

APPENDIX 3.4

**Detailed Calculations of
Vehicular Emission
Rate**

Calculation of Open Road Emission (Nox)

Year 2011 Nox Emission Factors of different vehicle categories [sourced from the approved EIA Study "Sludge Treatment Facilities" (EIA-155/2008)]

Vehicle Type	Yr 2011 Emission Factors (g/km-veh)				
	P/C	Taxi	SPB	HGV	PT
NO _x	0.54	0.49	4.96	3.46	6.15

Road Link	No.	x-start	y-start	x-end	y-end	Rd L (m)	Traffic flow					Emission Rate (g/km)					Traffic flow veh	Composite Em Rate g/ml/veh		
							Car	Taxi	SPB	HGV	PT	Total	Car	Taxi	SPB	HGV			PT	Total
Lung Kwu Tan Road	I1	809917.1	826989.7	809903.0	827191.8	203	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I2	809903.0	827191.8	809923.8	827290.5	101	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I3	809923.8	827290.5	809935.1	827336.7	48	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I4	809935.1	827336.7	809939.7	827399.8	63	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I5	809939.7	827399.8	809932.1	827483.1	84	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I6	809932.1	827483.1	809923.1	827549.9	67	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I7	809923.1	827549.9	809908.3	827616.2	68	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I8	809908.3	827616.2	809868.9	827734.0	124	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I9	809868.9	827734.0	809832.1	827815.6	89	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I10	809832.1	827815.6	809815.6	827868.3	55	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I11	809815.6	827868.3	809808.0	827921.1	53	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I12	809808.0	827921.1	809815.6	828012.3	92	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I13	809815.6	828012.3	809818.5	828072.0	60	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I14	809818.5	828072.0	809808.4	828136.5	65	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I15	809808.4	828136.5	809748.9	828355.3	227	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I16	809748.9	828355.3	809734.5	828422.9	69	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I17	809734.5	828422.9	809709.0	828544.0	124	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I18	809709.0	828544.0	809690.6	828621.0	79	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I19	809690.6	828621.0	809648.1	828729.2	116	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I20	809648.1	828729.2	809624.0	828806.3	81	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I21	809624.0	828806.3	809586.0	828943.9	143	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I22	809586.0	828943.9	809552.2	829069.8	130	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I23	809552.2	829069.8	809523.4	829197.7	131	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I24	809523.4	829197.7	809501.5	829315.1	119	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I25	809501.5	829315.1	809501.5	829408.9	94	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I26	809501.5	829408.9	809509.3	829459.1	51	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I27	809509.3	829459.1	809531.0	829533.1	77	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I28	809531.0	829533.1	809559.0	829604.7	77	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I29	809559.0	829604.7	809586.2	829678.2	78	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I30	809586.2	829678.2	809603.6	829759.8	83	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I31	809603.6	829759.8	809598.2	829803.3	44	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Lung Kwu Tan Road	I32	809598.2	829803.3	809585.2	829841.2	40	83	83	50	141	10	367	45	41	248	488	62	883	367	3.871
Nim Wan Road-1	I33	809585.2	829841.2	809564.7	829874.7	39	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I34	809564.7	829874.7	809529.7	829910.3	50	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I35	809529.7	829910.3	809467.4	829964.1	82	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I36	809467.4	829964.1	809349.0	830122.2	197	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I37	809349.0	830122.2	809302.5	830219.1	107	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I38	809302.5	830219.1	809279.0	830300.9	85	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I39	809279.0	830300.9	809267.0	830392.6	93	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I40	809267.0	830392.6	809260.1	830505.8	113	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I41	809260.1	830505.8	809254.3	830621.9	116	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I42	809254.3	830621.9	809237.1	830932.6	311	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I43	809237.1	830932.6	809224.9	831172.7	240	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I44	809224.9	831172.7	809239.1	831233.7	63	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I45	809239.1	831233.7	809273.7	831288.3	65	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I46	809273.7	831288.3	809322.5	831326.2	62	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I47	809322.5	831326.2	809380.4	831346.8	61	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I48	809380.4	831346.8	809769.9	831450.6	403	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I49	809769.9	831450.6	810123.5	831569.1	373	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I50	810123.5	831569.1	810175.9	831587.4	56	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I51	810175.9	831587.4	810235.9	831593.9	60	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I52	810235.9	831593.9	810327.7	831593.3	92	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I53	810327.7	831593.3	810415.2	831581.2	88	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I54	810415.2	831581.2	810563.4	831548.7	152	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-1	I55	810563.4	831548.7	810829.1	831489.4	272	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661
Nim Wan Road-2	I56	810147.9	831565.5	810234.3	831406.8	181	18	18	3	141	0	180	10	9	15	488	0	521	180	4.661

