

Appendix 3.14

***Calculation of Emission Factor in Year 2031
(Portal, Ventilation Building & Toll Plaza)***

Details calculations for Portals and Ventilation Buildings

			Traffic Breakdown																	
Roads Name	Read Link No.	Road Speed	Q	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	
Road L1 (S/B)	320	50	30	8%	37%	37%	0%	5%	0%	0%	1%	0%	5%	3%	4%	0%	0%	0%	0%	
Road L1 (N/B)	319	50	990	7%	34%	34%	0%	5%	0%	0%	1%	0%	7%	5%	6%	0%	0%	0%	0%	
Road D2 Landscape Deck (W/B)	337	50	670	8%	36%	36%	0%	5%	0%	0%	1%	0%	3%	4%	4%	0%	0%	0%	0%	
Road D2 Landscape Deck (E/B)	336	50	530	8%	36%	36%	0%	5%	0%	0%	1%	0%	4%	3%	3%	0%	0%	0%	0%	
Road T2 (N/B)	361	80	1950	6%	28%	28%	0%	4%	0%	0%	1%	1%	12%	9%	10%	1%	0%	0%	0%	
Road T2 (S/B)	366	80	1920	6%	29%	29%	0%	4%	0%	0%	1%	1%	12%	8%	9%	1%	0%	0%	0%	
Kai Tak Airport Tunnel (E/B)	200	70	2370	7%	39%	31%	0%	2%	0%	0%	1%	1%	7%	5%	5%	0%	0%	1%	1%	
Kai Tak Airport Tunnel (W/B)	199	70	2640	7%	38%	30%	0%	2%	0%	0%	1%	1%	6%	6%	6%	0%	0%	2%	1%	
HEC (E/B)	300	80	4540	4%	60%	19%	0%	2%	0%	0%	1%	0%	4%	3%	3%	0%	0%	2%	2%	
CKR (E/B)	342	80	4500	6%	29%	29%	0%	4%	0%	0%	1%	1%	11%	9%	9%	1%	0%	0%	0%	
TKO-LLT (E/B)	366	80	1920	6%	29%	29%	0%	4%	0%	0%	1%	1%	12%	8%	9%	1%	0%	0%	0%	
TKO-LLT (W/B)	361	80	1950	6%	28%	28%	0%	4%	0%	0%	1%	1%	12%	9%	10%	1%	0%	0%	0%	

Emission Factor for NO ₂ in gm/mile-veh (50kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
1.157	0.158	0.268	0.000	3.981	0.000	0.000	0.352	6.428	0.296	2.367	4.775	5.014	3.163	3.036	0.312	
Emission Factor for NO ₂ in gm/mile-veh (70kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
1.255	0.152	0.251	0.000	3.859	0.000	0.000	0.353	6.405	0.276	2.245	4.522	5.557	3.221	2.991	0.314	
Emission Factor for NO ₂ in gm/mile-veh (80kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
1.255	0.136	0.227	0.000	3.859	0.000	0.000	0.339	6.350	0.267	2.181	4.522	5.557	3.221	2.991	0.306	

Roads Name	Road Link No.	Q	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	Nox E.F. (g/mile-veh)
Road L1	320 319	1020	83.0	55.0	93.2	0.0	203.0	0.0	0.0	3.6	4.2	20.5	119.3	289.4	0.0	0.0	46.7	2.1	0.8
Road D2 Landscape Deck	337 336	1200	111.1	70.1	118.6	0.0	238.9	0.0	0.0	4.2	0.0	12.0	101.1	203.9	0.0	0.0	40.7	2.1	0.8
Road T2 (N/B)	361	1950	146.8	74.3	123.9	0.0	301.0	0.0	0.0	6.6	7.6	52.5	382.8	881.8	108.4	0.0	0.0	0.0	1.1
Road T2 (S/B)	366	1920	144.6	75.7	126.4	0.0	296.4	0.0	0.0	6.5	7.5	61.5	335.0	781.4	106.7	0.0	0.0	0.0	1.0
Kai Tak Airport Tunnel (E/B)	200	2370	208.2	138.6	184.4	0.0	182.9	0.0	0.0	8.4	9.6	45.8	266.0	535.9	0.0	0.0	70.9	7.4	0.7
Kai Tak Airport Tunnel (W/B)	199	2640	231.9	150.5	198.8	0.0	203.8	0.0	0.0	9.3	10.7	43.7	355.6	716.3	0.0	0.0	157.9	8.3	0.8
HEC (E/B)	300	4540	227.9	370.5	195.8	0.0	350.4	0.0	0.0	15.4	0.0	48.5	297.1	615.9	0.0	0.0	271.6	29.6	0.5
CKR (E/B)	342	4500	338.9	177.5	296.2	0.0	694.6	0.0	0.0	15.3	17.5	132.2	883.3	1831.4	250.1	0.0	0.0	0.0	1.0
TKO-LLT (E/B)	366	1920	144.6	83.5	139.8	0.0	206.4	0.0	0.0	6.8	7.8	63.6	344.8	781.4	106.7	0.0	0.0	0.0	1.0
TKO-LLT (W/B)	361	1950	146.8	81.9	137.0	0.0	301.0	0.0	0.0	6.9	7.9	64.6	394.0	881.8	108.4	0.0	0.0	0.0	1.1

