

Detailed Calculations of Emission Factors for Construction Activities

Heavy Construction Operation

For the dust calculations, the emission factor as suggested by the USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.3.3, for general heavy construction operations is 2.69 Mg/hectare/month of activity.

As confirmed with the Project Engineer, 10 working hours per day was assumed for the dusty construction works in the assessment

$$\begin{aligned} \text{Emission rate (Heavy Construction)} &= 2.69 \times 10^6 / (10000 \times 30 \times 10 \times 3600) \\ &= 2.4907 \times 10^{-4} \quad \text{g/m}^2/\text{s} \end{aligned}$$

Wind Erosion for Construction Site

The emission factor of 0.85 Mg/hectare/year, based on Table 11.9-4 of the USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), is used to calculate the wind erosion effect for the construction site taking place over the whole day

$$\begin{aligned} \text{Emission rate (Wind Erosion)} &= 0.85 \times 10^6 / (10000 \times 365 \times 24 \times 3600) \\ &= 2.6953 \times 10^{-6} \quad \text{g/m}^2/\text{s} \end{aligned}$$

Traffic from Paved Road

For the dust calculations, the emission factor as suggested by the USEPA's Compilation of Air Pollutant Emission Factors, 5th edition, 1995 (AP-42), Section 13.2.1, for traffic dust on paved road can be estimated using the following expression:

$$E = k(sL/2)^{0.65}(W/3)^{1.5}$$

where	E	particulate emission factor, g/veh-km
	k	particulate size multiplier for particle size range and units of interest
	sL	road surface silt loading, g/m ²
	W	average weight, ton

In this study,

k	24	g/veh-km	(AP-42, Table 13.2.1-1)
sL	12	g/m ²	(AP-42, Table 13.2.1-4)
W	19	ton	The average weight of the empty truck (16 ton) and full load truck (22 ton)
E	1225.9085	g/veh-km	

For maximum hourly traffic flow of 10 veh/hour(round-trip included), the emission rate due to traffic from paved road is: -

$$\begin{aligned} \text{Emission rate} &= 1225.909 \times (10/3600) / 1000 \\ &= 0.0034053015 \quad \text{g/m}^2/\text{s} \end{aligned}$$

Coordination (x, y) of emission sources of construction sites at Siu Ho Wan and Silver Mine Bay

Emission Sources	Source Type	Siu Ho Wan*		X-Dimension (m)	Y-Dimension (m)	Mitigated Emission Rate	Remark
		X	Y				
Heavy Construction Operation (Central Point of the Area Source)	Area Source	818022.547	819258.192	20	20	3.96028E-05 g/m2/s	08:00 - 18:00 from Monday to Saturday without public holiday 84.1% dust removal efficiency is adopted for the mitigated Emission Rate
Wind Erosion for Construction Site (Central Point of the Area Source)		818022.547	819258.192	20	20	2.69533E-06 g/m2/s	All Day no dust removal efficiency is adopted for wind erosion emission
Traffic from Paved Road	Line Source	818012.544	819260.008	N/A		2.69019E-04 g/m/s	08:00 - 18:00 from Monday to Saturday without public holiday 92.1% dust removal efficiency is adopted for the mitigated Emission Rate
		817849.564	819260.008				

Emission Sources	Source Type	Silver Mine Bay						
		Site Formation**		X-Dimension (m)	Y-Dimension (m)	Mitigated Emission Rate	Remark	
		X	Y					
Heavy Construction Operation (Central Point of the Area Source)	Area Source	817784.631	813524.045	20	50	3.96028E-05 g/m2/s	08:00 - 18:00 from Monday to Saturday without public holiday 84.1% dust removal efficiency is adopted for the mitigated Emission Rate	
Wind Erosion for Construction Site (Central Point of the Area Source)		817770.100	813551.100	8	12	2.69533E-06 g/m2/s	All Day no dust removal efficiency is adopted for wind erosion emission	
Traffic from Paved Road		Line Source	817784.631	813524.045	20	50	5.41443E-04 g/m/s	08:00 - 18:00 from Monday to Saturday without public holiday 84.1% dust removal efficiency is adopted for the mitigated Emission Rate
			817770.100	813551.100	8	12		
	817810.000		813481.600	N/A				
	817768.100		813554.100					
	817768.100	813554.100						
	817782.700	813578.000						

Emission Sources	Source Type	Silver Mine Bay					
		Vertical Shaft***		X-Dimension (m)	Y-Dimension (m)	Mitigated Emission Rate	Remark
		X	Y				
Heavy Construction Operation (Central Point of the Area Source)	Area Source	817803.656	813469.734	30	30	3.96028E-05 g/m2/s	08:00 - 18:00 from Monday to Saturday without public holiday 84.1% dust removal efficiency is adopted for the mitigated Emission Rate
Wind Erosion for Construction Site (Central Point of the Area Source)		817804.656	813470.734	30	30	2.69533E-06 g/m2/s	All Day no dust removal efficiency is adopted for wind erosion emission
Traffic from Paved Road	Line Source	817810.000	813481.600	N/A		5.41443E-04 g/m/s	08:00 - 18:00 from Monday to Saturday without public holiday 84.1% dust removal efficiency is adopted for the mitigated Emission Rate
		817768.100	813554.100				
		817768.100	813554.100				
		817782.700	813578.000				