

Appendix 4.9

Details of Emission from other Gaseous Sources and Calculations

Chimney Identified within the Study Area

Assessment Area	Source ID	Type	X	Y	Description	Operation Mode [1]
			(m)	(m)		
West Portion	W1	POINT	835512.7	819388.3	Boiler at Tak Yue Restaurant	Continuously in-use
	W2	POINT	835512.7	819388.3	Boiler at Tak Yue Restaurant	Continuously in-use
	W3	POINT	835512.7	819388.3	Boiler at Tak Yue Restaurant	Continuously in-use
	W4	POINT	835585.6	819028.1	Boiler at Mei Du Restaurant	Continuously in-use
	W5	POINT	835538.8	819398.3	Back-up power generator on roof-top of Hip Kwan Commercial Building	Emergency use only
	W6	POINT	835573.6	819409.4	Back-up power generator on roof-top of Cheong Wai Building	Emergency use only
	W7	POINT	835566.5	819050.2	Back-up power generator on roof-top of Dorsett Seaview Hotel	Emergency use only
	W8	POINT	835566.5	819050.2	Back-up power generator on roof-top of Dorsett Seaview Hotel	Emergency use only
	W9	POINT	834627.4	820011.2	Back-up power generator on roof-top of HSBC Centre	Emergency use only
	W10	POINT	835367.0	819328.0	Boiler at Kam Wah Building	Not used
	W11	POINT	835474.0	819595.0	Boiler at Tung Chun Commercial Centre	Not used
	W12	POINT	835634.0	819088.0	Boiler at Sunbeam Commercial Building	Not used
Central Portion	M1	POINT	836481.0	819225.0	Boiler at Lai Man House	Not used
	M2	POINT	836482.0	819163.0	Boiler at Po Man House	Not used
East Portion	E1	POINT	837909.5	819980.2	Back-up power generator on roof-top of Lucky Building	Emergency use only
	E2	POINT	837909.5	819990.0	Back-up power generator on roof-top of Lucky Building	Emergency use only
	E3	POINT	837742.7	819631.4	Back-up power generator on roof-top of Sui Ying Industrial Building	Emergency use only
	E4	POINT	837834.8	819747.9	Back-up power generator on roof-top of Bonjour Tower	Emergency use only
	E5	POINT	839219.0	820530.0	Boiler at New Camel House	Not used
	HOS	POINT	839486.0	819737.0	KTD EIA Appendix 6.1 (215), Planned Hospital	Planned Hospital
	TG_1	POINT	837904.0	820141.0	Specified Process Licence for HKCG	Continuously in-use
	TG_2	POINT	837913.0	820136.0	Specified Process Licence for HKCG	Continuously in-use
	TG_3	POINT	837921.0	820133.0	Specified Process Licence for HKCG	Continuously in-use
	TG_4	POINT	837928.0	820130.0	Specified Process Licence for HKCG	Continuously in-use
	TG_16	POINT	837837.0	820081.0	Specified Process Licence for HKCG	Continuously in-use
	TG_5	POINT	-	-	Specified Process Licence for HKCG	Emergency use only
	TG_6	POINT	-	-	Specified Process Licence for HKCG	Emergency use only
	TG_15	POINT	-	-	Specified Process Licence for HKCG	Emergency use only

Note [1] : Information provided by the operator or given in the approved EIA Study/ SP License

Emission Inventory for Chimney (In-use only)

Assessment Area	Source ID	Type	Location		Point Source				Emission Rate		Remark / Reference
			X	Y	Release Height	Exit Temperature [3]	Exit velocity [3]	Internal diameter	Nox	RSP	
			(m)	(m)	(m)	(K)	(m/s)	(m)	(g/s)	(g/s)	
Western Portion	W1	POINT	835512.7	819388.3	50	373	6	0.20	0.0444	0.0044	Maximum fuel consumption rate provided by the operator [1]
	W2	POINT	835512.7	819388.3	50	373	6	0.20	0.0444	0.0044	Maximum fuel consumption rate provided by the operator [1]
	W3	POINT	835512.7	819388.3	50	373	6	0.20	0.0444	0.0044	Maximum fuel consumption rate provided by the operator [1]
	W4	POINT	835585.6	819028.1	15	373	6	0.30	0.1333	0.0133	No information available, estimated based on W1-W3 [1]
Eastern Portion	HOS	POINT	839486.0	819737.0	60	298	6	0.50	0.4000	0.0400	KTD EIA Appendix 6.1 (215), Planned Hospital [2]
	TG_1	POINT	837904.0	820141.0	34	473	5.5	1.00	0.3472	0.0000	Specified Process Licence for HKCG
	TG_2	POINT	837913.0	820136.0	34	473	5.5	1.00	0.3472	0.0000	Specified Process Licence for HKCG
	TG_3	POINT	837921.0	820133.0	34	473	5.5	1.00	0.3472	0.0000	Specified Process Licence for HKCG
	TG_4	POINT	837928.0	820130.0	34	473	5.5	1.00	0.3472	0.0000	Specified Process Licence for HKCG
	TG_16	POINT	837837.0	820081.0	44.5	450	20.4	0.50	0.1667	0.0000	Specified Process Licence for HKCG

