APPENDIX 5A:

Pollution Loading Inventory

A5.1 Introduction

A5.1.1.1 This appendix contains the pollution loading inventory used in the water quality modelling for the present Study. The methodology used in compiling the inventory and details of flow and load data are presented.

A5.2 Methodology

A5.2.1.1 The pollution loading inventory for the present Study was prepared based on the flow and load data compiled under the "Review of North District and Tolo Harbour Sewerage Master Plans – Agreement No. CE28/99" (SMP Study). The pollution flow and load data from the SMP Study were also applied in the regions outside of the Study Area. The projected flows and potential population for 2016 presented in the "Final Report on Review of Yuen Long and Kam Tin Sewerage and Sewage Treatment Requirements" were used to update the pollution flows and loads within the Study Area.

A5.2.1.2 In the SMP Study, updated pollution flow and load data were compiled covering the North District/Tolo Harbour areas for year 2016. The catchments of concern for the San Wai STW include the Yuen Long/Kam Tin and Tin Shui Wai catchments. The preparation of this pollution loading inventory made reference to the latest information available from the SMP Study.

Source of Data

A5.2.1.3 The pollution flows and loads for the SMP Study was compiled based on the following studies and data:

1. Update on Cumulative Water Quality and Hydrological Effect of Coastal Development and Upgrading of Assessment Tool (Agreement No. CE42/97) – Pollution Load and Flow Data HKSAR (Cumulative Impact Study).

2. Territory Population and Employment Data Matrices (TPEDM) issued by Planning Department in August 1999.

3. Review of North District and Tolo Harbour Sewerage Master Plans Technical Note 2 on Water Quality Modelling Methodology and Approach.

4. Review of North District and Tolo Harbour Sewerage Master Plans Technical Note 4 on Development Land Use, Population Flows and Loads.

5. Sewerage Manual – Key Planning Issues and Gravity Collection System. Drainage Services Department, Hong Kong Government.

Yuen Long/Kam Tin and Tin Shui Wai Catchments

Estimation of Sewage Flows and Loads

A5.2.1.4 The population and employment figures presented in relevant Comprehensive Transport Study (CTS) zones were first distributed into the sewerage catchments to facilitate the estimation of pollution loadings. **Table A5.1** shows the population and employment numbers within the Yuen Long, Tin Shui Wai and Kam Tin catchments by different sub-catchment areas. In addition, the corresponding CTS zones for each sub-catchments are also presented. The population and employment figures were then multiplied by the global unit flow factors and

global unit load factors provided in the Sewerage Manual and summarised in **Tables A5.2** and **A5.3** respectively to give the estimated sewage flows and loads for the catchments.

Table A5.1 Population and Employment Statistics for Yuen Long, Tin Shui Wai and Kam Tin Catchments by Sub-Catchment Area

Sub-Catchment Area	CTS Zone	Residential	Industrial	Commercial	Employment Total	Students
Hung Shui Kui	172 & 173	182,840	6,854	24,553	32,735	20,449
Lau Fau Shan & Ha Tsuen	174	18,330	492	1,604	2,359	473
Tin Shui Wai (Ph1)	175, 176, 261 & 281	151,360	5,209	26,158	33,485	44,844
Long Ping	177	24,000	1,258	6,101	7,869	13,217
Yuen Long Kau Hui	178	15,460	1,590	5,938	8,851	2,460
Area 13 & 14	178 & 180	63,260	2,661	16,113	22,620	2,459
Yuen Long	179	70,140	1,109	5,298	6,779	14,738
Yuen Long South	181	11,330	1,442	5,297	6,887	4,160
Au Tau	182	22,270	1,738	27,918	30,122	8,056
Ngau Tam Mei/San Tin & Sha Po	183	77,200	2,984	20,079	23,718	9,545
Kam Tin	182 & 184	133,970	2,662	37,032	40,359	9,305
Yuen Long Industrial Estate	232	8,730	5,440	802	6,341	199
Tin Shui Wai (Ph2)	280	140,250	1,319	5,767	7,386	17,421
Total for Tuen Mun Port	163, 258 & 259	595	9,143	311	9,579	16

