Attachment 1

Replacement Pages of
Sewerage Impact Assessment

4. PROPOSED SEWERAGE STRATEGY FOR THE PROPOSED REDEVELOPMENT

4.1 The Application Site lies within the catchment of Sham Tseng STW and is in the vicinity of the existing trunk sewer along Castle Peak Road – Ting Kau.

4.2 The sewage will be conveyed to Sham Tseng STW via Casam SPS for disposal to Ma Wan Channel.

Proposed Sewage Disposal Scheme

4.3 It is proposed that the sewage generated from the Proposed Redevelopment will be discharged to the existing 225mm diameter gravity sewer by the connection to the existing manhole FMH4052476 near the north of the Application Site for disposal at Sham Tseng STW via Casam SPS.

4.4 The calculation for the backwash sewage generated by the swimming pool of the Proposed Redevelopment is shown in **Annex B**. The capacity calculations for the existing sewers starting from the upstream to the Casam SPS are provided in **Annex C**.

4.5 The connection point is shown on **Figure TIK/SIA/003**.

4.6 As presented in **Table 3.1** above, the estimated sewage generated from the Proposed Redevelopment is an ADWF of 527.4 m^3/d, which is anticipated there will be a decrease in sewage generation comparing with the current hotel development.

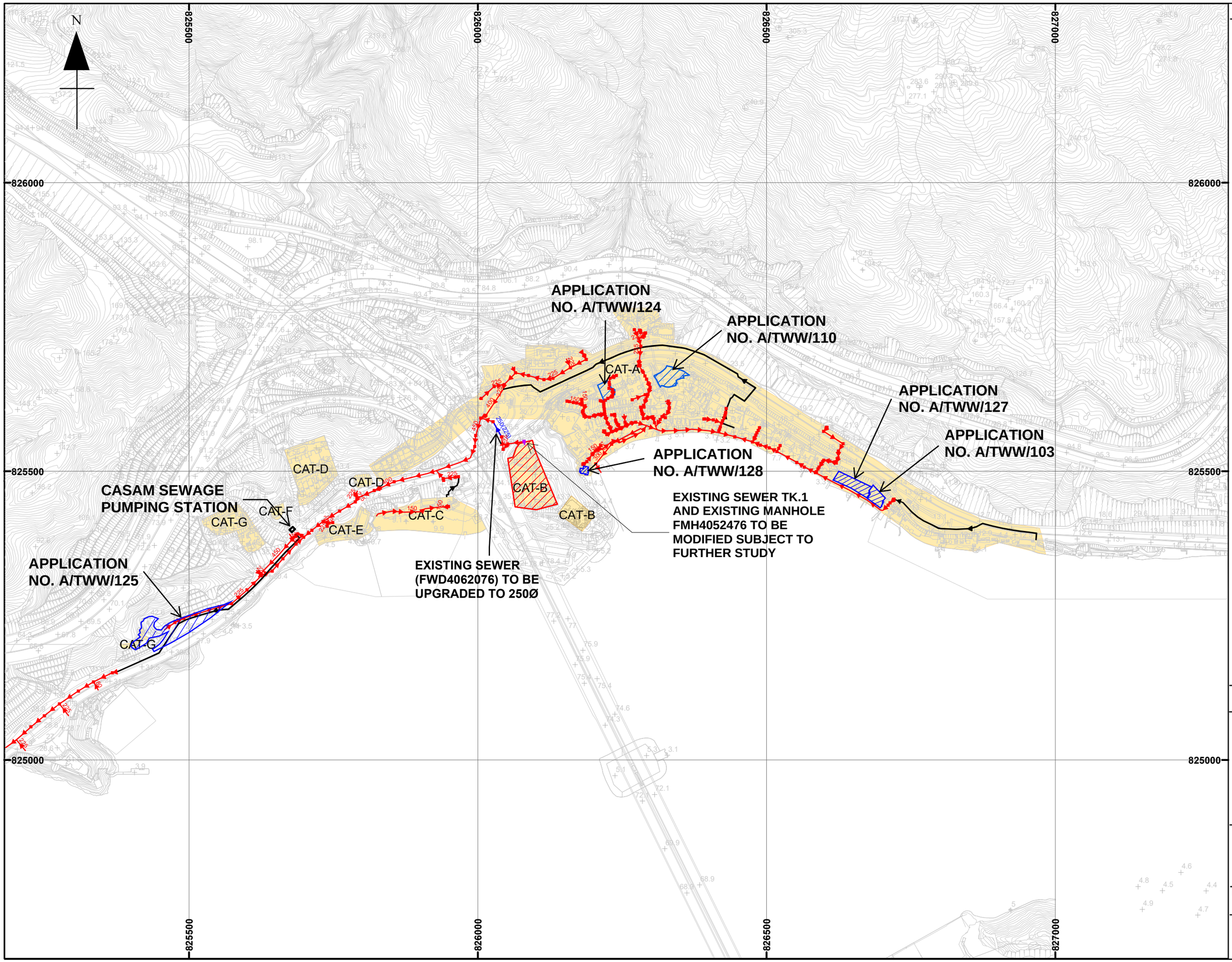
4.7 In considering potential cumulative impact, sewage flow generated by existing/planned developments in the catchment is estimated and shown in **Annex D** and the capacity calculations for the existing sewers starting from the upstream to Casam SPS are provided in **Annex C**. A detailed sewerage map is provided in **Figure TIK/SIA/002** and **Figure TIK/SIA/003**.

