Fordoun Road (outside Market Rd)	N	48.0	4,125	6.5	267
23	24	Fordoun Road (outside speed limit)	N	66	1,322	9.2	122
13	14	Aberdeen Road South	N	32.3	6,118	5.1	310
14	15	Aberdeen Road Central	N	48	5,156	5.9	303
15	16	Aberdeen Rd (north of speed limit)	N	70.4	5,149	6.5	336
8	9	B9120 (East)	N	92.0	1,117	4.7	52
17	18	Garvock Road	N	52.3	2,658	2.3	62
21SD	22	Station Road	Y	5	4,899	5.5	269
17SD	17	Market Road	Y	5	1,296	1.9	25
15SD	16	Aberdeen Rd (north of speed limit)	Y	20	5,149	6.5	336

Table 16 2030 With Development

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
1N	1	A90 South Northbound	N	104.9	15,527	15.0	2,329
1S	1	A90 South Southbound	N	100.6	15,601	13.7	2,137
2N	2	A90 Central (south of B9120) Northbound	N	97.8	17,973	13.0	2,336
2S	2	A90 Central (south of B9120) Southbound	N	95.1	18,151	12.6	2,287
3N	3	A90 Central (north of B9120) Northbound	N	104.4	17,458	13.4	2,339
3S	3	A90 Central (north of B9120) Southbound	N	103.5	17,769	12.8	2,274
4N	5	A90 North Northbound	N	104.8	19,969	12.3	2,456
4S	5	A90 North Southbound	N	102.5	19,569	12.1	2,368
26NOFF	26	A937	N	63.7	1,015	8.9	90
26NON	26	C9K	N	76.4	3,465	3.2	111
26SOFF	26	B974	N	64.5	3,343	5.2	174
26SON	26	Oatyhill	N	77.1	799	5.6	45
N4	4	High Street (south of speed limit)	N	96.9	14,509	15.3	2,220
S4	4	High Street South (South of Blackiemuir Ave)	N	100.1	14,806	14.2	2,102
5	6	Blackiemuir Ave	N	100.9	8,048	4.2	341
7	8	Blackiemuir Ave (outside Market Rd)	N	58.6	7	0.0	0
6	7	B9120(West) outside speed limit	N	77.6	444	7.5	33
31	25	Market Road	N	0	0	0.0	0

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
9	10	High Street Central (Blackiemuir Ave to Co-Op)	N	67.3	3,275	5.6	182
10	11	High Street North (Co-Op to Station Rd)	N	33.9	3,424	5.3	183
18	19	Station Road	N	43.85	2,572	3.8	98
19	20	Fordoun Road (outside Market Rd)	N	40.55	2,560	3.9	101
20	21	Fordoun Road (outside speed limit)	N	57.4	1,503	6.6	99
16	17	Aberdeen Road South	N	48.15	1,340	1.8	24
11	12	Aberdeen Road Central	N	26.3	4,503	4.1	187
12	13	Aberdeen Rd (north of speed limit)	N	26.6	5,320	3.7	195
21	22	B9120 (East)	N	49.5	4,951	5.4	266
22	23	Garvock Road	N	47.85	4,218	6.3	268
23	24	New Overbridge	N	67.5	1,427	8.6	123
13	14	West Dumbbell	N	32.25	6,231	5.1	321
14	15	West Dumbbell	N	47.95	5,241	5.6	294
15	16	West Dumbbell	N	70.3	5,250	6.3	329
8	9	West Dumbbell	N	91.95	1,144	4.6	53
17	18	East Dumbbell	N	52.4	2,588	2.3	61
27	27	East Dumbbell	N	45.8	5,526	3.5	192
28NW	28	East Dumbbell	N	22.7	4,854	3.3	160
28NE	28	East Dumbbell	N	22.7	1,394	3.7	52
28SE	28	Station Road	N	27	4,133	3.4	141

ADMS ID	TC ID	Description	Slow Down	Modelled Speed km/hr	2023 With Development		
					AADT	HDV%	HDV
28SW	28	Garvock Road	N	16.1	5,148	4.5	232
29NW	29	Aberdeen Rd (north of speed limit)	N	25.9	1,392	3.7	52
29NE	29	A937	N	19.6	4,737	4.8	227
29SE	29	C9K	N	16.4	4,930	3.7	182
29SW	29	B974	N	21.2	4,133	3.4	141
21SD	22	Oatyhill	Y	5	4,951	5.4	266
17SD	18	High Street (south of speed limit)	Y	52.4	2,588	2	61
15SD	16	High Street South (South of Blackiemuir Ave)	Y	20	5,250	6.3	329

Appendix 6.3: Emission Factors

Table 17 2017 Verification and Base Year Emission Factors

ADMS ID	2017 Verification and Base Year Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.07276453	0.00484792	0.00306688
1S	0.07123679	0.00468543	0.00296723
2N	0.07933903	0.00514207	0.00326225
2S	0.07484619	0.00505826	0.00319337
3N	0.07601965	0.00499144	0.00316243
3S	0.07567425	0.004938	0.00312984
4N	0.08352552	0.00543437	0.00344572
4S	0.08307147	0.00538598	0.00341545
5	0.02319424	0.00144925	0.00092097
7	0.00039811	0.00002676	0.00001661
6	0.0028452	0.00019868	0.00012370
31	0	0	0
9	0.01193885	0.00083483	0.00051804
10	0.01645033	0.00091018	0.00057890
18	0.00868742	0.00053542	0.00033574
19	0.01208731	0.00071311	0.00044967
20	0.00599005	0.00040484	0.00025164
16	0.00381503	0.00024224	0.00015132
11	0.02190363	0.00113062	0.00072704
12	0.02498518	0.00129315	0.00083155
21	0.01446999	0.00092098	0.00057571
22	0.01255076	0.00077748	0.00048755

ADMS ID	2017 Verification and Base Year Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
23	0.01076913	0.00076142	0.00047229
13	0.02797474	0.00153282	0.00097663
14	0.01718977	0.0011122	0.00069379
15	0.01540922	0.00110538	0.00068742
8	0.00381574	0.00025715	0.00016177
17	0.00774224	0.00050372	0.00031360
21SD	0.04545281	0.00112088	0.00076561
17SD	0.00908196	0.00028617	0.00019306
15SD	0.02826694	0.00123866	0.00081403
Rounded to 8d.p.			

