APPENDIX 2B

DETAILS OF AIR QUALITY MODELING

Appendix 2B
Calculation of Dust Emission Factors

Item	Description		Remarks
1	**General Construction Activities**		
	TSP emission factor (Mg/hectare/month)	2.69	*from AP-42 5th edition (S13.2.3.3)*
	Percentage area actively operating (%)	30	*estimated for typical construction site*
	Assuming no dust mitigation:-		
	TSP emission factor (kg/day)	3	
	TSP emission factor (g/sq.m/sec)	3.11E-05	
	Assuming 50% dust reduction:-		*for twice daily watering with complete coverage (AP-42 4th edition S11.2.4.4)*
	TSP emission factor (kg/day)	1	*calculated*
	TSP emission factor (g/sq.m/sec)	1.56E-05	*calculated*
	Assuming 75% dust reduction:-		*for watering once every 1.5 hour with complete coverage*
	TSP emission factor (kg/day)	1	*calculated*
	TSP emission factor (g/sq.m/sec)	7.78E-06	*calculated*

2	**Site Erosion**		
	TSP emission factor (Mg/hectare/yr)	0.85	*from AP-42 5th edition (Table 11.9-4)*
	Percentage area actively operating (%)	30	*estimated for typical construction site*
	Assuming no dust mitigation:-		
	TSP emission factor (kg/day)	0	
	TSP emission factor (g/sq.m/sec)	8.09E-07	
	Assuming 50% dust reduction:-		*for twice daily watering with complete coverage (AP-42 4th edition S11.2.4.4)*
	TSP emission factor (kg/day)	0	*calculated*
	TSP emission factor (g/sq.m/sec)	4.04E-07	*calculated*
	Assuming 75% dust reduction:-		*for watering once every 1.5 hour with complete coverage*
	TSP emission factor (kg/day)	0	*calculated*
	TSP emission factor (g/sq.m/sec)	2.02E-07	*calculated*

0% dust reduction	
Day total	3.19E-05
Night total	8.09E-07
50% dust reduction	
Day total	1.60E-05
Night total	4.04E-07
75% dust reduction	
Day total	7.99E-06
Night total	2.02E-07

Unmitigated Scenario	Daytime (g/sq.m/sec)	3.19E-05
	Nighttime (g/sq.m/sec)	8.09E-07
Mitigated Scenario	Strips of Sources in the Daytime (g/sq.m/sec)	1.60E-05
	Inner Sources in the Daytime (g/sq.m/sec)	7.99E-06
	Strips of Sources in the Nighttime (g/sq.m/sec)	8.09E-07
	Inner Sources in the Nighttime (g/sq.m/sec)	8.09E-07