Emission Factor for RSP in gm/mile-veh (50kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
0.063	0.007	0.029	0.000	0.188	0.000	0.000	0.260	0.168	0.099	0.202	0.327	0.312	0.210	0.106	0.234	
Emission Factor for RSP in gm/mile-veh (70kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
0.062	0.006	0.024	0.000	0.137	0.000	0.000	0.226	0.135	0.080	0.163	0.222	0.194	0.214	0.086	0.212	
Emission Factor for RSP in gm/mile-veh (80kph)														Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t				
0.062	0.006	0.024	0.000	0.137	0.000	0.000	0.226	0.135	0.080	0.163	0.222	0.194	0.214	0.086	0.212	

Roads Name	Road Link No.	Q	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <8.4t	Non-franchised Buses 8.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	RSP E.F. (g/mile-veh)
Road L1	320 319	1020	4.5	2.5	10.0	0.0	9.6	0.0	0.0	2.7	1.7	7.0	10.2	18.8	0.0	0.0	0.0	0.0	0.07
Road D2 Landscape Deck	337 336	1200	6.1	3.2	12.8	0.0	11.3	0.0	0.0	3.1	0.0	4.1	8.6	14.0	0.0	0.0	1.4	1.6	0.06
Road T2 (N/B)	361	1950	7.3	2.2	8.7	0.0	10.7	0.0	0.0	3.3	2.1	14.1	21.4	43.2	3.8	0.0	0.0	0.0	0.06
Road T2 (S/B)	366	1920	7.1	2.2	8.9	0.0	10.5	0.0	0.0	3.2	2.0	13.8	18.7	38.3	3.7	0.0	0.0	0.0	0.06
Kai Tak Airport Tunnel (E/B)	200	2370	10.2	5.9	17.6	0.0	6.5	0.0	0.0	5.4	3.2	13.2	19.3	26.3	0.0	0.0	2.1	5.0	0.05
Kai Tak Airport Tunnel (W/B)	199	2640	11.4	6.4	19.0	0.0	7.2	0.0	0.0	6.0	3.6	12.6	25.8	35.1	0.0	0.0	4.6	5.6	0.05
HEC (E/B)	300	4540	11.3	10.9	13.8	0.0	12.4	0.0	0.0	7.6	0.0	10.9	16.6	30.2	0.0	0.0	8.0	14.1	0.03
CKR (E/B)	342	4500	16.7	1.1	4.3	0.0	37.0	0.0	0.0	45.1	28.7	16.2	32.9	59.8	52.4	57.8	23.8	41.9	0.09
TKO-LLT (E/B)	366	1920	7.1	2.2	8.9	0.0	10.5	0.0	0.0	3.2	2.0	13.8	18.7	38.3	3.7	0.0	0.0	0.0	0.06
TKO-LLT (W/B)	361	1950	7.3	2.2	8.7	0.0	10.7	0.0	0.0	3.3	2.1	14.1	21.4	43.2	3.8	0.0	0.0	0.0	0.06