4.8 Based on the planning application records on Outline Zoning Plan (OZP) from Statutory Planning Portal and as advised by Planning Department, Applications No. A/TWW/103, 110, 124, 125, 127, 128 in the area are considered active, since the other applications are dated many years ago, which would have been completed. Thus, these developments are considered as planned development in the sewage estimation.

4.9 Information from DSD indicates the design flow of Casam SPS is 10,368 m^3/d. Detailed checking on the capacity of Casam SPS due to the planned development is shown in **Annex E**.

4.10 Based on the calculation in **Annex E**, including the Proposed Redevelopment, the total peak flow conveyed to Casam SPS is estimated to be 8177.1 m^3/d (Equivalent to 78.9% utilization of Casam SPS), while the total peak flow with existing development is 8660.50 m^3/d (Equivalent to 83.5% utilization of Casam SPS). The peak flow would be lower with the proposed residential development and the proposed sewage disposal scheme. Moreover, the utilization of existing sewer will be decreased after the Proposed Redevelopment as shown in **Annex C**. While the sewage generation of the Proposed Redevelopment are decreased, it is observed the estimated spare capacity of some segments of sewers is still expected to be less than 10% during peak flow, hence, upgrading works of the sewer is proposed. The project proponent proposes the existing sewer between FMH4052479 and FMH4052480 be upgraded from 225mm dia. pipe to 250mm dia. pipe to address the existing condition of less than ideal spare capacity. In view that the full flow velocity of TK.1 would be operated at high velocity as shown in **Annex C**, site verification will be conducted in later design stage to further confirm the modification works on TK.1 and associated manhole FMH4052476 and implement the works if necessary. The potential upgrading/modification works are indicated in **Figure TIK/SIA/003.** Thus, it is considered that the sewers, Casam SPS and Sham Tseng STW will have sufficient capacity to cater sewage generated from the Proposed Redevelopment.

Lining works to the connection to the public sewerage system has been requested by DSD. Further liaison with DSD would be conducted in the later design stage to confirm detailed



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Legend

- The Application Site
- Existing Sewer
- Existing Rising Main
- Existing SPS
- Planned Development
- Catchment
- Existing Sewer to be Upgraded
- Existing Sewer to be Modified Subject to Further Study
- Existing Manhole to be Modified Subject to Further Study