Table A5.2 Flow Factors used in Estimation of Sewage Flows

Category	Flow Factor (m^3/person/d)
Public Rental	0.175
Subsidised Sale Flats	0.240
Private Permanent	0.250
Institution / Special Classes	0.210
Non-Domestic	0.100
Temporary	0.150
School Places	0.025
E1 (manufacturing employment)	0.600
E2 – E5 (non-manufacturing employment)	0.290

Table A5.3 Load Factors used in Estimation of Sewage Loads

Parameter	Load Factors (kg/person/d)			
	Residents	Employment / Students	Commercial	Industrial
Suspended Solids	0.040	0.034	0.025	0.230
BOD	0.042	0.034	0.053	0.230
COD	0.090	0.070	0.103	0.580
Total Kjeldahl Nitrogen TKN)	0.0085	0.0067	0.0025	0.029
NH3N	0.005	0.0040	0.0008	0.008
E. Coli	4.30×10^{10}	3.50×10^{10}	-	-

A5.2.1.5 For pollutant factors, which are not provided in the Sewerage Manual, the following assumptions were made based on the Cumulative Impact Study:

- Total Phosphorus Load Factors:
  - Residents 1.33 g/d/head
  - Employment 1.06 g/d/head
  - Commercial 0.53 g/d/head
  - Industrial 0.00 g/d/head

- Total Phosphorus (TP) to Ortho-Phosphate (Ortho P) is 1.68.

- The Silica content is 1.7 mg/L with reference to the Cross Border Link Study.

- The estimation of copper loading was done in two parts. The first part was carried out for 2016 residential and employment populations for which load factors of 6.5 mg/person/d and 5.2 mg/person/d were assumed. These factors were extracted from Table C9-7 of the CIS. For copper loads arisen from the industrial processes, the same were assumed for loads projected under the CIS for 2012 and added to the domestic loads to get the total copper load for each catchment.

- For Organic Nitrogen loading, the following load factors were assumed and basing on the differences of load factors for TKN and NH_3.
  - Residents 3.50 g/d/head
  - Employment 2.70 g/d/head
  - Commercial 1.70 g/d/head
  - Industrial 21.0 g/d/head

- Pollution load for Total Oxidized Nitrogen (TON) given for effluent from major primary and secondary treatment facilities was based on a combination of concentrations assumed in the Cumulative Impact Study, DSD monitoring data, and design standards.

Sewage Distribution for the Four Option Scenarios

A5.2.1.6 It was assumed that 10% of the total sewage load generated in the Yuen Long/Kam Tin and Tin Shui Wai catchments would be lost to the storm system. The 10% figure is in line with the assumption made in the Cumulative Impact Update Study (CE 42/97, EPD) for the study area. It was assumed that 95% of the total sewage load would be discharged to the corresponding Sewage Treatment Works (STWs) for treatment. The total load input to the model for the study area is therefore more than 100% of the total estimated load that would be generated in the Yuen Long/Kam Tin and Tin Shui Wai catchments (10% to storm system + 95% to STWs = 105%). This is considered a conservative approach for the receiving waters at Deep Bay and Urmston Road. For regions outside the study area, it was assumed that 5% and 95% of the total sewage load would be discharged to the storm and sewerage systems respectively. **Table A5.4** shows the sub-catchment areas and the corresponding Sewage Treatment Works. The effluent from SW STW would be discharged to the Urmston Road sewage outfall under normal circumstances.

Table A5.4 Population by Different CTS Zones and Sub-catchment Areas

Sewerage Catchment Area	Sub-catchment Area
Yuen Long STW	Long Ping
	Yuen Long Kau Hui
	Kam Tin
	Ngau Tam Mei / San Tin & Sha Po
	Yuen Long Industrial Estate
San Wai STW	Hung Shui Kui *
	Lau Fau Shan & Ha Tsuen
	Tin Shui Wai (Ph 1)
	Area 13 & 14
	Yuen Long
	Yuen Long South
	Au Tau
	Tin Shui Wai (Ph 2)
Tuen Mun Port	Tuen Mun Port

* Population covered the Hung Shui Kiu New Development Area for year 2016 based on the best available information.