Table 18 2023 Without Development Emission Factors

ADMS ID	2023 Without Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.05276763	0.00563616	0.00325147
1S	0.05134254	0.00539894	0.00311652
2N	0.0577891	0.00588371	0.00339829
2S	0.05547918	0.00602199	0.00347452
3N	0.05530867	0.00573332	0.00330993
3S	0.05736945	0.00590172	0.00340905
4N	0.06144347	0.00627694	0.00362586
4S	0.06216088	0.0063753	0.00368349
5	0.01775582	0.00160523	0.00093194
7	0.00046035	0.00004515	0.00002625
6	0.00172636	0.00018561	0.00010739
31	0	0	0
9	0.00779676	0.00085556	0.00049504
10	0.01048017	0.00090754	0.00053318
18	0.00680399	0.00063814	0.00037266
19	0.00762812	0.00069093	0.00040448
20	0.00369032	0.00040546	0.00023480
16	0.00325637	0.00030425	0.00017761
11	0.01472787	0.00114635	0.00067890
12	0.01784546	0.00137142	0.00081300
21	0.01094997	0.00110886	0.00064490
22	0.00893907	0.00091576	0.00053248
23	0.00362605	0.00042844	0.00024727

ADMS ID	2023 Without Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
13	0.01931821	0.00162657	0.00095739
14	0.01346558	0.00133387	0.00077664
15	0.01207589	0.00133613	0.00077265
8	0.00318795	0.00031014	0.00017982
17	0.00595333	0.00057499	0.00033492
21SD	0.03657985	0.00122782	0.00075792
17SD	0.00762928	0.00033437	0.00020622
15SD	0.01993452	0.00140881	0.00084170
Rounded to 8d.p.			

Table 19 2023 With Development Emission Factors

ADMS ID	2023 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.05099493	0.00548989	0.00316627
1S	0.04973831	0.00543197	0.00313309
2N	0.05356617	0.00604907	0.00348680
2S	0.05342623	0.00609869	0.00351528
3N	0.05706102	0.00595842	0.00344001
3S	0.0582205	0.00599163	0.00346104
4N	0.06454135	0.00651385	0.00376446
4S	0.06266707	0.00643814	0.00371974
26NOFF	0.00253842	0.0002983	0.00017222
26NON	0.00841858	0.00086185	0.00049959
26SOFF	0.00810733	0.00088475	0.00051214
26SON	0.00203957	0.00022516	0.00013015
N4	0.04298258	0.00517623	0.00297835
S4	0.04660853	0.00521513	0.00300615
5	0.02403823	0.00208973	0.00121505
7	0.00002497	0.00000234	0.00000136
6	0.00136517	0.00015232	0.00008801
31	0	0	0
9	0.00818426	0.00089815	0.00051968
10	0.01106827	0.00096077	0.00056436
18	0.00708507	0.0006614	0.00038634
19	0.00781532	0.00070746	0.00041416
20	0.00387577	0.00042265	0.00024482

ADMS ID	2023 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
16	0.00327917	0.00030456	0.00017784
11	0.01532044	0.00119547	0.00070786
12	0.01778352	0.00137977	0.00081732
21	0.01099552	0.00111239	0.00064698
22	0.00925878	0.00094406	0.00054904
23	0.00391952	0.00045692	0.00026380
13	0.01943498	0.00163636	0.00096318
14	0.01339122	0.00132191	0.00076980
15	0.0120601	0.00132831	0.00076825
8	0.00327536	0.00031687	0.00018376
17	0.00578742	0.00056012	0.00032624
27	0.01500578	0.00142229	0.00082998
28NW	0.01753295	0.0012847	0.00076485
28NE	0.00526985	0.00038644	0.00023007
28SE	0.0138078	0.00107468	0.00063641
28SW	0.02184615	0.00142598	0.00085861
29NW	0.00497963	0.00038309	0.00022711
29NE	0.01880339	0.00131987	0.00078905
29SE	0.02061965	0.00134836	0.00081178
29SW	0.01525049	0.00108902	0.00064994
21SD	0.03650255	0.00123163	0.00076026
17SD	0.01481584	0.00061796	0.00038118
15SD	0.01983001	0.00140038	0.00083671

ADMS ID	2023 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
Rounded to 8d.p.			

Table 20 2030 Without Development Emission Factors

ADMS ID	2030 Without Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.03391473	0.00607167	0.00343466
1S	0.03156812	0.00566671	0.00320648
2N	0.03687096	0.00626579	0.00354708
2S	0.03490007	0.00639377	0.00361944
3N	0.03504352	0.00607672	0.00343887
3S	0.03585069	0.00626447	0.00354721
4N	0.03976878	0.0067962	0.00384867
4S	0.03903578	0.00681598	0.00386099
5	0.01169846	0.00171827	0.00097911
7	0.00056081	0.00008967	0.00005143
6	0.00095812	0.00017576	0.00010001
31	0	0	0
9	0.00505281	0.00091259	0.00052040
10	0.00662872	0.00096808	0.00055797
18	0.00439025	0.00069415	0.00039858
19	0.00459162	0.00070319	0.00040440
20	0.00233672	0.00042743	0.00024369
16	0.00226237	0.00035281	0.00020276
11	0.00971169	0.00126215	0.00073267
12	0.01195733	0.00153417	0.00089146
21	0.00870615	0.00147689	0.00084506
22	0.00747324	0.00127823	0.00073104
23	0.00220982	0.00043614	0.00024782

ADMS ID	2030 Without Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
13	0.01293762	0.00184724	0.00106602
14	0.00930132	0.00157244	0.00089983
15	0.00849818	0.0015842	0.00090175
8	0.00205985	0.00032711	0.00018644
17	0.0046046	0.00073148	0.00041987
21SD	0.03402744	0.00159982	0.00096184
17SD	0.00555852	0.0003809	0.00022945
15SD	0.01387868	0.00164515	0.00095965
Rounded to 8d.p.			