Note :

- [1] Maximum fuel consumption rate is provided by the operator and not presented in this appendix due to confidentiality of the information. Emission rates of NOx and RSP are calculated based on USEPA AP-42.
- [2] No updated information is available for the planned hospital in ex-Kai Tak airport area. Hence, reference has been made to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009) for the emission details.
- [3] Exit temperatures and velocities of Chimney W1, W2, W3 and W4 are not available from the operator. Hence, an exit temperature of 100°C and velocity of 6m/s are assumed based on EPD's guidelines.

Emission factor for Gas Works in To Kwa Wan

The Hong Kong and China Gas Company Limited - Gas Works

With reference to the current Specified Process (SP) Licence [L-8-004(4)]:

Emission Details

Source ID	Emission Rate (kg/hour)				Emission Rate (g/s)			
	NO _x	SO ₂	Odour	Naphtha Vapour	NO _x	SO ₂	Odour ^[1]	Naphtha Vapour
TG_1	1.25	-	-	-	0.3472	-	-	-
TG_2	1.25	-	-	-	0.3472	-	-	-
TG_3	1.25	-	-	-	0.3472	-	-	-
TG_4	1.25	-	-	-	0.3472	-	-	-
TG_5	1.25	-	-	-	0.3472	-	-	-
TG_6	1.25	-	-	-	0.3472	-	-	-
TG_15	13.4	1.7	-	-	3.7222	0.4722	-	-
TG_16	0.6	-	-	-	0.1667	-	-	-
TG_17	-	-	-	-	-	-	-	-
TG_18	-	-	-	-	-	-	-	-
TG_19	-	-	-	-	-	-	11.9	-
TG_20	-	-	-	-	-	-	11.9	-
TG_21	-	-	-	-	-	-	11.9	-
TG_22	-	-	-	-	-	-	5.2	-
TG_23	-	-	-	-	-	-	5.2	-

Note : [1] Odour emission in the unit of OUs/s

Dimensions

Source ID	Gas Flow Rate	Temperature	Exit Velocity	Diameter	Emission Height
	(m ³ /hour)	(K)	(m/s)	(m)	(mPD)
TG_1	15451	473	5.5	1	34
TG_2	15451	473	5.5	1	34
TG_3	15451	473	5.5	1	34
TG_4	15451	473	5.5	1	34
TG_5	15451	473	5.5	1	34
TG_6	15451	473	5.5	1	34
TG_15	17142	673	31.3	0.44	19
TG_16	14444	450	20.4	0.5	44.5
TG_17	678	298	6	0.2	15.3
TG_18	678	298	6	0.2	15.3
TG_19	18.1	298	1	0.08	6.8
TG_20	18.1	298	1	0.08	6.8
TG_21	18.1	298	1	0.08	6.8
TG_22	N/A	298	N/A	N/A	17
TG_23	N/A	298	N/A	N/A	15