Sewage Distribution for Baseline Scenario

A5.2.1.7 Projected population for Scenario 2016 was used to estimate the pollution load generated in the sewerage catchment areas. It was assumed that the baseline scenario represents a situation without the expansion and upgrading works of San Wai Sewage Treatment Works (SW STW), but with all other SMP projects completed as scheduled except for the Yuen Long Effluent Pipeline.

A5.2.1.8 It was assumed that SW STW would serve the catchment areas of Tin Shui Wai, Area 13 & 14, Au Tau, Hung Shui Kui, Yuen Long, Lau Fau Shan, Ha Tsuen and Yuen Long South. The flow to SW STW would however be limited to its existing capacity i.e. 164,000 m^3/day. Surplus flow from these catchment areas would be discharged to Deep Bay waters via local storm system and rivers. **Table A5.5** summarises the sewage flow distribution for the baseline scenario.

A5.2.1.9 Yuen Long STW (YL STW) would serve the catchment area of Long Ping, Yuen Long Industrial Estate, Yuen Long Kau Hui, Kam Tin, Ngau Tam Mei, San Tin & Sha Po. It was assumed that the treated effluent from YL STW would be discharged to Deep Bay via the San Pui Ho River.

A5.2.1.10 To be consistent with the four option scenarios, the pollution load entering the Deep Bay water was further adjusted so that the total load input to the WQ model for the baseline scenario would also be 105% of the total estimated sewage generated in the study area.

Table A5.5 Sewage Flow Distribution for Baseline Scenario

Sub-catchment Area	Sewage Flow Distribution
Yuen Long STW	
Long Ping	Foul Sewer -> Yuen Long STW (biological Treatment) -> Shan Pui River -> Deep Bay Water
Yuen Long Industrial Estate	
Yuen Long Kau Hui	
Kam Tin	
Ngau Tam Mei/San Tin & Sha Po	
San Wai STW	
Area 13 & 14 (Partial)	Foul Sewer -> San Wai Preliminary Treatment Plant -> Urmston Road Outfall
Tin Shui Wai Ph 2 (Partial)	
Au Tau (Partial)	
Hung Shui Kui * (Partial)	
Tin Shui Wai Ph 1 (Partial)	
Yuen Long (Partial)	
Lau Fau Shan & Ha Tsuen (Partial)	
Yuen Long South (Partial)	

Sub-catchment Area	Sewage Flow Distribution
Deep Bay Waters	
Area 13 & 14 (Partial)	Kam Tin and Shan Pui River -> Deep Bay Water
Yuen Long (Partial)	
Au Tau (Partial)	
Hung Shui Kui * (Partial)	Tin Shui Wan River -> Deep Bay water
Tin Shui Wai Ph 1 (Partial)	
Tin Shui Wai Ph 2 (Partial)	
Lau Fau Shan & Ha Tsuen (Partial)	Deep Bay Streams (i.e.Tsang Kok Stream, Ha Pak Nai Stream, Pak Nai Stream, Sheung Pak Nai Stream & Ngau Hom Sha Stream) -> Deep Bay water
Yuen Long South (Partial)	Kam Tin and Shan Pui River -> Deep Bay Water
Tuen Mun Port	
Tuen Mun Port	Foul Sewer -> Local treatment plant (biological + disinfection) -> Urmston Road Outfall

* Population covered the Hung Shui Kiu New Development Area for year 2016 based on the best available information.

A5.3 Pollution Loading Inventory for HKSAR

A5.3.1.1 As described in Section A5.2, the pollution flows and loads were compiled based on the SMP Study incorporating the projected flows and potential population as stated in the report "Review of Yuen Long and Kam Tin Sewerage and Sewage Treatment Requirements". The pollution loading inventory used in the water quality modelling in the vicinity of the Study Area are provided in **Tables A5.6** to **A5.9** for dry and wet seasons respectively.