Initial	Date	Checked	Date
Kathy		KKL	

Project

Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Title

Proposed Sewerage System and Catchment Plan

Figure No.	Scale
TIK/SIA/002	1:6,000 @ A3

binnies

Plot date: 2021-12-13

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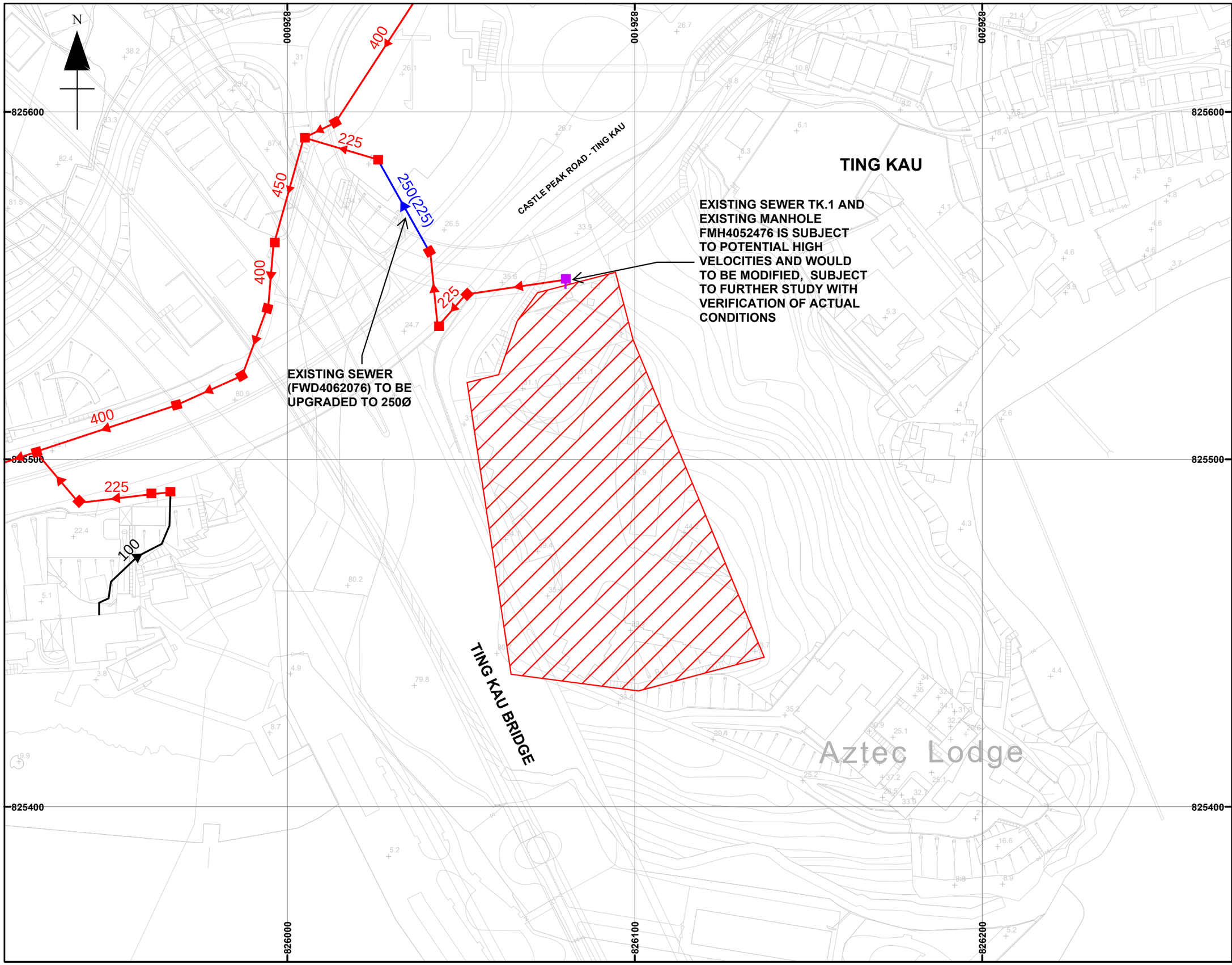

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Legend

- The Application Site
- Existing Sewer
- Existing Rising Main
- Existing Sewer to be Upgraded
- Existing Sewer to be Modified Subject to Further Study
- Existing Manhole to be Modified Subject to Further Study

Initial	Date	Checked	Date
Kathy		KKL	

Project

Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Title

Proposed Sewerage System

Figure No.	Scale
TIK/SIA/003	1:1,000 @ A3

[redacted]

Plot date: 2021-10-25

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Annex C Design Checking of Existing Sewer (Before Re-Development)

Note:

1) Colebrook-White's equation is adopted for full-bore pipe velocity calculation.