Calculation of Open Road Emission (RSP)

Year 2011 RSP Emission Factors of different vehicle categories [sourced from the approved EIA Study "Sludge Treatment Facilities" (EIA-155/2008)]

Vehicle Type	Yr 2011 Emission Factors (g/km-veh)				
	P/C	Taxi	SPB	HGV	PT
RSP	0.03	0.01	0.33	0.36	0.45

Road Link	No.	x-start	y-start	x-end	y-end	Rd L (m)	Traffic flow					Total	Emission Rate (g/km)					Traffic flow veh	Composite Em Rate g/ml/veh	
							Car	Taxi	SPB	HGV	PT		Car	Taxi	SPB	HGV	PT			
Lung Kwu Tan Road	11	809917.1	826989.7	809903.0	827191.8	203	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	12	809903.0	827191.8	809923.8	827290.5	101	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	13	809923.8	827290.5	809935.1	827336.7	48	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	14	809935.1	827336.7	809939.7	827399.8	63	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	15	809939.7	827399.8	809932.1	827483.1	84	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	16	809932.1	827483.1	809923.1	827549.9	67	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	17	809923.1	827549.9	809908.3	827616.2	68	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	18	809908.3	827616.2	809868.9	827734.0	124	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	19	809868.9	827734.0	809832.1	827815.6	89	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	110	809832.1	827815.6	809815.6	827868.3	55	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	111	809815.6	827868.3	809808.0	827921.1	53	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	112	809808.0	827921.1	809815.6	828012.3	92	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	113	809815.6	828012.3	809818.5	828072.0	60	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	114	809818.5	828072.0	809808.4	828136.5	65	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	115	809808.4	828136.5	809748.9	828355.3	227	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	116	809748.9	828355.3	809734.5	828422.9	69	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	117	809734.5	828422.9	809709.0	828544.0	124	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	118	809709.0	828544.0	809690.6	828621.0	79	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	119	809690.6	828621.0	809648.1	828729.2	116	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	120	809648.1	828729.2	809624.0	828806.3	81	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	121	809624.0	828806.3	809586.0	828943.9	143	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	122	809586.0	828943.9	809552.2	829069.8	130	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	123	809552.2	829069.8	809523.4	829197.7	131	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	124	809523.4	829197.7	809501.5	829315.1	119	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	125	809501.5	829315.1	809501.5	829408.9	94	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	126	809501.5	829408.9	809509.3	829459.1	51	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	127	809509.3	829459.1	809531.0	829533.1	77	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	128	809531.0	829533.1	809559.0	829604.7	77	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	129	809559.0	829604.7	809586.2	829678.2	78	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	130	809586.2	829678.2	809603.6	829759.8	83	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	131	809603.6	829759.8	809598.2	829803.3	44	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Lung Kwu Tan Road	132	809598.2	829803.3	809585.2	829841.2	40	83	83	50	141	10	367	2	1	17	51	5	75	367	0.329
Nim Wan Road-1	133	809585.2	829841.2	809564.7	829874.7	39	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	134	809564.7	829874.7	809529.7	829910.3	50	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	135	809529.7	829910.3	809467.4	829964.1	82	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	136	809467.4	829964.1	809349.0	830122.2	197	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	137	809349.0	830122.2	809302.5	830219.1	107	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	138	809302.5	830219.1	809279.0	830300.9	85	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	139	809279.0	830300.9	809267.0	830392.6	93	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	140	809267.0	830392.6	809260.1	830505.8	113	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	141	809260.1	830505.8	809254.3	830621.9	116	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	142	809254.3	830621.9	809237.1	830932.6	311	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	143	809237.1	830932.6	809224.9	831172.7	240	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	144	809224.9	831172.7	809239.1	831233.7	63	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	145	809239.1	831233.7	809273.7	831288.3	65	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	146	809273.7	831288.3	809322.5	831326.2	62	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	147	809322.5	831326.2	809380.4	831346.8	61	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	148	809380.4	831346.8	809769.9	831450.6	403	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	149	809769.9	831450.6	810123.5	831569.1	373	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	150	810123.5	831569.1	810175.9	831587.4	56	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	151	810175.9	831587.4	810235.9	831593.9	60	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	152	810235.9	831593.9	810327.7	831593.3	92	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	153	810327.7	831593.3	810415.2	831581.2	88	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	154	810415.2	831581.2	810563.4	831548.7	152	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-1	155	810563.4	831548.7	810829.1	831489.4	272	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469
Nim Wan Road-2	156	810147.9	831565.5	810234.3	831406.8	181	18	18	3	141	0	180	1	0	1	51	0	52	180	0.469