Emission Inventory for the Planned Heliport

Assessment Area	Source ID	Type	Location		Volume Source			Emission Rate		Reference [2]
			X	Y	Release Height	Lateral Dim. (Sy)	Vertical Dim. (Sz)	Nox [1]	RSP	
			(m)	(m)	(m)	(m)	(m)	(g/s)	(g/s)	
Eastern Portion	1001	VOLUME	839950.5	817924.0	80	3.26	1.03	0.000340	0.000094	KTD EIA Appendix 6.2 (Planned Heliport)
	1002	VOLUME	839955.1	817929.4	78	3.26	1.03	0.000340	0.000094	
	1003	VOLUME	839959.7	817934.8	77	3.26	1.03	0.000340	0.000094	
	1004	VOLUME	839964.3	817940.2	76	3.26	1.03	0.000340	0.000094	
	1005	VOLUME	839968.9	817945.6	75	3.26	1.03	0.000340	0.000094	
	1006	VOLUME	839973.5	817951.0	74	3.26	1.03	0.000340	0.000094	
	1007	VOLUME	839978.1	817956.4	73	3.26	1.03	0.000340	0.000094	
	1008	VOLUME	839982.7	817961.8	72	3.26	1.03	0.000340	0.000094	
	1009	VOLUME	839987.3	817967.2	71	3.26	1.03	0.000340	0.000094	
	1010	VOLUME	839991.9	817972.6	70	3.26	1.03	0.000340	0.000094	
	1011	VOLUME	839996.5	817978.0	69	3.26	1.03	0.000340	0.000094	
	1012	VOLUME	840001.1	817983.4	67	3.26	1.03	0.000340	0.000094	
	1013	VOLUME	840005.7	817988.8	66	3.26	1.03	0.000340	0.000094	
	1014	VOLUME	840010.3	817994.2	65	3.26	1.03	0.000340	0.000094	
	1015	VOLUME	840014.9	817999.6	64	3.26	1.03	0.000340	0.000094	
	1016	VOLUME	840019.5	818005.0	63	3.26	1.03	0.000340	0.000094	
	1017	VOLUME	840024.1	818010.4	62	3.26	1.03	0.000340	0.000094	
	1018	VOLUME	840028.7	818015.8	61	3.26	1.03	0.000340	0.000094	
	1019	VOLUME	840033.3	818021.2	60	3.26	1.03	0.000340	0.000094	
	1020	VOLUME	840037.9	818026.6	59	3.26	1.03	0.000340	0.000094	
	1021	VOLUME	840042.5	818032.0	57	3.26	1.03	0.000340	0.000094	
	1022	VOLUME	840047.1	818037.4	56	3.26	1.03	0.000340	0.000094	
	1023	VOLUME	840051.7	818042.8	55	3.26	1.03	0.000340	0.000094	
	1024	VOLUME	840056.3	818048.2	54	3.26	1.03	0.000340	0.000094	
	1025	VOLUME	840060.9	818053.6	53	3.26	1.03	0.000340	0.000094	
	1026	VOLUME	840065.5	818059.0	52	3.26	1.03	0.000340	0.000094	
	1027	VOLUME	840070.1	818064.4	51	3.26	1.03	0.000340	0.000094	
	1028	VOLUME	840074.7	818069.8	50	3.26	1.03	0.000340	0.000094	
	1029	VOLUME	840079.3	818075.2	49	3.26	1.03	0.000340	0.000094	
	1030	VOLUME	840083.9	818080.6	47	3.26	1.03	0.000340	0.000094	
	1031	VOLUME	840088.5	818086.0	46	3.26	1.03	0.000340	0.000094	
	1032	VOLUME	840093.1	818091.4	45	3.26	1.03	0.000340	0.000094	
	1033	VOLUME	840097.7	818096.8	44	3.26	1.03	0.000340	0.000094	
	1034	VOLUME	840102.3	818102.2	43	3.26	1.03	0.000340	0.000094	
	1035	VOLUME	840106.9	818107.6	42	3.26	1.03	0.000340	0.000094	
	1036	VOLUME	840111.5	818113.0	41	3.26	1.03	0.000340	0.000094	
	1037	VOLUME	840116.1	818118.4	40	3.26	1.03	0.000340	0.000094	
	1038	VOLUME	840120.7	818123.8	39	3.26	1.03	0.000340	0.000094	
	1039	VOLUME	840125.3	818129.2	37	3.26	1.03	0.000340	0.000094	
	1040	VOLUME	840129.9	818134.6	36	3.26	1.03	0.000340	0.000094	
	1041	VOLUME	840134.5	818140.0	35	3.26	1.03	0.000340	0.000094	
	1042	VOLUME	840139.1	818145.4	34	3.26	1.03	0.000340	0.000094	
	1043	VOLUME	840143.7	818150.8	33	3.26	1.03	0.000340	0.000094	