Appendix 2B

Chimney Data for South East Kowloon Development

NO.												REMARKS
1	836540	817790	53.6	540	72		614				
2	836560	822320	45.2	500	151		743				
3	836570	817860	51.8	736	46		676				
4	836580	822270	12	200						VSM	
5	836580	822270	12	200						VSM	
6	836610	822310	21	200						VSM	
7	836610	822310	18	200						VSM	
8	836620	820610	21	450	227		NA				
9	836660	819890	30				57				
10	836950	820750	24	300	185		122				
11	836960	818840	47.3	250			NA				
12	837010	818680	53.3	300			83				NOC
13	837020	822470	71.2	450						1328	
14	837100	820690	28.7	460	66		162				
15	837100	820690	28.7	460	66		162				
16	837110	820810	40.6	440	202		162				
17	837110	820820	40.6	440	202		162				
18	837120	820820	40.6	440	202		162				
19	837120	820820	40.6	440	202		162				
20	837300	820690	32	381	57		47				
21	837300	820690	32	381	57		69				
22	837390	820960	18	203			32				
23	837410	818790	46.3	330	53		134				
24	837410	818800	46.3	460	35		134				
25	837420	818930	51.2	533			122				
26	837420	821820	75.4	406			75				
27	837430	818910	51.2	483			69				
28	837450	820150	45.56	440			215				
29	837450	820400	27				237				
30	837470	820340	43.4	270	135		NA				ALA
31	837490	821800	35.3	33			134				
32	837500	821800	35.3	330			134				
33	837500	821850	28	305			NA				
34	837590	819770	39.1	316			147				
35	837610	819780	40.5	300	130		83				
36	837720	819600	41.2	876	124		508				
37	837812	820096	47.5	450	300		461				
38	837816	820093	47.5	450	300		461				
39	837823	820089	46.5	300	300		237				
40	837828	820086	46.5	300	300		237				
41	837833	820084	46.5	300	300		237				
42	837837	820081	44.5	800	240					13083	
43	837840	819950	45.4	584	120		147				
44	837878	820103	19	440			461				
45	837881	820108	19	440			461				
46	837884	820150	34	1000				700			
47	837894	820145	34	1000				700			
48	837904	820141	34	1000				700			
49	837910	819980	41.1	490	58		134				
50	837910	819990	39.4	402	52		75				
51	837913	820136	34	1000				700			
52	837921	820133	34	1000				700			
53	837928	820130	34	1000				700			
54	837940	821230	51	450			558				
55	838020	822460	74.2	450			47				
56	838020	822460	74.2	450						4169	
57	838250	821810	30.5	330			VSM				
58	838260	821810	30.5	330			62				
59	838260	821810	30.5	330			NA				
60	838290	821800	30.5	330			32				
61	838290	821920	57	290	148.5		110				NOC
62	838310	822960	27.2	400						4585	
63	838340	821770	69.2	500			83				
64	838350	821770	68	300			26				
65	838350	821770	68	300			69				
66	838370	822720	69.2	225	167		69				
67	838370	822720	69.3	225	170		69				
68	838410	821900	42.1	406	206	178					
69	838420	821920	45.7	500	206	260					
70	838440	822050	53.7	457	167		215				
71	838450	821830	57.9	200			NA				NOC
72	838460	822840	6.1	460			VSM				
73	838470	822840	9.1	690			32				
74	838490	822200	61.7	300	149		134				ALA