Table 21 2030 With Development Emission Factors

ADMS ID	2030 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.03230039	0.00584908	0.00330746
1S	0.03073967	0.00570885	0.00322961
2N	0.03427798	0.00647286	0.00366286
2S	0.03360956	0.00647661	0.00366546
3N	0.03632171	0.00635012	0.00359475
3S	0.03658759	0.00637598	0.00361063
4N	0.04200657	0.0070865	0.00401525
4S	0.03984715	0.00690987	0.00391463
26NOFF	0.00170978	0.00033259	0.00018911
26NON	0.0057467	0.00097238	0.00055507
26SOFF	0.00556524	0.00099472	0.00056749
26SON	0.00132453	0.00023973	0.00013648
N4	0.02713123	0.00549471	0.00310408
S4	0.02892195	0.00547741	0.00309741
5	0.01656061	0.00232694	0.00132802
7	0.00001166	0.00000179	0.00000103
6	0.00073537	0.00014004	0.00007957
31	0	0	0
9	0.00542209	0.00098442	0.00056111
10	0.0071152	0.00103789	0.00059824
18	0.00471995	0.00074197	0.00042617
19	0.00484904	0.00074224	0.00042689
20	0.00258851	0.00046538	0.00026553

ADMS ID	2030 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
16	0.0023373	0.00036369	0.00020904
11	0.01022294	0.00133196	0.00077302
12	0.01192939	0.00155514	0.00090264
21	0.00879212	0.00148852	0.00085180
22	0.00764273	0.00130028	0.00074385
23	0.00237254	0.00046365	0.00026352
13	0.01319431	0.00188155	0.00108589
14	0.00943629	0.00158554	0.00090761
15	0.00866465	0.00160681	0.00091481
8	0.00210825	0.00033409	0.00019044
17	0.00448079	0.00071218	0.00040879
27	0.00994871	0.0015787	0.00090637
28NW	0.01150411	0.00141121	0.00082258
28NE	0.00333381	0.00040999	0.00023889
28SE	0.00915931	0.00119712	0.00069480
28SW	0.01450089	0.00157272	0.00092451
29NW	0.00315545	0.00040731	0.00023656
29NE	0.01236297	0.0014462	0.00084515
29SE	0.01345526	0.00147068	0.00086454
29SW	0.01008875	0.00120844	0.00070555
21SD	0.03402323	0.00161231	0.00096939
17SD	0.01186386	0.00077002	0.00046374
15SD	0.01408416	0.00166847	0.00097339

ADMS ID	2030 With Development Emission Factors		
	NO _x	PM ₁₀	PM _{2.5}
Rounded to 8d.p.			

Appendix 6.4: Model Verification

Table 22 Model Verification Step 1

Site ID	2017 Monitored NO ₂	2017 Background NO _x	2017 Background NO ₂	2017 Monitored Total NO _x	2017 Monitored Road Contribution NO ₂ (total – background)	2017 Monitored Road Contribution NO _x (total - background)	2017 Modelled Road Contribution NO _x (excludes background)	Ratio
A	27.5	8.5	6.1	49.5	21.3	41.0	9.3	4.4
B	20.3	7.0	5.1	35.3	15.2	28.3	7.9	3.6
C	16.2	8.8	6.4	26.8	9.8	18.0	6.9	2.6
F	17.7	8.4	6.1	29.9	11.7	21.5	3.2	6.8
G	9.9	8.4	6.1	15.3	3.8	6.9	1.4	4.8