A5.3.1.2 Four options of treatment levels would be considered in the present Study. The effluent quality for the four options is shown below:

Option 1 – CEPT

This option would typically achieve an effluent quality of:

TSS (mg/L)	55
BOD5 (mg/L)	100
DO (mg/L)	0.1
Ammonia-N (mg/L)	25
NO3 (mg/L)	0
NO2 (mg/L)	0
Org-N (mg/L)	8.8
E.coli (cfu/100mL)	2.00E+07

Option 2 – CEPT with Disinfection

Effluent quality is similar to Option 1 except that the *E.coli* will be 2.00E+04 cfu/100mL (as a monthly geometric mean).

Option 3 – Secondary Treatment with Disinfection

Secondary treatment would allow more cost-effective disinfection (or a higher level of disinfection for the same cost. If nitrification is not included, this option would typically achieve an effluent quality of:

TSS (mg/L)	15	(30 as 95%ile)
BOD_5 (mg/L)	10	(20 as 95%ile)
DO (mg/L)	0.5	
Ammonia-N (mg/L)	25	
NO_3 (mg/L)	0	
NO_2 (mg/L)	0	
Org-N (mg/L)	3	
E. coli (cfu/100mL)	1.00E+03	

Option 4 Secondary Treatment with Nitrogen Removal and Disinfection

If denitrification is included, then the total nitrogen concentrations (particularly nitrate) in the effluent will be lower, but land requirements will be higher.

TSS (mg/L)	15 (30 as 95%ile)
BOD_5 (mg/L)	10 (20 as 95%ile)
DO (mg/L)	0.5
Ammonia-N (mg/L)	<1
NO_3 (mg/L)	5
NO_2 (mg/L)	< 0.1
Org-N (mg/L)	2
E. coli (cfu/100mL)	1.00E+03

A5.3.1.3 The pollution loading for the different treatment options from San Wai STW as well as the emergency discharge scenarios are presented in **Table A5.10**.

A5.3.1.4 A sensitivity test was conducted to predict the water quality impacts as a results of San Wai STW reaching its full capacity of 264,000m^3/s. The sensitivity test was conducted on the preferred option (CEPT with disinfection (Option 2)). The pollution loads adopted in the sensitivity test was based on the effluent quality. However, in cases where the pollutants are not defined in the effluent quality (ie copper, total phosphate, ortho-P and silicate), the loads are calculated by linearly extrapolate the loadings in the operational phase scenario against the increase in flow. The final pollution loads proposed for the sensitivity test at San Wai STW and Urmston Road Outfall are shown in **Table A5.11**.

Table A5.6 Pollution Loading for Baseline Scenario, Dry Season

Discharge	Outfall Locations		Flow	BOD	SS	Org-N	NH3-N	E.coli	Copper	TP	Ortho-P	Silicate	TON
	Easting	Northing	m3/d	g/d	G/d	g/d	g/d	no./d	g/d	g/d	g/d	g/d	g/d
Tuen Mun Catchment (SCA 12)													
TM1	815246.72	825755.33	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM2	815713.91	826080.34	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM3	817542.05	825633.46	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM4	819735.81	824658.45	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM5	809900.92	827589.21	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TMC	811202.49	823289.34	194263	21207903	12838208	2004894	4013285	3.59E+13	1754	464586	276539	1840385	0
Yuen Long, Kam Tin and Tin Shui Wai (SCAs 12A, 12C, 12D)													
YL1	819062.08	837352.11	29,266	4,788,624	4,849,583	393,086	483,390	4.90E+15	765	144,075	71,320	191,297	796
YL2	821221.85	837978.02	137,114	9,377,813	11,027,154	1,240,959	1,107,423	7.76E+15	1,944	412,592	304,766	1,137,137	209,018
Deep Bay Stream (SCA 12b)													
DE1	809945.96	831031.41	0	0	0	0	0	0	0	0	0	0	0
DE2	810634.71	831206.14	978	186,783	170,711	14,318	17,763	1.44E+14	30	4,684	2,782	7,462	31
DE3	811076.28	831170.81	0	0	0	0	0	0	0	0	0	0	0
DE4	811818.13	831329.78	0	0	0	0	0	0	0	0	0	0	0
DE5	812083.07	832124.61	1,655	186,783	246,711	18,318	22,763	3.39E+14	30	8,684	2,782	7,462	31
DE6	812559.97	833237.38	978	186,783	170,711	14,318	17,763	1.44E+14	30	4,684	2,782	7,462	31
DE7	813372.47	834226.51	1,075	186,783	181,711	14,318	18,763	1.72E+14	30	5,684	2,782	7,462	31
DE8	814237.95	834703.40	978	186,783	170,711	14,318	17,763	1.44E+14	30	4,684	2,782	7,462	31