Assessment Area	Source ID	Type	Location		Volume Source			Emission Rate		Reference [2]
			X	Y	Release Height	Lateral Dim. (Sy)	Vertical Dim. (Sz)	Nox [1]	RSP	
			(m)	(m)	(m)	(m)	(m)	(g/s)	(g/s)	
	1044	VOLUME	840148.3	818156.2	32	3.26	1.03	0.000340	0.000094	
	1045	VOLUME	840152.9	818161.6	31	3.26	1.03	0.000340	0.000094	
	1046	VOLUME	840157.5	818167.0	30	3.26	1.03	0.000340	0.000094	
	1047	VOLUME	840162.1	818172.4	29	3.26	1.03	0.000340	0.000094	
	1048	VOLUME	840166.7	818177.8	27	3.26	1.03	0.000340	0.000094	
	1049	VOLUME	840171.3	818183.2	26	3.26	1.03	0.000340	0.000094	
	1050	VOLUME	840175.9	818188.6	25	3.26	1.03	0.000340	0.000094	
	1051	VOLUME	840180.5	818194.0	24	3.26	1.03	0.000340	0.000094	
	1052	VOLUME	840185.1	818199.4	23	3.26	1.03	0.000340	0.000094	
	1053	VOLUME	840189.7	818204.8	22	3.26	1.03	0.000340	0.000094	
	1054	VOLUME	840194.3	818210.2	21	3.26	1.03	0.000340	0.000094	
	1055	VOLUME	840198.9	818215.6	20	3.26	1.03	0.000340	0.000094	
	1056	VOLUME	840203.5	818221.0	19	3.26	1.03	0.000340	0.000094	
	1057	VOLUME	840208.1	818226.4	18	3.26	1.03	0.000340	0.000094	
	1058	VOLUME	840212.7	818231.8	16	3.26	1.03	0.000340	0.000094	
	1059	VOLUME	840217.3	818237.2	15	3.26	1.03	0.000340	0.000094	
	1060	VOLUME	840221.9	818242.6	14	3.26	1.03	0.000340	0.000094	
	1061	VOLUME	840226.5	818248.0	13	3.26	1.03	0.000340	0.000094	
	1062	VOLUME	840231.1	818253.4	12	3.26	1.03	0.000340	0.000094	
	1063	VOLUME	840235.7	818258.8	11	3.26	1.03	0.000340	0.000094	
	1064	VOLUME	840240.3	818264.2	10	3.26	1.03	0.000340	0.000094	
	1065	VOLUME	840244.9	818269.6	9	3.26	1.03	0.000340	0.000094	
	1066	VOLUME	840249.5	818275.0	8	3.26	1.03	0.000340	0.000094	
	1067	VOLUME	840254.1	818280.4	6	3.26	1.03	0.000340	0.000094	
	1068	VOLUME	840258.7	818285.8	5	3.26	1.03	0.000340	0.000094	
	1069	VOLUME	840263.3	818291.2	4	3.26	1.03	0.000340	0.000094	
	1070	VOLUME	840267.9	818296.6	3	3.26	1.03	0.000340	0.000094	
	1071	VOLUME	840272.5	818302.0	2	3.26	1.03	0.000340	0.000094	
	1072	VOLUME	840275.4	818301.8	0	3.26	1.03	0.024691	0.006803	
	1073	VOLUME	840275.4	818301.8	0	3.26	1.03	0.033938	0.016969	
	1074	VOLUME	840275.4	818301.8	0	3.26	1.03	0.067050	0.001407	
	1101	VOLUME	840277.7	818304.5	2	3.26	1.03	0.000206	0.000039	
	1102	VOLUME	840282.3	818309.9	2	3.26	1.03	0.000206	0.000039	
	1103	VOLUME	840286.9	818315.3	2	3.26	1.03	0.000206	0.000039	
	1104	VOLUME	840291.5	818320.7	2	3.26	1.03	0.000206	0.000039	
	1105	VOLUME	840272.5	818266.7	2	3.26	1.03	0.000206	0.000039	
	1106	VOLUME	840272.5	818266.7	2	3.26	1.03	0.000206	0.000039	
	1107	VOLUME	840267.8	818261.5	2	3.26	1.03	0.000206	0.000039	
	1108	VOLUME	840263.1	818256.3	2	3.26	1.03	0.000206	0.000039	
	1109	VOLUME	840258.4	818251.1	2	3.26	1.03	0.000206	0.000039	
	1110	VOLUME	840253.7	818245.9	2	3.26	1.03	0.000206	0.000039	
	1111	VOLUME	840249.0	818240.7	2	3.26	1.03	0.000206	0.000039	
	1112	VOLUME	840244.3	818235.5	3	3.26	1.03	0.000206	0.000039	
	1113	VOLUME	840239.6	818230.3	3	3.26	1.03	0.000206	0.000039	
	1114	VOLUME	840234.9	818225.1	3	3.26	1.03	0.000206	0.000039	