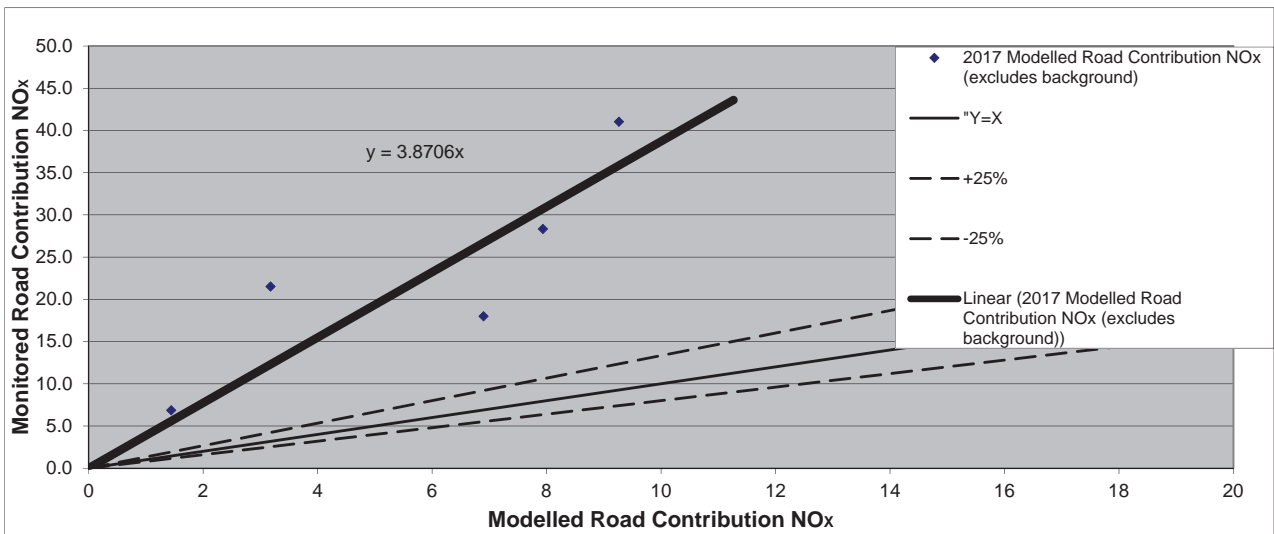


Table 23 Model Verification Step 2

Site ID	Ratio of Monitored Road Contribution NO _x /Modelled Road Contribution NO _x	Adjustment Factor for Modelled Road Contribution	Adjusted Modelled Road Contribution NO _x	Adjusted Modelled Total NO _x (incl background NO _x)	Modelled Total NO ₂ (based on empirical NO _x /NO ₂ relationship)	Monitored Total NO ₂	% Difference [(modelled – monitored)/monitored] x100
A	4.4	3.8706	35.9	44.3	25.0	27.5	-9.1
B	3.6		30.7	37.7	21.5	20.3	5.9
C	2.6		26.7	35.5	20.6	16.2	27.8
F	6.8		12.3	20.7	12.9	17.7	-27.4
G	4.8		5.6	14.0	9.2	9.9	-7.2

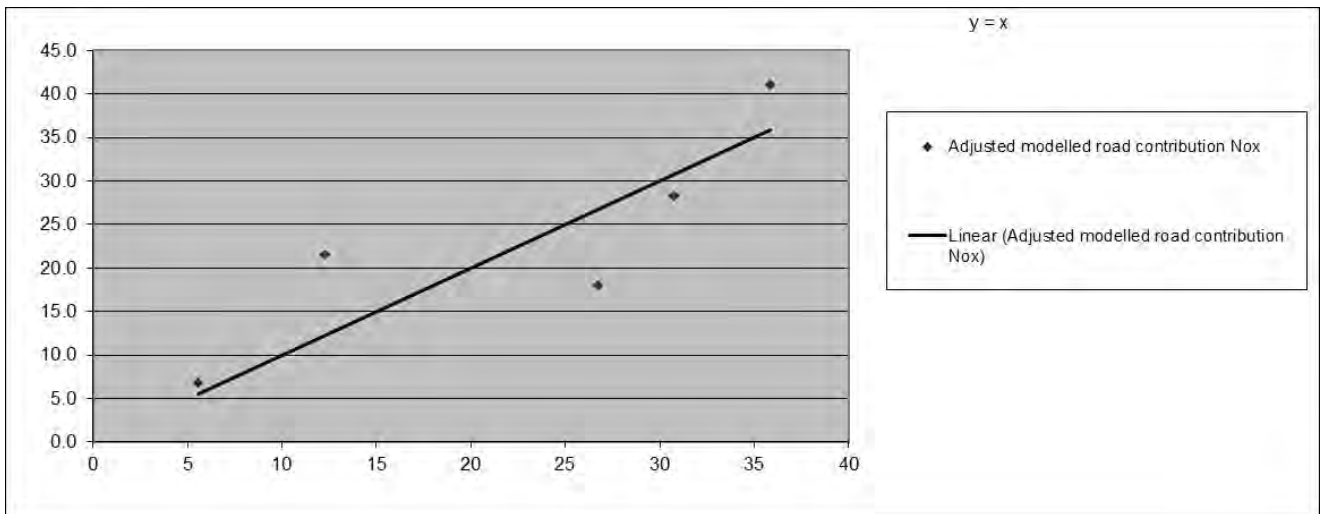


Table 24 Root Mean Square Error Calculation

Root Mean Square Error (RMSE)			
Site ID	Monitored Total NO ₂	Modelled Total NO ₂ (based on empirical NO _x to NO ₂ relationship)	(Obsi – Predi) ²
A	27.5	25.0	6.2
B	20.3	21.5	1.5
C	16.2	20.6	20.2

Root Mean Square Error (RMSE)			
Site ID	Monitored Total NO ₂	Modelled Total NO ₂ (based on empirical NO _x to NO ₂ relationship)	(Obsi – Predi) ²
F	17.7	12.9	23.6
G	9.9	9.2	0.5
Sum (Obs – Pred) ²			52
1/No. of Comparisons			0.2
Mean Monitored – Mean Modelled			0.5
Mean Monitored + Mean Modelled			36.1
Correlation Coefficient			0.8
RMSe			3.2
Fractional Bias			0.5

Appendix 6.5: Sensitivity Analysis Emission Factors

Table 25 2023 Opening Year Without Development Emission Factors - Sensitivity Analysis

ADMS ID	2023 Without Development Emission Factors - Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.07355263	0.00387628	0.00251049
1S	0.07226168	0.00385329	0.00249160
2N	0.08143753	0.00414996	0.00270007
2S	0.07807942	0.00437498	0.00280966
3N	0.07762544	0.00400445	0.00260105
3S	0.08141587	0.00433017	0.00280095
4N	0.08698697	0.00453589	0.00294194
4S	0.08862673	0.00477476	0.00308309
5	0.03090975	0.00189117	0.00120425
7	0.00074769	0.00005045	0.00003131
6	0.00300147	0.0002103	0.00013092
31	0	0	0
9	0.01377709	0.00096311	0.00059757
10	0.0189314	0.00104676	0.00066580
18	0.01171447	0.0007223	0.00045288
19	0.01327508	0.00078679	0.00049584
20	0.006777	0.00045734	0.00028425
16	0.00538252	0.000342	0.00021360
11	0.02593153	0.00133575	0.00085930
12	0.03106719	0.00159765	0.00102848
21	0.01968848	0.00125502	0.00078422
22	0.01662876	0.00104122	0.00065204

ADMS ID	2023 Without Development Emission Factors - Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
23	0.00684183	0.00048393	0.00030017
13	0.03429273	0.00187709	0.00119606
14	0.02390491	0.00150952	0.00094407
15	0.02138525	0.0015068	0.00093535
8	0.00548584	0.0003591	0.00022647
17	0.0099082	0.00064452	0.00040123
21SD	0.05845582	0.00151753	0.00103360
17SD	0.01220774	0.00040226	0.00027085
15SD	0.03737837	0.00168437	0.00110404
Rounded to 8d.p.			

