

### Appendix 3.02f Calculation of Dust Suppression Efficiency by Watering

Dust suppression efficiency of 87.5% is assumed in the assessment. The estimation and relevant assumptions are discussed as below.

With reference to the Equation of (5-4) of USEPA's Control of Open Fugitive Dust Sources (EPA-450/3-98-008), dust suppression efficiency can be estimated by:

$$C = 100 - \frac{0.8 \cdot p \cdot d \cdot t}{i}$$

where

$C$  = average control efficiency, in percent

$p$  = potential average hourly daytime evaporation rate in mm/ hour

$d$  = average hourly daytime traffic rate in vehicles per hour

$i$  = application intensity in L/m<sup>2</sup>

$t$  = time between applications in hour

The following assumptions are made for assessment purpose:

- Potential average hourly daytime evaporation rate  $p$  can be estimated by  $0.0049 \cdot e$ , where  $e$  is the mean annual average evaporation rate (inches). From past measurement data by Hong Kong's Observatory, evaporation recorded at King's Park between 1981 – 2010 is 1227.3 mm<sup>1</sup>. Therefor  $p = 0.0049 \cdot 1227.3 \text{ mm} = 0.0049 \cdot (48.32 \text{ inches}) = 0.2368$
- Estimated average hourly daytime traffic rate in vehicles per hour  $d = 140$ .
- Assume watering application intensity  $i = 2.12 \text{ L/m}^2$ .
- Assume watering frequency as once per hour,  $t = 1$ .

With the above assumptions, dust suppression efficiency by watering is estimated as below:

$$C = 100 - 0.8 \cdot 0.2368 \cdot 140 \cdot 1 / 2.12 = \underline{\underline{87.5\%}}$$

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<sup>1</sup> The Hong Kong's Observatory evaporation recorded at King's Park between 1981 to 2010 is taken from [http://www.weather.gov.hk/cis/normal/1981\\_2010/normal\\_e.htm](http://www.weather.gov.hk/cis/normal/1981_2010/normal_e.htm).