2) Backwash Flowrate generated by swimming pool from developments, if any, has been included in the Design Peak Flowrate.

Existing Sewer Before Re-Development (With Existing Hotel in the Development Site)																			
Pipe	Feature Number	Diameter (mm)	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Pipe Length (m)	Gradient (1 in)	Roughness (mm) *	No. of Pipes	Catchment No.	ADWF (m3/d)	ADWF*Inflow factor (m3/d)	ADWF (m3/s)	Catchment Inflow Factor	ADWF*Inflow factor (m3/s)	Contributing Population	Peak Factor	Design Peak Flowrate (m3/s)	Full Bore Velocity (m/s)	Full Bore Capacity (m3/s)	Utilization (%)
FTH4007922 to FMH4052476	TK.1	225	26.3	24.977	3.50	3	0.15	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	9.621035103	0.38253988	13%
FMH4052476 to FMH4052477	FWD4062073	225	24.977	24.265	28.00	39	0.6	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	2.092429116	0.083196618	61%
FMH4052477 to FMH4052478	FWD4062074	225	24.215	23.9	11.00	35	0.6	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	2.221276902	0.088319707	58%
FMH4052478 to FMH4052479	FWD4062075	225	23.542	23.29	20.00	79	0.6	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	1.469136156	0.058414002	87%
FMH4052479 to FMH4052480	FWD4062076	225	23.2	23.01	28.50	150	0.6	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	1.065239105	0.04235474	120%
FMH4052480 to FMH4052458	FWD4062077	225	23	22.5	20.50	41	0.6	1	B (Existing)	664.28	730.708	0.007688426	1.1	0.008457269	2706	6	0.050990556	2.048998713	0.081469791	63%
FMH4052457 to FMH4052458	FWD4062050	400	22.57	22.37	9.90	50	3	1	A	188.75	207.622294	0.002184578	1.1	0.002403036	769	8	0.030396624	2.142018308	0.269173959	11%
FMH4052458 to FMH4052459	FWD4062051	450	22.32	22.06	29.50	113	3	1	A, B (Existing)	853.03	938.330294	0.009873004	1.1	0.010860304	3475	6	0.077018024	1.528384837	0.243079105	32%
FMH4052459 to FMH4052460	FWD4062052	400	22.04	21.9	19.00	136	3	1	A, B (Existing)	853.03	938.330294	0.009873004	1.1	0.010860304	3475	6	0.077018024	1.292584603	0.162430972	47%
FMH4052460 to FSH4001720	FWD4062053	400	21.88	21.74	21.43	153	3	1	A, B (Existing)	853.03	938.330294	0.009873004	1.1	0.010860304	3475	6	0.077018024	1.216810482	0.152908915	50%
FSH4001720 to FSH4001721	FWD4062054	400	21.73	21.444	20.62	72	3	1	A, B (Existing)	853.03	938.330294	0.009873004	1.1	0.010860304	3475	6	0.077018024	1.774597239	0.223002466	35%
FSH4001721 to FSH4001722	FWD4062055	400	21.094	20.497	42.38	71	3	1	A, B (Existing)	853.03	938.330294	0.009873004	1.1	0.010860304	3475	6	0.077018024	1.78825551	0.224718815	34%
FSH4001722 to FSH4001723	FWD4062056	400	20.006	19.67	16.76	50	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	2.133618211	0.268118372	44%
FSH4001723 to FSH4001724	FWD4062057	400	19.64	19.15	32.98	67	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	1.836440063	0.230773864	51%
FSH4001724 to FMH4052466	FWD4062058	400	19.14	18.536	25.48	42	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	2.320363275	0.291585449	40%
FMH4052466 to FMH4052467	FWD4062059	400	18.496	17.87	26.37	42	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	2.322021942	0.291793883	40%
FMH4052467 to FMH4052468	FWD4062060	400	17.38	17.124	11.59	45	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	2.240272019	0.281520885	42%
FMH4052468 to FMH4052469	FWD4062061	400	16.696	15.951	31.15	42	3	1	A, B (Existing), C	891.03	980.130294	0.010312819	1.1	0.011344101	3630	6	0.117656913	2.330693348	0.292883564	40%
FMH4052469 to FMH4052470	FWD4062062	400	15.55	15.3	8.07	32	3	1	A, B (Existing), C, D	928.40	1021.237294	0.010745342	1.1	0.011819876	3782	6	0.131362051	2.65333488	0.333427895	39%
FMH4052470 to FMH4052471	FWD4062063	400	15.025	14.25	31.65	41	3	1	A, B (Existing), C, D	928.40	1021.237294	0.010745342	1.1	0.011819876	3782	6	0.131362051	2.358624384	0.296393481	44%
FMH4052471 to FMH4052472	FWD4062064	400	14.24	13.84	33.74	84	3	1	A, B (Existing), C, D	928.40	1021.237294	0.010745342	1.1	0.011819876	3782	6	0.131362051	1.640201513	0.206113801	64%
FMH4052472 to FMH4052541	FWD4062065	400	13.83	13.247	24.56	42	3	1	A, B (Existing), C, D, E	938.77	1032.644294	0.010865365	1.1	0.011951902	3825	6	0.13208219	2.32196478	0.2917867	45%
FMH4052541 to FMH4052473	FWD4062146	400	13.237	12.845	18.88	48	3	1	A, B (Existing), C, D, E	938.77	1032.644294	0.010865365	1.1	0.011951902	3825	6	0.13208219	2.171434741	0.272870537	48%
FMH4052473 to SPS	FWD4062086	400	12.835	12.65	13.97	76	3	1	A, B (Existing), C, D, E, F, G	951.24	1046.360194	0.011009682	1.1	0.01211065	3875	6	0.134058093	1.733843529	0.217881204	62%

