Estimation of Sewage Generation (from the Proposed Project)

Sewage Source	Approx. Number	Unit Flow Factor (m^3/d/ person)	Estimated Consumption (m^3/wash)	Average Dry Weather Flow (m^3/d)	References
HKPF's Population	30	0.18	/	5.40	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transportation trade activities according to Table T-2 of GESF
FEHD's Population	127	0.18	/	22.86	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transportation trade activities according to Table T-2 of GESF
EMSD's Population	33	0.18	/	5.94	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transportation trade activities according to Table T-2 of GESF
GL's Population	36	0.18	/	6.48	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for storage trade activities according to Table T-2 of GESF
Daily vehicle washing from EMSD's workshop (Manual Wash)	2	/	0.12	0.24	- No. of vehicles to be washed: estimated by user - Estimated consumption: estimated by user
Daily vehicle washing from FEHD's depot (Automated Vehicle Washing Machine)	33	/	1.00	33.00	- No. of vehicles to be washed: estimated by user - Estimated consumption: estimated by user
Daily vehicle washing from FEHD's depot (Manual Wash)	17	/	8.00	136.00	- No. of vehicles to be washed: estimated by user - Estimated consumption: estimated by user
Total Average Dry Weather Flow (ADWF) (m^3/d)				209.92	
Peaking Factor				8	Table T-5 of GESF
Catchment Inflow Factor (P_{CIF})				1.1	Table T-4 of GESF
Peak Wet Weather Flow (PWWF) (m^3/d)				1847.30	
Peak Wet Weather Flow (PWWF) (m^3/s)				0.0214	

Estimation of Sewage Generation (from Surrounding Developments)

Sewage Source	Sewer Manhole Number	Population	Unit Flow Factor (m^3/d/ person)	Peaking Factor	Catchment Inflow Factor (P_{CIF})	Peak Wet Weather Flow (PWWF) (m^3/s)	References
Government Logistics Centre	FMH7034178	180	0.18	8	1.1	0.0033	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transport, storage and communication activities according to Table T-2 of GESF
New World First Bus Depot	FMH7034178	700	0.18	8	1.1	0.0128	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transportation trade activities according to Table T-2 of GESF
Citybus Chai Wan Depot	FMH7034208	385	0.18	8	1.1	0.0071	- Population: estimated by user - Unit Flow Factor: 0.08 for employee and 0.1 for transportation trade activities according to Table T-2 of GESF

Estimation of Sewerage Hydraulic

Upstream Manhole	Downstream Manhole	Pipe Size (mm)	Length (m) [1]	Upstream invert level (mPD) [1]	Downstream invert level (mPD) [1]	Gradient (1:x)	Slope, *S* (m/m)	Colebrook-White roughness coefficient (mm) [2]	Velocity, *V* (m/s) [3]	Pipe Capacity, *Q* (m^3/s) [4]	Contribution by the proposed Project (%)	Total Flow from Proposed Project and Surrounding Developments (m^3/s)	Total Capacity Taken (%)	Sufficient Capacity?
FMH7034177	FMH7034178	225	8	3.23	3.15	100.0	0.0100	6.0	0.8983	0.0357	59.9%	0.0214	59.9%	Yes
FMH7034178	FMH7034180	400	53	2.64	2.58	883.3	0.0011	6.0	0.4491	0.0564	37.9%	0.0375	66.5%	Yes
FMH7034180	FMH7034216	400	24	2.58	2.44	171.9	0.0058	6.0	1.0204	0.1282	16.7%	0.0375	29.3%	Yes
FMH7034216	FMH7034205	400	31	2.44	2.26	171.9	0.0058	6.0	1.0204	0.1282	16.7%	0.0375	29.3%	Yes
FMH7034205	FMH7034206	400	11	2.26	2.22	275.0	0.0036	6.0	0.8063	0.1013	21.1%	0.0375	37.0%	Yes
FMH7034206	FMH7034208	600	56	2.22	1.63	94.9	0.0105	6.0	1.8068	0.5109	4.2%	0.0375	7.3%	Yes
FMH7034208	FMH7034210	600	62	1.63	1.43	310.0	0.0032	6.0	0.9990	0.2825	7.6%	0.0446	15.8%	Yes
FMH7034210	FMH7034212	600	52	1.41	1.38	1733.3	0.0006	6.0	0.4215	0.1192	17.9%	0.0446	37.4%	Yes
FMH7034212	FMH7034213	600	49	1.37	1.12	196.0	0.0051	6.0	1.2568	0.3554	6.0%	0.0446	12.5%	Yes
FMH7034213	FMH7034200	600	80	1.10	1.07	2325.0	0.0004	6.0	0.3637	0.1028	20.8%	0.0446	43.3%	Yes
FMH7034200	FMH7034199	600	13	1.07	1.06	2325.0	0.0004	6.0	0.3637	0.1028	20.8%	0.0446	43.3%	Yes
FMH7034199	FMH7034198	600	23	1.04	1.00	575.0	0.0017	6.0	0.7331	0.2073	10.3%	0.0446	21.5%	Yes
FMH7034197	FMH7034198	1200	62	1.51	1.40	563.6	0.0018	6.0	1.1709	1.3242	0.0%	1.3242	100.0% [5]	Yes
FMH7034198	FSH7001100	2100	9	0.85	0.81	225.0	0.0044	6.0	2.6614	9.2181	0.2%	1.3688	14.8%	Yes

Note:

1) Information from DSD's Drainage Layout Plan.

2) Reference to Table 5 of DSD's Sewerage Manual Part 1.

3) Velocity is calculated using Colebrook-White Equation:

$$V = -2(2gDS)^{0.5} \log\left(\frac{k}{3.7D} + \frac{2.5\boldsymbol{\nu}}{D(2gDS)^{0.5}}\right)$$

k = Colebrook-White roughness coefficient, in metres
V = velocity, in metres per second
D = circular cross-section pipe, inside diameter, in metres
S = slope, in metres per metre
ν = kinematic viscosity of water, in square metres per second.

4) Pipe capacity is calculated from: $Q = V \times A$

5) The discharge is assumed to be at full capacity as a worst-case scenario.