Appendix 2B
Chimney Data for South East Kowloon Development

75	838510	822190	61.8	200			57					
76	838510	822230	61.3	200	200		35					
77	838640	822070	47.9	254			VSM					
78	838660	822100	43.9	254			VSM					
79	838720	822040	54.2	406		110						ALA
80	838740	822130	53.9	203	177		26					
81	838770	816910	80.9	380							VSM	
82	838770	816910	80.9	380			100					
83	838880	821620	2.8	431			196					ALA
84	839220	820530	25.1	559	58		62					
85	839220	820530	25.1	559	58		VSM					
86	839230	820520	25.1	180	49		VSM					
87	839230	820530	25.1	150	49		VSM					
88	839270	820430	30.3	430	37		134					NOC
89	839300	821800	21.3	356			26					
90	839450	822950	10.5	525			43					
91	839650	816850	72.2	560			315					
92	839710	816730	83.8	360			134					
93	839970	820120	47.2	280	69		57					
94	840200	820090	7.6	459			26					
95	840210	819740	47.5	613	40	110						
96	840210	821730	124.1	406			NA					
97	840270	819660	47.2	356	54	110						ALA
98	840330	819810	31.4	356			VSM					
99	840330	819810	31.4	356			100					
100	840340	819630	47.1	1000	114		899					ALA
101	840370	820520	83.8	200			75					
102	840370	820520	83.8	200			52					
103	840370	820520	83.8	200			NA					
104	840380	819620	47.2	455	92		215					
105	840440	819530	46.6	864	46		215					
106	840450	819500	47.6	627	41		147					
107	840470	819560	46.5	254			69					NOC
108	840470	819560	46.5	254			69					NOC
109	840500	819320	47.1	330	67	83						NOC
110	840500	819380	47.3	432	62		162					
111	840500	819450	47.4	850	47	287						
112	840510	819320	72.7	450	120		215					
113	840510	819320	70.3	300	120	122						NOC
114	840510	819330	50.4	200							VSM	NOC
115	840520	819320	47.1	850	35		260					
116	840550	819350	55.4	380	120		134					NOC
117	840560	819300	47.1	566	44	110						
118	840570	819260	47.6	652	37	215						
119	840570	819320	47.5	783	49	215						ALA
120	840580	819360	59.3	387	200		315					ALA
121	840590	819350	53.9	330	120		110					
122	840590	819350	47.7	470	56		110					
123	840590	819360	47.7	520	29		178					ALA
124	840600	819343	47.7	584	91		420					
125	840610	819310	43.6	200			NA					NOC
126	840620	819180	47.7	680	57		110					ALA
127	840620	819180	47.7	680	57		100					ALA
128	840620	819310	47.2	740	59		315					ALA
129	840630	819410	47.4	290	56		62					
130	840650	819140	47.2	714	51		315					
131	840650	819160	47.2	515	46		147					
132	840650	819190	47.2	741	50		315					
133	840650	819500	47.4	560	58		420					
134	840670	819150	47.2	400							VSM	
135	840670	819160	47.5	650	47	196						
136	840700	819150	53.6	400	134	215						
137	840700	819200	47.1	727	37	178						ALA
138	840700	819280	27.4	300			110					
139	840700	819280	27.4	300			NA					
140	840700	819280	27.4	300			NA					
141	840710	819260	47.3	691	49	215						
142	840710	819280	24	375			43					
143	840710	819280	24	375					NA			
144	840710	819350	46.4	711	115		818					
145	840730	819100	47.8	690	20		215					ALA
146	840730	819420	47.2	965	90		989					
147	840740	819020	47.5	830	56		508					
148	840740	819480	47.4	520	177		347					

Appendix 2B
Chimney Data for South East Kowloon Development

149	840780	819130	58.4	496		315						
150	840790	819130	47.9	967	47		461					
151	840790	819130	47.9	948	41		347					
152	840790	819130	47.9	992	51		508					
153	840790	819130	65	300			134					
154	840810	819100	47.9	895	54		381					
155	840810	819110	47.9	880	53		461					
156	840810	819450	30.4	433			26					
157	840860	819100	47.4	330	71		52					ALA
158	840920	819070	30.9	300			91					ALA
159	840930	818980	47.1	522	46		122					
160	840960	818960	47.5	508	89		287					
161	840960	818970	47.5	508	95		347					
162	841040	818850	47.3	696	43		260					
163	841040	819320	47	254	68		69					
164	841040	819370	50	305	50		62					NOC
165	841050	818850	47.3	846	56		558					ALA
166	841060	818830	47.8	696	120		287					ALA
167	841120	818780	66.9	450	160		989					
168	841120	819580	35.1	200	207		57					
169	841140	818750	53.5	500	120		461					
170	841160	818860	36	508			39					NOC
171	841160	819100	48.7	508	74		315					ALA
172	841180	818860	36	356			VSM					NOC
173	841190	818740	27	305	149		75					
174	841200	818740	39.8	203	149		32					
175	841240	821390	26.2	330	121		110					ALA
176	841270	818960	55.7	280	125		122					
177	841290	819040	47	737	75		676					ALA
178	841330	820450	11	200							2139	
179	841400	819020	49.8	305	51		47					ALA
180	841410	821070	16.2	305	121		NA					
181	841410	821070	16.2	305	121		100					
182	841430	820450	11	200							2139	
183	841500	820410	88	600			461					
184	841500	820410	88	600			461					
185	841500	820410	88	600			461					
186	841950	820880	8	100			39					
187	841950	820920	25.4	1550			2333					
188	841960	820880	8	100			NA					
189	841960	820880	8	100			NA					
190	841960	820880	8	100			NA					
191	841960	820880	8	100			39					
192	841980	820900	8	100			NA					
193	841980	820900	8	100			NA					
194	842150	817310	25.8	545	48		215					
195	842160	817320	25.7	584	77		315					
196	842250	817240	9.1	406	40		52					
197	842250	817250	11.9	227							VSM	
198	842250	821430	18.3	483	204		52					
199	842320	817270	28.7	700	51		315					
200	842320	817280	55.6	500			52					ALA
201	842330	817370	46.5	904	51		743					
202	842340	817230	60.9	635	172	420						NOC
203	842370	817380	46.5	304	177		35					ALA
204	842370	817410	49.2	143			29					
205	842370	819150	6.1	343			26					ALA
206	842380	817380	49.2	121			VSM					
207	842390	817390	59.7	500	129	347						
208	842390	817390	50.7	300	120		162					ALA
209	842390	817390	46.1	912	68		743					
210	842390	817400	46.5	770	51	347						
211	842410	817090	40.9	363			147					
212	842500	817430	30	725	48		381					
213	842550	816700	7.6	250			32					
214	842600	816760	3	203			26					ALA
5L	839979.3	819432.6	20	500			600					Hospital