Note: * Assumed Pipe Materials (Or Material of Equvalent Roughness) - 0.15 mm => Normal uPVC with Slime (Fast Flow)

0.6 mm => Poor Clayware with Slime (Fast Flow)

3.0 mm => Poor Clayware with Slime (Slow Flow)

Annex C Design Checking of Existing Sewer (After Re-Development)

Note:

1) Colebrook-White's equation is adopted for full-bore pipe velocity calculation.
2) Backwash Flowrate generated by swimming pool from developments, if any, has been included in the Design Peak Flowrate.
3) Upgraded pipes/proposed modification works are highlighted in yellow colour.
4) Refer to Section 5.1.3 of Sewerage Maunal Part 1 published by DSD, maximum velocity of 6 m/s has been adopted for pipe with internal lining, i.e. feature number TK.1.

Existing Sewer After Re-Development

Pipe	Feature Number	Diameter (mm)	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Pipe Length (m)	Gradient (1 in)	Roughness (mm)*	No. of Pipes	Catchment	ADWF (m3/d)	ADWF*Inflow factor (m3/d)	ADWF (m3/s)	Catchment Inflow Factor	ADWF*Inflow factor (m3/s)	Contributing Population	Peak Factor	Design Peak Flowrate (m3/s)	Full Bore Velocity (m/s)	Full Bore Capacity (m3/s)	Utilization (%)
FTH4007922 to FMH4052476	TK.1	225	26.3	24.977	3.50	3	0.15	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	9.621035103	0.38253988	11%
FMH4052476 to FMH4052477	FWD4062073	225	24.977	24.265	28.00	39	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.092429116	0.083196618	52%
FMH4052477 to FMH4052478	FWD4062074	225	24.215	23.9	11.00	35	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.221276902	0.088319707	49%
FMH4052478 to FMH4052479	FWD4062075	225	23.542	23.29	20.00	79	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	1.469136156	0.058414002	74%
FMH4052479 to FMH4052480	FWD4062076	225	23.2	23.01	28.50	150	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	1.065239105	0.04235474	102%
FMH4052480 to FMH4052458	FWD4062077	225	23	22.5	20.50	41	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.048998713	0.081469791	53%
FMH4052457 to FMH4052458	FWD4062050	400	22.57	22.37	9.90	50	3	1	A	188.75	207.622294	0.002184578	1.1	0.002403036	769	8	0.030396624	2.142018308	0.269173959	11%
FMH4052458 to FMH4052459	FWD4062051	450	22.32	22.06	29.50	113	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.528384837	0.243079105	28%
FMH4052459 to FMH4052460	FWD4062052	400	22.04	21.9	19.00	136	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.292584603	0.162430972	43%
FMH4052460 to FSH4001720	FWD4062053	400	21.88	21.74	21.43	153	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.216810482	0.152908915	45%
FSH4001720 to FSH4001721	FWD4062054	400	21.73	21.444	20.62	72	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.774597239	0.223002466	31%
FSH4001721 to FSH4001722	FWD4062055	400	21.094	20.497	42.38	71	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.78825551	0.224718815	31%
FSH4001722 to FSH4001723	FWD4062056	400	20.006	19.67	16.76	50	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.133618211	0.268118372	41%
FSH4001723 to FSH4001724	FWD4062057	400	19.64	19.15	32.98	67	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	1.836440063	0.230773864	48%
FSH4001724 to FMH4052466	FWD4062058	400	19.14	18.536	25.48	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.320363275	0.291585449	38%
FMH4052466 to FMH4052467	FWD4062059	400	18.496	17.87	26.37	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.322021942	0.291793883	38%
FMH4052467 to FMH4052468	FWD4062060	400	17.38	17.124	11.59	45	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.240272019	0.281520885	39%
FMH4052468 to FMH4052469	FWD4062061	400	16.696	15.951	31.15	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.330693348	0.292883564	37%
FMH4052469 to FMH4052470	FWD4062062	400	15.55	15.3	8.07	32	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	2.65333488	0.333427895	37%
FMH4052470 to FMH4052471	FWD4062063	400	15.025	14.25	31.65	41	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	2.358624384	0.296393481	42%
FMH4052471 to FMH4052472	FWD4062064	400	14.24	13.84	33.74	84	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	1.640201513	0.206113801	60%
FMH4052472 to FMH4052541	FWD4062065	400	13.83	13.247	24.56	42	3	1	A, B, C, D, E	815.20	896.720506	0.009435191	1.1	0.01037871	3321	6	0.124201143	2.32196478	0.2917867	43%
FMH4052541 to FMH4052473	FWD4062146	400	13.237	12.845	18.88	48	3	1	A, B, C, D, E	815.20	896.720506	0.009435191	1.1	0.01037871	3321	6	0.124201143	2.171434741	0.272870537	46%
FMH4052473 to SPS	FWD4062086	400	12.835	12.65	13.97	76	3	1	A, B, C, D, E, F, G	827.67	910.436406	0.009579508	1.1	0.010537458	3372	6	0.126177046	1.733843529	0.217881204	58%