Assessment Area	Source ID	Type	Location		Volume Source			Emission Rate		Reference [2]
			X	Y	Release Height	Lateral Dim. (Sy)	Vertical Dim. (Sz)	Nox [1]	RSP	
			(m)	(m)	(m)	(m)	(m)	(g/s)	(g/s)	
	1115	VOLUME	840230.2	818219.9	3	3.26	1.03	0.000206	0.000039	
	1116	VOLUME	840225.5	818214.7	3	3.26	1.03	0.000206	0.000039	
	1117	VOLUME	840220.8	818209.5	3	3.26	1.03	0.000206	0.000039	
	1118	VOLUME	840216.1	818204.3	3	3.26	1.03	0.000206	0.000039	
	1119	VOLUME	840211.4	818199.1	3	3.26	1.03	0.000206	0.000039	
	1120	VOLUME	840206.7	818193.9	3	3.26	1.03	0.000206	0.000039	
	1121	VOLUME	840202.0	818188.7	3	3.26	1.03	0.000206	0.000039	
	1122	VOLUME	840197.3	818183.5	3	3.26	1.03	0.000206	0.000039	
	1123	VOLUME	840192.6	818178.3	3	3.26	1.03	0.000206	0.000039	
	1124	VOLUME	840187.9	818173.1	4	3.26	1.03	0.000206	0.000039	
	1125	VOLUME	840183.2	818167.9	4	3.26	1.03	0.000206	0.000039	
	1126	VOLUME	840178.5	818162.7	4	3.26	1.03	0.000206	0.000039	
	1127	VOLUME	840173.8	818157.5	4	3.26	1.03	0.000206	0.000039	
	1128	VOLUME	840169.1	818152.3	4	3.26	1.03	0.000206	0.000039	
	1129	VOLUME	840164.4	818147.1	4	3.26	1.03	0.000206	0.000039	
	1130	VOLUME	840159.7	818141.9	6	3.26	1.03	0.000206	0.000039	
	1131	VOLUME	840155.0	818136.7	7	3.26	1.03	0.000206	0.000039	
	1132	VOLUME	840150.3	818131.5	9	3.26	1.03	0.000206	0.000039	
	1133	VOLUME	840145.6	818126.3	10	3.26	1.03	0.000206	0.000039	
	1134	VOLUME	840140.9	818121.1	12	3.26	1.03	0.000206	0.000039	
	1135	VOLUME	840136.2	818115.9	14	3.26	1.03	0.000206	0.000039	
	1136	VOLUME	840131.5	818110.7	15	3.26	1.03	0.000206	0.000039	
	1137	VOLUME	840126.8	818105.5	17	3.26	1.03	0.000206	0.000039	
	1138	VOLUME	840122.1	818100.3	19	3.26	1.03	0.000206	0.000039	
	1139	VOLUME	840117.4	818095.1	20	3.26	1.03	0.000206	0.000039	
	1140	VOLUME	840112.7	818089.9	22	3.26	1.03	0.000206	0.000039	
	1141	VOLUME	840108.0	818084.7	23	3.26	1.03	0.000206	0.000039	
	1142	VOLUME	840103.3	818079.5	25	3.26	1.03	0.000206	0.000039	
	1143	VOLUME	840098.6	818074.3	27	3.26	1.03	0.000206	0.000039	
	1144	VOLUME	840093.9	818069.1	28	3.26	1.03	0.000206	0.000039	
	1145	VOLUME	840089.2	818063.9	30	3.26	1.03	0.000206	0.000039	
	1146	VOLUME	840084.5	818058.7	31	3.26	1.03	0.000206	0.000039	
	1147	VOLUME	840079.8	818053.5	33	3.26	1.03	0.000206	0.000039	
	1148	VOLUME	840075.1	818048.3	35	3.26	1.03	0.000206	0.000039	
	1149	VOLUME	840070.4	818043.1	36	3.26	1.03	0.000206	0.000039	
	1150	VOLUME	840065.7	818037.9	38	3.26	1.03	0.000206	0.000039	
	1151	VOLUME	840061.0	818032.7	40	3.26	1.03	0.000206	0.000039	
	1152	VOLUME	840056.3	818027.5	41	3.26	1.03	0.000206	0.000039	
	1153	VOLUME	840051.6	818022.3	43	3.26	1.03	0.000206	0.000039	
	1154	VOLUME	840046.9	818017.1	44	3.26	1.03	0.000206	0.000039	
	1155	VOLUME	840042.2	818011.9	46	3.26	1.03	0.000206	0.000039	
	1156	VOLUME	840037.5	818006.7	48	3.26	1.03	0.000206	0.000039	
	1157	VOLUME	840032.8	818001.5	49	3.26	1.03	0.000206	0.000039	
	1158	VOLUME	840028.1	817996.3	51	3.26	1.03	0.000206	0.000039	
	1159	VOLUME	840023.4	817991.1	52	3.26	1.03	0.000206	0.000039	

