

APPENDIX 6-3

**ESTIMATION OF POLLUTANT LOAD FROM EXISTING HOUSES
FOUND ON SITE**

Estimation of Baseline Sewage Flow and Load from Village Houses

Assuming 2 heads per occupied village house found on site and only the people living in the village houses would use the toilets, the total population is 20. The existing sewage flows and pollution loads within the site are tabulated in Table (a) and (b).

Table (a) The Current Sewage Flow of the Existing Village Houses within the Site Area to the Deep Bay WCZ

Item	Values
Total Heads of the Existing Village Houses	= 10 houses x 2 heads/house = 20 heads
Total Sewage Flow of the Existing Village Houses ⁽¹⁾	= 20 heads x 0.15 m ³ /head/day = 3.0 m ³ /day
Total Sewage Flow without any Treatment	= 16 heads x 0.15 m ³ /head/day = 2.4 m ³ /day
Total Sewage Flow treated by Septic Tanks	= 4 heads x 0.15 m ³ /head/day = 0.6 m ³ /day

Remark:-

(1) Unit flow rate of traditional villages with reference to the EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) Table T1 for "Traditional Village" and "Temporary and Non-domestic" type.

Table (b) The Current Pollution Load of the Existing Village Houses within the Site Area to the Deep Bay WCZ

Item	BOD	TSS	NH ₃ -N	TN-N	E.coli.	TP
(A) Unit Pollution Loads Factors ⁽¹⁾	0.042 kg/head/day	0.04 kg/head/day	0.005 kg/head/day	0.0085 kg/head/day	4.3x10 ¹⁰ count/head/day	0.0015 kg/head/d ⁽²⁾
(B) = (A) x 16 Total Pollution Loads from Existing Houses without connection to any sewerage	0.672 kg BOD/day	0.640 kg TSS/day	0.080 kg NH ₃ -N/day	0.136 kg TN-N/day	6.88x10 ¹¹ count E.coli./day	0.024 kg P/day
(C) = (A) x 4 Total Pollution from the Existing Houses connected to septic tanks	0.168 kg BOD/day	0.160 kg TSS/day	0.020 kg NH ₃ -N/day	0.034 kg TN-N/day	1.72x10 ¹¹ count E.coli./day	0.006 kg P/day
(D) Typical Removal Efficiency of Septic Tanks ⁽³⁾	45%	70%	-200% ⁽⁴⁾	24%	99.9%	NA

Item	BOD	TSS	NH ₃ -N	TN-N	E.coli.	TP
(E) = (C) x (1-(D)) Total Pollution Loads to be Discharged from the Existing Septic Tanks of Village Houses	0.092 kg BOD/day	0.048 kg TSS/day	0.026 kg NH ₃ - N/day ⁽⁴⁾	0.026 kg TN-N/day	1.72x10 ⁸ count E.coli./day	0.005 kg P/day ⁽⁵⁾
(F) Removal Effect of Soakaway to Effluent from Septic Tanks ⁽⁶⁾	50%	50%	50%	50%	50%	50%
(G) = (E) x (F) Total Pollution Loads to be Discharged from the Existing Village Houses with Septic Tanks	0.046 kg BOD/day	0.024 kg TSS/day	0.013 kg NH ₃ - N/day ⁽⁴⁾	0.013 kg TN-N/day	0.86x10 ⁸ count E.coli./day	0.003 kg P/day
(F) = (B) + (G) Total Pollution Loads to be Discharged from the Existing Houses	0.718 kg BOD/day	0.664 kg TSS/day	0.093 kg NH ₃ -N/day	0.149 kg TN-N/day	6.88x10 ¹¹ count E.coli./day	0.027 kg P/day

Remark:-

- (1) With reference to the DSD Sewerage Manual
- (2) With reference to Section 1.2, Domestic Wastewater Phosphorus Concentration Report, State of Idaho Department of Environmental Quality (2012)
- (3) With reference to Table 6.8 of EIA Report EIA-190/2010 for Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
- (4) With reference to Table 6.8 of EIA Report EIA-190/2010 for Liantang / Heung Yuen Wai Boundary Control Point and Associated Works which states the amount of NH₃N in the effluent of septic tank will be increased after the biological reactions within the septic tank but it will not exceed the amount of TN in the effluent of septic tank.
- (5) With reference to Section 1.2, Domestic Wastewater Phosphorus Concentration Report, State of Idaho Department of Environmental Quality (2012), i.e. (P concentration of septic tank as 8.6 mg/L)
- (6) Removal efficiency of soakaway is highly dependent on the permeability of soil. It is noted that the existing ground level of the site is at about 2.0 mPD only which is lower than the mean higher high water level measured at Tsim Bei Tsui at 2.28 mPD. Salinity of soil of the site is also very high which further proves that the site is subjected to the impact of high water level (please see photo on the right). The high water table would have significant impact on the permeability of the soil and therefore performance of the soakaway. With reference to ISSN 2071-1050 – Application of On-Site Wastewater Treatment in Ireland and Perspectives on Its Sustainability (2014), good design soakaway system can have removal efficiency up to around 80%. Given high water table of the site it is assumed that the efficiency of soakaway will be reduced to 50% only.