KEY TO DATA SHORTHAND

CHIM_GX	:	Hong Kong 1980 Grid X coordinates (round to the nearest 10 metre, hence chimneys may at most be 5 m away from actual locations)
CHIM_GY	:	Hong Kong 1980 Grid Y coordinates (round to the nearest 10 metre, hence chimneys may at most be 5 m away from actual locations)
HEIGHTAG	:	Chimney height above ground in metre
TOPDIA	:	Chimney top diameter in mm
GTEMP-EXIT	:	Flue gas temperature at chimney exit in °C
BO_MRATE	:	Total maximum hourly fuel consumption rating of boiler gas oil in litre/hr (Please see Note 1 of Appendix I attached)
GO_MRATE	:	Total maximum hourly fuel consumption rating of light gas oil in litre/hr (Please see Note 1 of Appendix I attached)
NA_MRATE	:	Total maximum hourly fuel consumption rating of Naphtha in Kg/hr
TG_MRATE	:	Total maximum hourly fuel consumption rating of town gas in MJ/hr (Please see Note 1 of Appendix II attached)
PG_MRATE	:	Total maximum hourly fuel consumption rating of Liquefied Petroleum Gas in Kg/hr (Please see Note 1 of Appendix III attached)
VSM	:	denotes very small amount
NA	:	denotes data not available

Remarks Shorthand

NOC	:	Plant claimed to have no operation in the three months past.
ALA	:	Plant activity level to be ascertained

Appendix 2B
Sample Calculation of Traffic Emission Rate

Road details

Flow	1176	Vehicles
HV%	9.7	%

Traffic flow in veh/hr (2031am traffic forecast)

	VC1	VC2	Bus	Total
Vehicle	Private Vehicles, Taxi, SPI	All except VC1 & buses	All buses	
Total	1062	114	0	1176
%	90.3%	9.7%	0.0%	100.0%

2031 Fleet Average Emission Factors

NOx

VC1	0.73	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors
VC2	3.84	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors
BUS	6.80	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors

RSP

VC1	0.03	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors
VC2	0.53	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors
BUS	0.69	g/veh/km	conservatively taken as EPD 2011 fleet average emission factors

Emission Rate

NO2 (20% of NOx)

Emission rate	242.6	g/km

RSP

Emission rate	92.3	g/km

Traffic Flow Forecast

Year 2016 traffic flow forecast are included in Appendix 3B of the EIA Report.
The road network is shown in Drawing Nos. 22936/TR/708 & 712 included in the Section 3 Drawings of the EIA Report.