Sewer With Proposed Upgrading Works After Re-Development

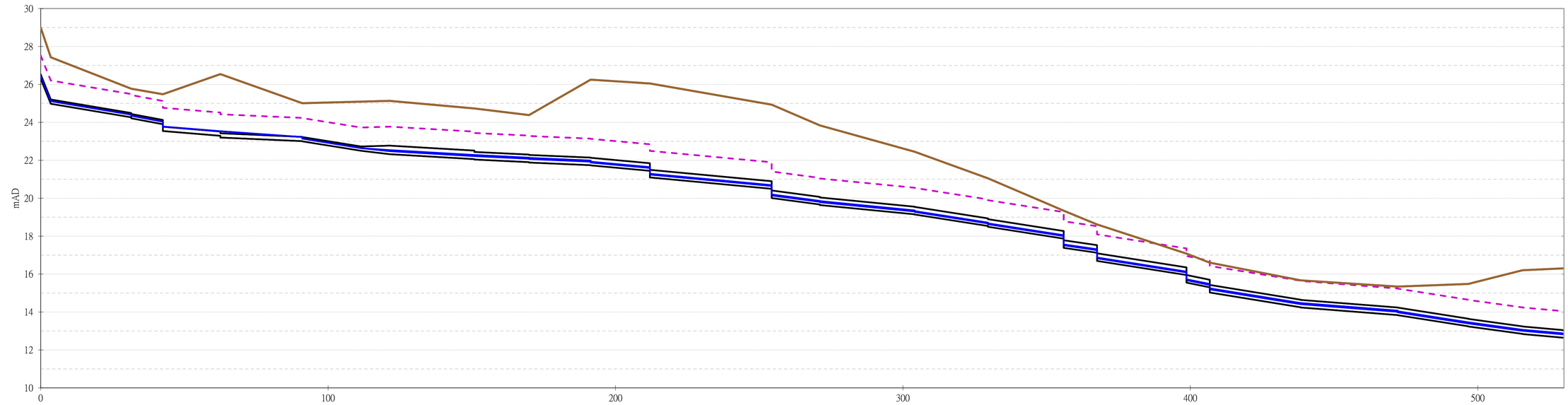
Pipe	Feature Number	Diameter (mm)	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Pipe Length (m)	Gradient (1 in)	Roughness (mm)*	No. of Pipes	Catchment	ADWF (m3/d)	ADWF*Inflow factor (m3/d)	ADWF (m3/s)	Catchment Inflow Factor	ADWF*Inflow factor (m3/s)	Contributing Population	Peak Factor	Design Peak Flowrate (m3/s)	Full Bore Velocity (m/s)	Full Bore Capacity (m3/s)	Utilization (%)
FTH4007922 to FMH4052476	TK.1	225	26.3	25.8	3.50	7	0.15	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	5.895128798	0.234394931	18%
FMH4052476 to FMH4052477	FWD4062073	225	24.977	24.265	28.00	39	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.092429116	0.083196618	52%
FMH4052477 to FMH4052478	FWD4062074	225	24.215	23.9	11.00	35	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.221276902	0.088319707	49%
FMH4052478 to FMH4052479	FWD4062075	225	23.542	23.29	20.00	79	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	1.469136156	0.058414002	74%
FMH4052479 to FMH4052480	FWD4062076	250 (225)	23.2	23.01	28.50	150	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	1.140077864	0.055963441	77%
FMH4052480 to FMH4052458	FWD4062077	225	23	22.5	20.50	41	0.6	1	B	540.71	594.784212	0.006258251	1.1	0.006884077	2203	6	0.043109508	2.048998713	0.081469791	53%
FMH4052457 to FMH4052458	FWD4062050	400	22.57	22.37	9.90	50	3	1	A	188.75	207.622294	0.002184578	1.1	0.002403036	769	8	0.030396624	2.142018308	0.269173959	11%
FMH4052458 to FMH4052459	FWD4062051	450	22.32	22.06	29.50	113	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.528384837	0.243079105	28%
FMH4052459 to FMH4052460	FWD4062052	400	22.04	21.9	19.00	136	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.292584603	0.162430972	43%
FMH4052460 to FSH4001720	FWD4062053	400	21.88	21.74	21.43	153	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.216810482	0.152908915	45%
FSH4001720 to FSH4001721	FWD4062054	400	21.73	21.444	20.62	72	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.774597239	0.223002466	31%