Emission from Portal							
ID	Length (m)	Q (veh/hr)	Original E.F.	Original mass	NO _x E.F. (g/mile-veh)	RSP E.F. (g/mile-veh)	RSP (g/s)
Road L1	243	1020	0.8541	0.0667	3.654E-02	7.308E-03	2.853E-03
Road D2 Landscape Deck	214	1200	0.7521	0.0551	3.334E-02	6.668E-03	2.443E-03
Road T2 (N/B) 80% pollutant will be extracted by vent building	2640	1950	0.4299	0.0239	3.820E-01	7.640E-02	2.125E-02
Road T2 (S/B) 50% pollutant will be extracted by vent building	2640	1920	0.5056	0.0283	4.424E-01	8.848E-02	2.474E-02
Kai Tak Airport Tunnel (E/B) 50% pollutant will be extracted by vent building	900	2370	0.3498	0.0242	1.288E-01	2.578E-02	8.910E-03
Kai Tak Airport Tunnel (W/B) 50% pollutant will be extracted by vent building	900	2640	0.3552	0.0260	1.621E-01	3.242E-02	1.067E-02
HEC (E/B) 70% pollutant will be extracted by vent building	1800	4540	0.1601	0.0090	2.258E-01	4.516E-02	1.265E-02
CKR (E/B) 100% pollutant will be extracted by vent building	1260	4500	1.0304	0.0508	0	0	0
TKO-LLT (E/B)	140	1920	1.0288	0.0566	4.773E-02	9.547E-03	2.624E-03
TKO-LLT (W/B)	140	1950	1.0925	0.0598	5.148E-02	1.000E-02	2.818E-03

Emission from Ventilation Building		
ID	NO _x (g/s)	RSP (g/s)
CKR	2.017E-01	9.984E-02
Road T2 Ventilation Building inside KTD site	1.146E-01	3.188E-02
Road T2 Ventilation Building (Kwun Tse)	8.848E-02	2.474E-02
Kai Tak Airport Tunnel	5.818E-02	1.958E-02
HEC Ventilation Building	1.054E-01	2.952E-02

Detailed calculation of vehicle emission factor for idling vehicle

	Q(veh/lane)	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
NOx Emission Rate (g/min-veh)		0.2	0.2	0.2	2	2	2	0.5	0.5	0.5	0.5	0.5	2	2	2	2	0.5
RSP Emission Rate (g/min-veh)		0	0	0	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Eastbound	13.3	4%	60%	19%	0%	2%	0%	0%	1%	0%	4%	3%	0%	0%	0%	2%	1%
Westbound	13.3	4%	63%	19%	0%	2%	0%	0%	1%	0%	4%	3%	0%	0%	0%	1%	1%

	Q(veh/lane)	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
NOx Emission Rate (g/min-veh)		0.2	0.2	0.2	2	2	2	0.5	0.5	0.5	0.5	0.5	2	2	2	2	0.5
RSP Emission Rate (g/min-veh)		0	0	0	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Eastbound	13.3	1	8	3	0	0	0	0	0	0	1	0	0	0	0	0	0
Westbound	13.3	1	8	3	0	0	0	0	0	0	1	0	0	0	0	0	0

	Q(veh/lane)	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	NOx E.F. (g/min-veh)
Eastbound	13.3	1	8	3	0	0	0	0	0	0	0.5	0.5	2	2	2	2	0.5	0.3560
Westbound	13.3	1	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3170

	Q(veh/lane)	Motor Cycles	Petrol PC & LGV	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	Diesel PC&LGV <2.5t	Diesel LGV 2.5-3.5t	Diesel LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	RSP, g/min-veh
Eastbound	13.3	1	8	3	0	0	0	0	0	0	0.043	0.043	0.043	0.043	0	0	0	0.0073
Westbound	13.3	1	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0060

	Eastbound	Westbound
No. of lanes	6	6
Capacity (veh)	80	80
total length (m)	100	100
Total Area (m2)	2500	2500
NOx emission rate g/min/veh	0.356	0.317
g/hr	1709	1522
NO2 emission rate g/s/m2	1.899E-04	1.691E-04
RSP emission rate g/s/m2	3.797E-05	3.381E-05
NO2 emission rate g/min/veh	0.0073	0.0060
g/hr	35	29
RSP emission rate g/s/m2	3.899E-06	3.211E-06

Notes:

- (1) Emission factors and Vehicular per Lane are made reference to the Approved Further Development of Tsung Kwan O Feasibility Study EIA Report
- (2) Motor Cycles, Petrol PC&LGV, Taxi belong to "Private Car (petrol)" category, whose NOx emission rate is 0.2 (g/min-veh) and RSP emission rate is 0 (g/min-veh)
- (3) Non-franchised Buses, HGV, Single Deck Franchised Buses & Double Deck Franchised Buses belong to "Bus, MG, HGV (diesel)" category, whose NOx emission rate is 2 (g/min-veh) and RSP emission rate is 0.043 (g/min-veh)
- (4) Private Light Buses, Diesel PC&LGV & Public Light Buses belong to "PLB,LGV (diesel)" category, whose NOx emission rate is 0.5 (g/min-veh) and RSP emission rate is 0.043 (g/min-veh)