Table 26 2023 Opening Year With Development Emission Factors - Sensitivity Analysis

ADMS ID	2023 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.09934824	0.00647272	0.00410214
1S	0.09572595	0.00636832	0.00402480
2N	0.10341479	0.00705621	0.00444601
2S	0.10259187	0.00708926	0.00445878
3N	0.10917509	0.00702834	0.00445882
3S	0.11029176	0.00706648	0.00448455
4N	0.12182386	0.00770049	0.00489438
4S	0.11793874	0.00758199	0.00480900
26NOFF	0.0048046	0.00033692	0.00020903
26NON	0.01412423	0.00097402	0.00060651
26SOFF	0.01434152	0.00099526	0.00061750
26SON	0.00360881	0.00025509	0.00015868
N4	0.08564195	0.00602172	0.00378362
S4	0.09044346	0.00610195	0.00385071
5	0.04104741	0.00246501	0.00157244
7	0.00003896	0.00000261	0.00000162
6	0.00243533	0.00017274	0.00010747
31	0	0	0
9	0.0144615	0.00101108	0.00062734
10	0.02003292	0.0011082	0.00070481
18	0.01214648	0.00074844	0.00046930
19	0.01356957	0.00080534	0.00050744
20	0.00706604	0.00047647	0.00029613

ADMS ID	2023 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
16	0.00538252	0.00034213	0.00021366
11	0.0271015	0.00139369	0.00089665
12	0.03116564	0.0016071	0.00103385
21	0.01973011	0.0012587	0.00078644
22	0.01712847	0.00107288	0.00067181
23	0.00727601	0.00051584	0.00031996
13	0.03458124	0.00188923	0.00120408
14	0.02367701	0.00149545	0.00093521
15	0.0212795	0.00149783	0.00092985
8	0.00561894	0.00036692	0.00023144
17	0.00965336	0.00062799	0.00039094
27	0.0257471	0.00160708	0.00100613
28NW	0.03067591	0.00150851	0.00097799
28NE	0.00936311	0.00045499	0.00029534
28SE	0.02412881	0.0012505	0.00080389
28SW	0.04008303	0.00171753	0.00113614
29NW	0.00880089	0.00044746	0.00028841
29NE	0.03465045	0.00157447	0.00103144
29SE	0.03716522	0.00161813	0.00106860
29SW	0.02689506	0.00128542	0.00083695
21SD	0.05833361	0.00152134	0.00103594
17SD	0.0237007	0.00074681	0.00050383
15SD	0.03702084	0.00167311	0.00109636

ADMS ID	2023 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
Rounded to 8d.p.			

Table 27 2030 Future Year Without Development Emission Factors - Sensitivity Analysis

ADMS ID	2030 Without Development Emission Factors - Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.11350165	0.00736047	0.00466606
1S	0.10501442	0.00685425	0.00434134
2N	0.12171328	0.00764175	0.00486163
2S	0.11499198	0.00768129	0.00485048
3N	0.11641784	0.00739604	0.00469931
3S	0.11758236	0.00758559	0.00480994
4N	0.13028748	0.00826204	0.00524947
4S	0.12698523	0.00823485	0.00521749
5	0.03427144	0.00207993	0.00132547
7	0.00151528	0.00010196	0.00006327
6	0.0028867	0.00020348	0.00012662
31	0	0	0
9	0.01512208	0.00104714	0.00064971
10	0.0206214	0.00114586	0.00072842
18	0.0130643	0.00080425	0.00050436
19	0.01379881	0.00082006	0.00051662
20	0.00730427	0.0004923	0.00030596
16	0.00636155	0.00040465	0.00025268
11	0.02958069	0.00151651	0.00097646
12	0.03608674	0.00184383	0.00118827
21	0.02666597	0.00170686	0.00106592
22	0.02343577	0.00148263	0.00092722
23	0.00712502	0.00050316	0.00031210

ADMS ID	2030 Without Development Emission Factors - Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
13	0.04016631	0.00219348	0.00139795
14	0.02878955	0.00182164	0.00113908
15	0.02587054	0.00182432	0.00113235
8	0.00595368	0.00038783	0.00024468
17	0.01284754	0.00083546	0.00052002
21SD	0.07620565	0.00205568	0.00139730
17SD	0.01394523	0.00047458	0.00031910
15SD	0.04541929	0.00204088	0.00133808
Rounded to 8d.p.			