FSH4001721 to FSH4001722	FWD4062055	400	21.094	20.497	42.38	71	3	1	A, B	729.46	802.406506	0.008442829	1.1	0.009287112	2972	6	0.069136976	1.78825551	0.224718815	31%
FSH4001722 to FSH4001723	FWD4062056	400	20.006	19.67	16.76	50	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.133618211	0.268118372	41%
FSH4001723 to FSH4001724	FWD4062057	400	19.64	19.15	32.98	67	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	1.836440063	0.230773864	48%
FSH4001724 to FMH4052466	FWD4062058	400	19.14	18.536	25.48	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.320363275	0.291585449	38%
FMH4052466 to FMH4052467	FWD4062059	400	18.496	17.87	26.37	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.322021942	0.291793883	38%
FMH4052467 to FMH4052468	FWD4062060	400	17.38	17.124	11.59	45	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.240272019	0.281520885	39%
FMH4052468 to FMH4052469	FWD4062061	400	16.696	15.951	31.15	42	3	1	A, B, C	767.46	844.206506	0.008882644	1.1	0.009770909	3127	6	0.109775865	2.330693348	0.292883564	37%
FMH4052469 to FMH4052470	FWD4062062	400	15.55	15.3	8.07	32	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	2.65333488	0.333427895	37%
FMH4052470 to FMH4052471	FWD4062063	400	15.025	14.25	31.65	41	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	2.358624384	0.296393481	42%
FMH4052471 to FMH4052472	FWD4062064	400	14.24	13.84	33.74	84	3	1	A, B, C, D	804.83	885.313506	0.009315167	1.1	0.010246684	3279	6	0.123481004	1.640201513	0.206113801	60%
FMH4052472 to FMH4052541	FWD4062065	400	13.83	13.247	24.56	42	3	1	A, B, C, D, E	815.20	896.720506	0.009435191	1.1	0.01037871	3321	6	0.124201143	2.32196478	0.2917867	43%
FMH4052541 to FMH4052473	FWD4062146	400	13.237	12.845	18.88	48	3	1	A, B, C, D, E	815.20	896.720506	0.009435191	1.1	0.01037871	3321	6	0.124201143	2.171434741	0.272870537	46%
FMH4052473 to SPS	FWD4062086	400	12.835	12.65	13.97	76	3	1	A, B, C, D, E, F, G	827.67	910.436406	0.009579508	1.1	0.010537458	3372	6	0.126177046	1.733843529	0.217881204	58%