Table A5.7 Pollution Loading for Baseline Scenario, Wet Season

Discharge Name	Outfall Locations		Flow	BOD	SS	Org-N	NH3-N	E.coli	Copper	TP	Ortho-P	Silicate	TON
	Easting	Northing	m3/d	g/d	G/d	g/d	g/d	no./d	g/d	g/d	g/d	g/d	g/d
Tuen Mun Catchment (SCA 12)													
TM1	815246.72	825755.33	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM2	815713.91	826080.34	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM3	817542.05	825633.46	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM4	819735.81	824658.45	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM5	809900.92	827589.21	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TMC	811202.49	823289.34	194263	21207903	12838208	2004894	4013285	3.59E+13	1754	464586	276539	1840385	0
Yuen Long, Kam Tin and Tin Shui Wai (SCAs 12a, 12c, 12d)													
YL1	819062	837352	132,515	6,730,302	8,586,071	496,541	484,774	4.90E+15	2,040	1.61E+05	74,992	474,233	35,137
YL2	821222	837978	291,987	12,290,330	16,631,885	1,396,142	1,109,499	7.76E+15	3,855	4.39E+05	310,273	1,561,541	260,530
Deep Bay Stream (SCA 12b)													
DE1	809946	831031	0	0	0	0	0	0	0	0	0	0	0
DE2	810635	831206	5,005	262,519	316,455	18,354	17,817	1.44E+14	80	5,358	2925	18,498	1,371
DE3	811076.28	831170.81	0	0	0	0	0	0	0	0	0	0	0
DE4	811818.13	831329.78	0	0	0	0	0	0	0	0	0	0	0
DE5	812083.07	832124.61	5,682	262,519	392,455	22,354	22,817	3.39E+14	80	9,358	2925	18,498	1,371
DE6	812559.97	833237.38	5,005	262,519	316,455	18,354	17,817	1.44E+14	80	5,358	2925	18,498	1,371
DE7	813372.47	834226.51	5,102	262,519	327,455	18,354	18,817	1.72E+14	80	6,358	2925	18,498	1,371
DE8	814237.95	834703.40	5,005	262,519	316,455	18,354	17,817	1.44E+14	80	5,358	2925	18,498	1,371