Table 28 2030 Future Year With Development Emission Factors - Sensitivity Analysis

ADMS ID	2030 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
1N	0.10898966	0.00709163	0.00449450
1S	0.10269867	0.0068683	0.00433787
2N	0.11385821	0.00774826	0.00488239
2S	0.11139254	0.0077154	0.00485034
3N	0.1198	0.00770103	0.00488574
3S	0.11981583	0.00772122	0.00489644
4N	0.13615034	0.00860968	0.00547113
4S	0.12934858	0.00835425	0.00529550
26NOFF	0.0054872	0.00038348	0.00023793
26NON	0.01628883	0.00112127	0.00069826
26SOFF	0.01651105	0.0011406	0.00070771
26SON	0.00395006	0.00027735	0.00017261
N4	0.09368485	0.00656156	0.00412375
S4	0.09748897	0.00658174	0.00415291
5	0.04739241	0.00282026	0.00180068
7	0.00003054	0.00000203	0.00000126
6	0.00227879	0.00016238	0.00010100
31	0	0	0
9	0.01621079	0.00113046	0.00070145
10	0.02213824	0.00122877	0.00078125
18	0.01398187	0.00085948	0.00053909
19	0.01445772	0.00086417	0.00054400
20	0.00795413	0.00053524	0.00033262

ADMS ID	2030 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
16	0.00655517	0.00041702	0.00026039
11	0.03129236	0.00160141	0.00103123
12	0.03613028	0.00186524	0.00119990
21	0.02686882	0.00171993	0.00107405
22	0.02386859	0.00150791	0.00094313
23	0.00755179	0.00053467	0.00033165
13	0.04096976	0.00223476	0.00142450
14	0.02901444	0.0018357	0.00114782
15	0.02626807	0.00184973	0.00114812
8	0.00608218	0.00039602	0.00024984
17	0.0125012	0.00081338	0.00050624
27	0.0291924	0.00182288	0.00114112
28NW	0.03469741	0.00170935	0.00110826
28NE	0.01016186	0.00049751	0.00032274
28SE	0.02750876	0.00143255	0.00092054
28SW	0.04556903	0.00196396	0.00129874
29NW	0.00956774	0.0004895	0.00031534
29NE	0.03894367	0.00178315	0.00116759
29SE	0.04140218	0.00182549	0.00120408
29SW	0.03058314	0.00147152	0.00095756
21SD	0.07635506	0.00207015	0.00140676
17SD	0.02922629	0.00096305	0.00064843
15SD	0.04589252	0.00206805	0.00135553

ADMS ID	2030 With Development Emission Factors – Sensitivity Analysis		
	NO _x	PM ₁₀	PM _{2.5}
Rounded to 8d.p.			

Appendix 6.6: Sensitivity Analysis Results

Table 29 2023 Opening Year Sensitivity Analysis Annual Mean NO₂ Results

Receptor ID	2017 Base (µg/m ³)	2023 Without Development (µg/m ³)	2023 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	5.2	5.3	6.1	0.9	Small	Minor
LK3	5.3	4.3	6.3	2.0	Medium	Moderate
LK4	7.6	6.1	9.3	3.2	Medium	Moderate
LK5	7.5	5.9	9.7	3.8	Medium	Moderate
LK2	5.9	4.7	7.4	2.7	Medium	Moderate
LK6	5.7	4.6	6.9	2.3	Medium	Moderate
LK7	6.8	5.5	8.5	3.0	Medium	Moderate
S3-1	20.5	15.4	28.4	13.0	Large	Major
S3-2	7.6	6.1	10.4	4.3	Large	Major
S3-3	15.8	11.9	22.3	10.4	Large	Major
S3-4	4.7	3.8	5.0	1.1	Small	Minor
S3-5	8.0	6.4	11.8	5.4	Large	Major
S3-6	9.8	7.2	12.8	5.6	Large	Major
S3-7	7.6	5.7	13.5	7.8	Large	Major

Receptor ID	2017 Base (µg/m³)	2023 Without Development (µg/m³)	2023 With Development (µg/m³)	Change (µg/m³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-8	12.6	9.7	15.9	6.2	Large	Major
S3-9	8.9	6.9	10.8	3.8	Medium	Moderate
S3-10	7.8	6.1	8.8	2.7	Medium	Moderate
S3-11	8.8	7.0	10.8	3.8	Medium	Moderate
S3-12	17.8	13.9	23.1	9.3	Large	Major
S3-13	7.2	5.8	8.5	2.7	Medium	Moderate
S3-14	6.6	5.3	8.3	2.9	Medium	Moderate
S3-15	8.1	6.6	10.6	4.0	Medium	Moderate
A	23.3	17.7	26.2	8.5	Large	Major
B	20.4	15.5	27.7	12.2	Large	Major
C	18.8	14.4	27.2	12.7	Large	Major
D	5.2	4.3	6.0	1.7	Small	Minor
E	5.7	4.6	6.8	2.2	Medium	Moderate
F	12.1	9.6	15.9	6.4	Large	Major
G	8.5	6.7	10.0	3.4	Medium	Moderate

Table 30 2023 Opening Year Sensitivity Analysis Annual Mean PM₁₀ Results

Receptor ID	2017 Base (µg/m ³)	2023 Without Development (µg/m ³)	2023 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	12.4	12.4	12.5	0.1	Imperceptible	Negligible
LK3	12.4	12.4	12.5	0.1	Imperceptible	Negligible
LK4	11.8	12.0	12.1	0.1	Imperceptible	Negligible
LK5	13.0	13.2	13.3	0.1	Imperceptible	Negligible
LK2	12.4	12.5	12.6	0.1	Imperceptible	Negligible
LK6	12.8	12.9	13.0	0.1	Imperceptible	Negligible
LK7	12.7	12.9	12.9	0.0	No Change	Negligible
S3-1	13.3	14.3	14.4	0.1	Imperceptible	Negligible
S3-2	12.7	12.8	13.0	0.2	Imperceptible	Negligible
S3-3	13.5	14.2	14.4	0.1	Imperceptible	Negligible
S3-4	11.8	11.8	11.8	0.0	No Change	Negligible
S3-5	12.4	12.6	12.8	0.2	Imperceptible	Negligible
S3-6	12.8	13.0	13.1	0.2	Imperceptible	Negligible
S3-7	12.6	12.7	13.2	0.5	Small	Minor
S3-8	12.3	12.6	12.7	0.1	Imperceptible	Negligible