Assessment Area	Source ID	Type	Location		Volume Source			Emission Rate		Reference [2]
			X	Y	Release Height	Lateral Dim. (Sy)	Vertical Dim. (Sz)	Nox [1]	RSP	
			(m)	(m)	(m)	(m)	(m)	(g/s)	(g/s)	
	1160	VOLUME	840018.7	817985.9	54	3.26	1.03	0.000206	0.000039	
	1161	VOLUME	840014.0	817980.7	56	3.26	1.03	0.000206	0.000039	
	1162	VOLUME	840009.3	817975.5	57	3.26	1.03	0.000206	0.000039	
	1163	VOLUME	840004.6	817970.3	59	3.26	1.03	0.000206	0.000039	
	1164	VOLUME	839999.9	817965.1	61	3.26	1.03	0.000206	0.000039	
	1165	VOLUME	839995.2	817959.9	62	3.26	1.03	0.000206	0.000039	
	1166	VOLUME	839990.5	817954.7	64	3.26	1.03	0.000206	0.000039	
	1167	VOLUME	839985.8	817949.5	65	3.26	1.03	0.000206	0.000039	
	1168	VOLUME	839981.1	817944.3	67	3.26	1.03	0.000206	0.000039	
	1169	VOLUME	839976.4	817939.1	69	3.26	1.03	0.000206	0.000039	
	1170	VOLUME	839971.7	817933.9	70	3.26	1.03	0.000206	0.000039	
	1171	VOLUME	839967.0	817928.7	72	3.26	1.03	0.000206	0.000039	
	1172	VOLUME	839962.3	817923.5	73	3.26	1.03	0.000206	0.000039	
	1173	VOLUME	839957.6	817918.3	75	3.26	1.03	0.000206	0.000039	

Note :

[1] NO₂/NO_x ratio of 20% has been assumed.

[2] No updated information is available for the planned heliport in ex-Kai Tak airport area. Hence, reference has been made to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009) for the emissi

Emission Inventory for Cruise Terminal

Assessment Area	Source ID	Type	Location		Point Source				Emission Rate		Remark
			X	Y	Release Height	Exit Temperatur	Exit velocity	Internal diameter	Nox	RSP	
			(m)	(m)	(m)	(K)	(m/s)	(m)	(g/s)	(g/s)	
Eastern Portion	M1a	POINT	839989.2	818039.7	48	537	24.6	1.90	24.7007	2.9590	Detailed calculation is provided in "Emission factor for Cruise Terminal in Eastern Portion".
	M1b	POINT	839974.7	818474.4	48	537	24.6	1.90	24.7007	2.9590	
	H1a	POINT	839974.7	818474.4	48	537	24.6	1.90	21.0698	2.1465	
	M2a	POINT	839717.3	818236.2	48	537	24.6	1.90	24.7007	2.9590	
	M2b	POINT	839683.2	818756.5	48	537	24.6	1.90	24.7007	2.9590	
	H2a	POINT	839683.2	818756.5	48	537	24.6	1.90	21.0698	2.1465	
	H1	POINT	839974.7	818474.4	48	537	24.6	1.90	42.1395	4.2930	
	H2	POINT	839683.2	818756.5	48	537	24.6	1.90	42.1395	4.2930	
	T1a	POINT	839940.3	818008.1	2	537	24.6	0.20	0.7177	0.0574	
	T1b	POINT	840040.2	818011.4	2	537	24.6	0.20	0.7177	0.0574	
	T1c	POINT	839917.8	818487.5	2	537	24.6	0.20	0.7177	0.0574	
	T1d	POINT	839989.9	818418.2	2	537	24.6	0.20	0.7177	0.0574	
	T2a	POINT	839669.4	818203.0	2	537	24.6	0.20	0.7177	0.0574	
	T2b	POINT	839769.2	818209.6	2	537	24.6	0.20	0.7177	0.0574	
T2c	POINT	839626.3	818769.6	2	537	24.6	0.20	0.7177	0.0574		
T2d	POINT	839698.4	818700.2	2	537	24.6	0.20	0.7177	0.0574		