Table A5.8 Pollution Loading for the Four Option Scenarios, Dry Season

Discharge	Outfall Locations		Flow	BOD	SS	Org-N	NH3-N	E.coli	Copper	TP	Ortho-P	Silicate	TON
	Easting	Northing	m3/d	g/d	g/d	g/d	g/d	no./d	g/d	g/d	g/d	g/d	g/d
Tuen Mun Catchment (SCA 12)													
TM1	815246.72	825755.33	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM2	815713.91	826080.34	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM3	817542.05	825633.46	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM4	819735.81	824658.45	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TM5	809900.92	827589.21	3494	510419	478034	39135	47068	3.77E+14	102	12353	7304	20492	253
TMC	811202.49	823289.34	194263	21207903	12838208	2004894	4013285	3.59E+13	1754	464586	276539	1840385	0
Yuen Long, Kam Tin and Tin Shui Wai (SCAs 12A, 12C, 12D)													
YL1	819062.08	837352.11	19,830	2,608,664	2,865,265	224,124	270,601	3.17E+15	420	88,174	38,046	106,373	796
YL2	821221.85	837978.02	28,494	3,912,996	4,156,398	328,186	397,902	4.38E+15	630	124,261	57,068	159,560	1,193
Deep Bay Stream (SCA 12b)													
DE1	809945.96	831031.41	0	0	0	0	0	0	0	0	0	0	0
DE2	810634.71	831206.14	610	101,752	93,312	7,728	9,463	7.63E+13	16	2,503	1,484	4,149	31
DE3	811076.28	831170.81	0	0	0	0	0	0	0	0	0	0	0
DE4	811818.13	831329.78	0	0	0	0	0	0	0	0	0	0	0
DE5	812083.07	832124.61	1,287	101,752	169,312	11,728	14,463	2.71E+14	16	6,503	1,484	4,149	31
DE6	812559.97	833237.38	610	101,752	93,312	7,728	9,463	7.63E+13	16	2,503	1,484	4,149	31
DE7	813372.47	834226.51	707	101,752	104,312	7,728	10,463	1.04E+14	16	3,503	1,484	4,149	31
DE8	814237.95	834703.40	610	101,752	93,312	7,728	9,463	7.63E+13	16	2,503	1,484	4,149	31

Table A5.9 Pollution Loading for Four Option Scenarios, Wet Season

Discharge Name	Outfall Locations		Flow	BOD	SS	Org-N	NH3-N	E.coli	Copper	TP	Ortho-P	Silicate	TON
	Easting	Northing	m3/d	g/d	g/d	g/d	g/d	no./d	g/d	g/d	g/d	g/d	g/d
Tuen Mun Catchment (SCA 12)													
TM1	815246.72	825755.33	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM2	815713.91	826080.34	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM3	817542.05	825633.46	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM4	819735.81	824658.45	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TM5	809900.92	827589.21	36375	1128769	1667964	72081	47509	3.77E+14	508	17856	8474	110596	11190
TMC	811202.49	823289.34	194263	21207903	12838208	2004894	4013285	3.59E+13	1754	464586	276539	1840385	0
Yuen Long, Kam Tin and Tin Shui Wai (SCAs 12a, 12c, 12d)													
YL1	819062	837352	123,079	4,550,341	6,601,753	327,580	271,986	3.17E+15	1,694	1.05E+05	41,717	389,309	35,137
YL2	821222	837978	183,368	6,825,512	9,761,130	483,369	399,978	4.38E+15	2,541	1.50E+05	62,576	583,964	52,705
Deep Bay Stream (SCA 12b)													
DE1	809946	831031	0	0	0	0	0	0	0	0	0	0	0
DE2	810635	831206	4,637	177,488	239,055	11,763	9,517	7.63E+13	66	3,177	1627	15,185	1,371
DE3	811076.28	831170.81	0	0	0	0	0	0	0	0	0	0	0
DE4	811818.13	831329.78	0	0	0	0	0	0	0	0	0	0	0
DE5	812083.07	832124.61	5,314	177,488	315,055	15,763	14,517	2.71E+14	66	7,177	1627	15,185	1,371
DE6	812559.97	833237.38	4,637	177,488	239,055	11,763	9,517	7.63E+13	66	3,177	1627	15,185	1,371
DE7	813372.47	834226.51	4,734	177,488	250,055	11,763	10,517	1.04E+14	66	4,177	1627	15,185	1,371
DE8	814237.95	834703.40	4,637	177,488	239,055	11,763	9,517	7.63E+13	66	3,177	1627	15,185	1,371

Table A5.10 Pollution Loading at Urmston Road Sewage Outfall for Different Treatment Options at San Wai STW