Receptor ID	2017 Base (µg/m³)	2023 Without Development (µg/m³)	2023 With Development (µg/m³)	Change (µg/m³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-9	12.0	12.1	12.2	0.1	Imperceptible	Negligible
S3-10	11.9	11.9	12.0	0.1	Imperceptible	Negligible
S3-11	12.0	12.3	12.2	-0.1	Imperceptible	Negligible
S3-12	12.6	13.1	13.1	0.0	No Change	Negligible
S3-13	11.8	11.9	11.9	0.0	No Change	Negligible
S3-14	12.9	13.1	13.1	0.0	No Change	Negligible
S3-15	12.9	13.2	13.2	0.0	No Change	Negligible
A	14.2	15.4	14.8	-0.6	Small	Minor
B	13.6	14.6	14.8	0.1	Imperceptible	Negligible
C	14.2	15.1	15.2	0.2	Imperceptible	Negligible
D	12.5	12.6	12.6	0.0	No Change	Negligible
E	12.8	12.9	13.0	0.0	No Change	Negligible
F	12.2	12.5	12.5	0.1	Imperceptible	Negligible
G	11.9	12.0	12.1	0.0	No Change	Negligible

Table 31 2023 Opening Year Sensitivity Analysis Annual Mean PM_{2.5} Results

Receptor ID	2017 Base (µg/m ³)	2023 Without Development (µg/m ³)	2023 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	5.8	5.7	5.8	0.1	Imperceptible	Negligible
LK3	5.8	5.8	5.8	0.1	Imperceptible	Negligible
LK4	5.6	5.6	5.8	0.1	Imperceptible	Negligible
LK5	6.1	6.1	6.3	0.2	Imperceptible	Negligible
LK2	5.8	5.8	5.9	0.1	Imperceptible	Negligible
LK6	5.9	6.0	6.0	0.1	Imperceptible	Negligible
LK7	6.0	6.0	6.1	0.1	Imperceptible	Negligible
S3-1	6.7	6.5	7.4	0.9	Small	Minor
S3-2	5.8	5.8	5.9	0.1	Imperceptible	Negligible
S3-3	6.5	6.4	7.1	0.7	Small	Minor
S3-4	5.5	5.5	5.5	0.0	Imperceptible	Negligible
S3-5	5.9	5.9	6.1	0.2	Imperceptible	Negligible
S3-6	6.0	6.1	6.3	0.2	Imperceptible	Negligible
S3-7	5.9	5.9	6.3	0.4	Small	Minor
S3-8	6.0	6.1	6.2	0.1	Imperceptible	Negligible

Receptor ID	2017 Base (µg/m³)	2023 Without Development (µg/m³)	2023 With Development (µg/m³)	Change (µg/m³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-9	5.7	5.7	5.8	0.1	Imperceptible	Negligible
S3-10	5.6	5.7	5.7	0.1	Imperceptible	Negligible
S3-11	5.7	5.8	5.9	0.1	Imperceptible	Negligible
S3-12	6.1	6.3	6.4	0.2	Imperceptible	Negligible
S3-13	5.6	5.6	5.7	0.1	Imperceptible	Negligible
S3-14	6.0	6.1	6.1	0.1	Imperceptible	Negligible
S3-15	6.1	6.2	6.3	0.1	Imperceptible	Negligible
A	7.1	6.9	7.4	0.6	Small	Minor
B	6.7	6.5	7.4	0.9	Small	Minor
C	6.9	6.8	7.6	0.8	Small	Minor
D	5.9	5.9	5.9	0.1	Imperceptible	Negligible
E	5.9	5.9	6.0	0.1	Imperceptible	Negligible
F	5.8	5.9	6.1	0.1	Imperceptible	Negligible
G	5.7	5.7	5.8	0.1	Imperceptible	Negligible

Table 32 2030 Future Year Sensitivity Analysis Annual Mean NO₂ Results

Receptor ID	2017 Base (µg/m ³)	2030 Without Development (µg/m ³)	2030 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	5.2	5.6	6.3	0.7	Small	Minor
LK3	5.3	5.9	6.6	0.7	Small	Minor
LK4	7.6	8.8	9.8	0.9	Small	Minor
LK5	7.5	9.3	10.5	1.2	Small	Minor
LK2	5.9	6.6	7.7	1.1	Small	Minor
LK6	5.7	6.5	7.3	0.8	Small	Minor
LK7	6.8	8.3	9.3	1.0	Small	Minor
S3-1	20.5	28.1	30.4	2.3	Medium	Moderate
S3-2	7.6	8.9	11.3	2.3	Medium	Moderate
S3-3	15.8	21.8	24.0	2.2	Medium	Moderate
S3-4	4.7	5.0	5.0	0.0	No Change	Negligible
S3-5	8.0	9.9	13.0	3.1	Medium	Moderate
S3-6	9.8	11.4	13.7	2.3	Medium	Moderate
S3-7	7.6	8.7	14.5	5.9	Large	Major
S3-8	12.6	15.4	17.3	1.9	Small	Minor

Receptor ID	2017 Base (µg/m³)	2030 Without Development (µg/m³)	2030 With Development (µg/m³)	Change (µg/m³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-9	8.9	10.3	11.5	1.2	Small	Minor
S3-10	7.8	8.4	9.2	0.8	Small	Minor
S3-11	8.8	11.4	12.5	1.1	Small	Minor
S3-12	17.8	23.9	26.8	2.9	Medium	Moderate
S3-13	7.2	8.3	9.2	0.9	Small	Minor
S3-14	6.6	8.0	9.0	1.0	Small	Minor
S3-15	8.1	10.5	11.8	1.3	Small	Minor
A	23.3	32.2	28.4	-3.8	Medium	Moderate
B	20.4	28.3	30.0	1.7	Small	Minor
C	18.8	26.0	29.7	3.7	Medium	Moderate
D	5.2	5.7	6.2	0.5	Small	Minor
E	5.7	6.4	7.2	0.8	Small	Minor
F	12.1	15.6	18.1	2.5	Medium	Moderate
G	8.5	9.9	10.8	0.9	Small	Minor