Emission Inventory for Existing Typhoon Shelter

Assessment Area	Source ID	Type	Location		Area Source				Emission Rate		Remark
			X	Y	Release Height	Length-X	Width-Y	Angle	Nox	RSP	
			(m)	(m)	(m)	(m)	(m)	(o)	(g/s)	(g/s)	
Eastern Portion	TKW	AREA	838104.0	819475.0	1	530	440	58	1.188E-05	4.753E-07	Detailed calculation is provided in "Emission factor for Typhoon Shelters in Eastern Portion"

Emission factor for Cruise Terminal in Eastern Portion

Marine Emission from Cruise Ships

$Emission\ Rate = Engine\ Power \times Loading\ Factor \times Emission\ Factor \times Low\ Load\ Adjustment\ Factor$

Given

Engine Type	Engine Power [1]	Loading Factor [2]		Emission Factor (g/kWh) [3]		Low Load Factor [4]	
	(kW)	Maneuvering	Hotelling	NOx	RSP	NOx	RSP
Propulsion Engine	88000	0.02	0	14.00	1.43	4.63	7.29
Auxiliary Engine	24464	0.666	0.416	14.70	1.44	N/A	N/A
Boiler	1000	1	1	2.10	0.80	N/A	N/A

Note:

- [1] Engine Power for the Propulsion Engine - Referenced from the approved EIA Study "Kai Tak Development" (AEIAR-130/2009) (KTD EIA) - Appendix 6.4
Engine Power for the Auxiliary Engine - According to Table 3-20 of the Study on Marine Vessels Emissions Inventory, February 2012 :
Auxiliary Engine Power = 88000 x 0.278 = 24464 kW
Engine Power for the Boiler - Referenced from Table 3-23 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the passenger carrying capacity is more than 2,600 for conservative assessment)
- [2] Loading Factor for the Propulsion Engine - Referenced from Table 3-18 of the Study on Marine Vessels Emissions Inventory, February 2012
Loading Factor for the Auxiliary Engine - Referenced from Table 3-21 of the Study on Marine Vessels Emissions Inventory, February 2012
Loading Factor for the Boiler - Assumed 100% loading as a conservative approach
- [3] Emission Factor for the Propulsion Engine - Referenced from Table 3-27 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the engine type of Medium Speed Diesel engine and use of Heavy Fuel Oil, according to KTD EIA)
Emission Factor for the Auxiliary Engine - Referenced from Table 3-28 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the use of Heavy Fuel Oil for conservative assessment)
Emission Factor for the Boiler - Referenced from Table 3-29 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the use of Heavy Fuel Oil for conservative assessment)
- [4] Low Load Adjustment Factor - Referenced from Table 3-30 of the Study on Marine Vessels Emissions Inventory, February 2012

Emission Rate (Maneuvering)

Pollutant	Emission Rate (kg/hr)				Emission Rate for 15mins within an hour [5]
	Propulsion Engine	Auxiliary Engine	Boiler	Total	(g/s)
NOx	114.08	239.51	2.10	355.69	24.70
RSP	18.35	23.46	0.80	42.61	2.96

Note [5]: With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009), the cruise will manoeuvre from the navigation channel to near the cruise terminal (for 15 minutes), and final manoeuvring around the berth for 15 minutes during the berthing period.

Emission Rate (Hotelling)

Pollutant	Emission Rate (kg/hr)				Emission Rate for 60mins within an hour [6]	Emission Rate for 30mins within an hour [7]
	Propulsion Engine	Auxiliary Engine	Boiler	Total	(g/s)	(g/s)
NOx	0.00	149.60	2.10	151.70	42.14	21.07
RSP	0.00	14.65	0.80	15.45	4.29	2.15

Note:

- [6] With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009), it is assumed that the cruise vessel is not equipped with cold-ironing and hence hotelling emission is anticipated throughout the hotelling period.
- [7] With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009), the hotelling period of 30 minutes during the berthing period is adopted.

Emission factor for Cruise Terminal in Eastern Portion

Marine Emission from Tugboat (assuming all Rivertrade tugboat)

$Emission\ Rate = Engine\ Power \times Loading\ Factor \times Emission\ Factor$

Given

Engine Type	Engine Power [1]	Loading Factor [2]	Emission Factor (g/kWh) [3]	
	(kW)	Maneuvering	NOx	RSP
Propulsion Engine	2371	0.30	13.20	0.72
Auxiliary Engine	220	0.43	10.00	0.40

Note:

- [1] Engine Power for the Propulsion Engine - Referenced from Table 4-5 of the Study on Marine Vessels Emissions Inventory, February 2012
Engine Power for the Auxiliary Engine - Referenced from Table 4-6 of the Study on Marine Vessels Emissions Inventory, February 2012
- [2] Loading Factor for the Propulsion Engine - Referenced from Table 4-7 of the Study on Marine Vessels Emissions Inventory, February 2012
Loading Factor for the Auxiliary Engine - Referenced from Table 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012
- [3] Emission Factor for the Propulsion Engine & Auxiliary Engine - Referenced from Table 4-16 of the Study on Marine Vessels Emissions Inventory, February 2012

Emission Rate (Maneuvering)

Pollutant	Emission Rate (kg/hr)			Emission Rate for 15mins within an hour [4]
	Propulsion Engine	Auxiliary Engine	Total	(g/s)
NOx	9.39	0.95	10.34	0.72
RSP	0.51	0.04	0.55	0.04

Note [4]: With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009), the tugboat will assist the curise vessel to during the 15 minutes maneuvering motion.

Emission factor for Cruise Terminal in Eastern Portion

Marine Emission from Tugboat (assuming all OGV tugboat)

Emission Rate = Engine Power x Loading Factor x Emission Factor x Low Load Adjustment Factor

Given

Engine Type	Engine Power [1]	Loading Factor [2]	Emission Factor (g/kWh) [3]		Low Load Factor [4]	
	(kW)	Maneuvering	NOx	RSP	NOx	RSP
Propulsion Engine	2344	0.02	14.00	1.43	4.63	7.29
Auxiliary Engine	520	0.45	14.70	1.44	N/A	N/A

Note:

- [1] Engine Power for the Propulsion Engine - Referenced from Table 3-15 of the Study on Marine Vessels Emissions Inventory, February 2012
 Engine Power for the Auxiliary Engine - Referenced from Table 3-20 of the Study on Marine Vessels Emissions Inventory, February 2012
 Auxiliary Engine Power = 2344 x 0.222 = 520 kW
- [2] Loading Factor for the Propulsion Engine - Referenced from Table 3-18 of the Study on Marine Vessels Emissions Inventory, February 2012
 Loading Factor for the Auxiliary Engine - Referenced from Table 3-21 of the Study on Marine Vessels Emissions Inventory, February 2012
- [3] Emission Factor for the Propulsion Engine - Referenced from Table 3-27 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the engine type of Medium Speed Diesel engine and use of Heavy Fuel Oil for conservative assessment)
 Emission Factor for the Auxiliary Engine - Referenced from Table 3-28 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the use of Heavy Fuel Oil for conservative assessment)
- [4] Low Load Adjustment Factor - Referenced from Table 3-30 of the Study on Marine Vessels Emissions Inventory, February 2012

Emission Rate (Maneuvering)

Pollutant	Emission Rate (kg/hr)			Emission Rate for 15mins within an hour [5]
	Propulsion Engine	Auxiliary Engine	Total	(g/s)
NOx	3.04	3.44	6.48	0.45
RSP	0.49	0.34	0.83	0.06

Note [5]: With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009), the tugboat will assist the cruise vessel to during the 15 minutes maneuvering motion.

Emission factor for Typhoon Shelter in Eastern Portion

Marine Emission from Barge (assuming all Rivertrade barge)

$Emission\ Rate = Engine\ Power \times Loading\ Factor \times Emission\ Factor$

Given

Engine Type	Engine Power [1]	Loading Factor [2]	Emission Factor (g/kWh) [3]	
	(kW)	Hotelling	NOx	RSP
Auxiliary Engine	116	0.43	10.00	0.40

Note:

- [1] Engine Power for the Auxiliary Engine - Referenced from Table 4-6 of the Study on Marine Vessels Emissions Inventory, February 2012
- [2] Loading Factor for the Auxiliary Engine - Referenced from Table 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012
- [3] Emission Factor for the Auxiliary Engine - Referenced from Table 4-16 of the Study on Marine Vessels Emissions Inventory, February 2012

Emission Rate

Pollutant	Emission Rate per Barge		Emission Rate for 20 barges [4]	Emission Rate from To Kwa Wan Typhoon Shelter [5]
	(kg/hr)	(g/s)	(g/s)	(g/m ² /s)
NOx	0.50	0.14	2.77	0.0000119
RSP	0.02	0.01	0.11	0.0000005

Note

- [4] With reference to the approved EIA Study "Kai Tak Development" (AEIAR-130/2009) and site survey conducted in November 2012, 20 barges parking within the To Kwa Wan Typhoon Shelters are identified and assumed in this assessment.
- [5] Total area of To Kwa Wan Typhoon Shelter = 233,200 m²