Treatment Type (Option)	Flow (m3/d)	BOD g/d	SS g/d	Org-N g/d	NH3-N g/d	E.coli No./d	Copper g/d	TP g/d	Ortho-P g/d	Silicate g/d	TON g/d
CEPT (Option 1)	290,435	22,233,521	15,353,435	2,495,649	5,255,103	3.958E+16	2,402	657,562	465,329	2,603,116	636,317
CEPT + Disinfection (Option 2)		22,233,521	15,353,435	2,495,649	5,255,103	4.33E+13	2,402	657,562	465,329	2,603,116	636,317
Biological + Disinfection (Option 3)		4,754,325	7,584,903	1,369,212	5,255,103	6.44E+12	2,824	657,562	636,035	2,603,116	636,317
Biological + Nitrification + Disinfection (Option 4)		4,754,325	7,584,903	1,174,998	593,984	6.44E+12	2,824	657,562	636,035	2,603,116	636,317
Baseline Scenario (Preliminary Treatment)	170,539	38,532,151	35,197,227	3,069,054	3,712,802	3.01E+16	6,280	977,713	583,628	1,517,597	372,546
Emergency Discharge. (Assumes breakdown of San Wai Plant)	290,435	47,598,018	45,205,926	4,231,817	5,794,584	7.84+16	8,034	1,345,845	875,022	2,603,116	636,317

Table A5.11 Pollution Flow and Loads for San Wai STW and Urmston Road Outfall for the Sensitivity Test Scenario

Location	Treatment at San Wai STW	Flow (m^3/d)	Treated Effluent Loads									
			BOD (g/d)	SS (g/d)	Org-N (g/d)	NH3N (g/d)	E.coli (no./d)	Copper (g/d)	TP (g/d)	Ortho-P (g/d)	Silicate (g/d)	TON (g/d)
San Wai STW	CEPT + Disinfection	264,000	26,400,000	14,520,000	2,323,200	6,600,000	5.28E+13	1,914	623,736	371,272	2,376,000	580,800
Urmston Rd Outfall		360,222	29,212,193	19,191,704	3,109,772	6,999,771	5.73E+13	2,908	822,443	563,473	3,231,196	789,848

A5.4 Pollution Loading Inventory for Mainland

A5.4.1.1 The Mainland loading adopted in the Shenzhen Western Corridor (SWC) EIA was adopted in the water quality model for the San Wan Project for the 4 option scenarios, the baseline scenario, the emergency discharge scenario as well as the sensitivity test. The Mainland loading from SWC EIA are summarised in **Tables A5.12** and **A5.13**.

Table A5.12 Mainland Pollution Loading for Dry Season

Discharge Location	BOD kg/d	SS Kg/d	Org-N kg/d	NH3-N kg/d	*E.coli* no./d	Copper kg/d	TP kg/d	Ortho-P kg/d	Silicate kg/d	TON kg/d
Shenzhen River	91889	66175	5842	6840	2.80E+16	90	3008	2164	3897	15475
Dasha River	5333	5414	425	611	5.31E+15	0	163	97	24	174
Xin Zhou River	17301	17283	1387	2017	1.75E+16	0	537	319	33	565
Shekou	5333	5414	425	611	5.31E+15	0	163	97	24	174
Jinxiu Zhonghua	49835	41701	3679	5095	3.69E+16	21	1615	1056	660	4618
Nanshan	5333	5414	425	611	5.31E+15	0	163	97	24	174
Chiwan	28198	16198	1821	2302	8.29E+15	29	1047	780	934	5527

Table A5.13 Mainland Pollution Loading for Wet Season

Discharge Location	BOD kg/d	SS Kg/d	Org-N kg/d	NH3-N kg/d	*E.coli* no./d	Copper kg/d	TP kg/d	Ortho-P kg/d	Silicate kg/d	TON kg/d
Shenzhen River	97938	77817	6164	6844	2.80E+16	94	3062	2176	4779	15582
Dasha River	9085	12634	625	645	5.31E+15	2	197	103	572	241
Xin Zhou River	22495	27275	1664	2064	1.75E+16	2	583	328	791	657
Shekou	9085	12634	625	645	5.31E+15	2	197	103	572	241
Jinxiu Zhonghua	60221	61684	4233	5188	3.69E+16	26	1707	1075	2175	4803
Nanshan	9085	12634	625	645	5.31E+15	2	197	103	572	241
Chiwan	31950	23418	2021	2336	8.29E+15	30	1080	787	1482	5594