Table 33 2030 Future Year Sensitivity Analysis Annual Mean PM₁₀ Results

Receptor ID	2017 Base (µg/m ³)	2030 Without Development (µg/m ³)	2030 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	12.4	12.4	12.5	0.1	Imperceptible	Negligible
LK3	12.4	12.4	12.5	0.1	Imperceptible	Negligible
LK4	11.8	12.0	12.1	0.1	Imperceptible	Negligible
LK5	13.0	13.2	13.4	0.2	Imperceptible	Negligible
LK2	12.4	12.5	12.6	0.1	Imperceptible	Negligible
LK6	12.8	12.9	13.0	0.1	Imperceptible	Negligible
LK7	12.7	12.9	13.0	0.1	Imperceptible	Negligible
S3-1	13.3	14.3	14.7	0.4	Imperceptible	Negligible
S3-2	12.7	12.8	13.1	0.2	Imperceptible	Negligible
S3-3	13.5	14.2	14.6	0.3	Imperceptible	Negligible
S3-4	11.8	11.8	11.8	0.0	No Change	Negligible
S3-5	12.4	12.6	12.9	0.3	Imperceptible	Negligible
S3-6	12.8	13.0	13.2	0.2	Imperceptible	Negligible
S3-7	12.6	12.7	13.3	0.6	Small	Minor
S3-8	12.3	12.6	12.9	0.2	Imperceptible	Negligible

Receptor ID	2017 Base ($\mu\text{g}/\text{m}^3$)	2030 Without Development ($\mu\text{g}/\text{m}^3$)	2030 With Development ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-9	12.0	12.1	12.2	0.1	Imperceptible	Negligible
S3-10	11.9	11.9	12.0	0.1	Imperceptible	Negligible
S3-11	12.0	12.3	12.4	0.1	Imperceptible	Negligible
S3-12	12.6	13.1	13.4	0.3	Imperceptible	Negligible
S3-13	11.8	11.9	12.0	0.1	Imperceptible	Negligible
S3-14	12.9	13.1	13.2	0.1	Imperceptible	Negligible
S3-15	12.9	13.2	13.3	0.2	Imperceptible	Negligible
A	14.2	15.4	15.1	-0.3	Imperceptible	Negligible
B	13.6	14.6	15.1	0.4	Small	Minor
C	14.2	15.1	15.6	0.5	Small	Minor
D	12.5	12.6	12.6	0.1	Imperceptible	Negligible
E	12.8	12.9	13.0	0.1	Imperceptible	Negligible
F	12.2	12.5	12.7	0.2	Imperceptible	Negligible
G	11.9	12.0	12.1	0.1	Imperceptible	Negligible

Table 34 2030 Future Year Sensitivity Analysis Annual Mean PM_{2.5} Results

Receptor ID	2017 Base (µg/m ³)	2030 Without Development (µg/m ³)	2030 With Development (µg/m ³)	Change (µg/m ³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
LK1	5.8	5.8	5.8	0.1	Imperceptible	Negligible
LK3	5.8	5.8	5.8	0.1	Imperceptible	Negligible
LK4	5.6	5.7	5.8	0.1	Imperceptible	Negligible
LK5	6.1	6.2	6.3	0.1	Imperceptible	Negligible
LK2	5.8	5.9	5.9	0.1	Imperceptible	Negligible
LK6	5.9	6.0	6.1	0.1	Imperceptible	Negligible
LK7	6.0	6.1	6.2	0.1	Imperceptible	Negligible
S3-1	6.7	7.3	7.6	0.2	Imperceptible	Negligible
S3-2	5.8	5.8	6.0	0.2	Imperceptible	Negligible
S3-3	6.5	7.0	7.2	0.2	Imperceptible	Negligible
S3-4	5.5	5.5	5.5	0.0	Imperceptible	Negligible
S3-5	5.9	6.0	6.2	0.2	Imperceptible	Negligible
S3-6	6.0	6.2	6.3	0.2	Imperceptible	Negligible
S3-7	5.9	6.0	6.4	0.4	Small	Minor
S3-8	6.0	6.1	6.3	0.1	Imperceptible	Negligible

Receptor ID	2017 Base (µg/m³)	2030 Without Development (µg/m³)	2030 With Development (µg/m³)	Change (µg/m³)	Magnitude of Change 174/13	Magnitude of Impact 205/08
S3-9	5.7	5.8	5.9	0.1	Imperceptible	Negligible
S3-10	5.6	5.7	5.7	0.1	Imperceptible	Negligible
S3-11	5.7	5.9	6.0	0.1	Imperceptible	Negligible
S3-12	6.1	6.5	6.6	0.2	Imperceptible	Negligible
S3-13	5.6	5.7	5.7	0.1	Imperceptible	Negligible
S3-14	6.0	6.1	6.2	0.1	Imperceptible	Negligible
S3-15	6.1	6.3	6.4	0.1	Imperceptible	Negligible
A	7.1	7.8	7.6	-0.2	Imperceptible	Negligible
B	6.7	7.3	7.6	0.3	Small	Minor
C	6.9	7.5	7.8	0.3	Small	Minor
D	5.9	5.9	5.9	0.0	Imperceptible	Negligible
E	5.9	6.0	6.0	0.1	Imperceptible	Negligible
F	5.8	6.0	6.2	0.2	Imperceptible	Negligible
G	5.7	5.8	5.8	0.1	Imperceptible	Negligible