Note: * Assumed Pipe Materials (Or Material of Equvalent Roughness) -

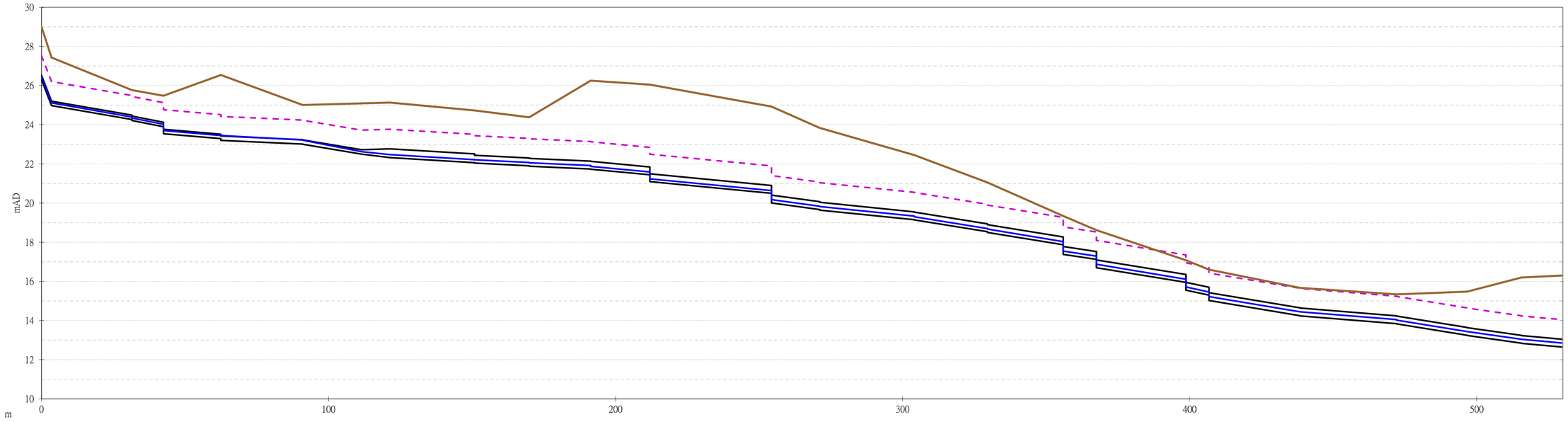
0.15 mm => Normal uPVC with Slime (Fast Flow)
0.6 mm => Poor Clayware with Slime (Fast Flow)
3.0 mm => Poor Clayware with Slime (Slow Flow)

Annex C Design Checking of Existing Sewer

Existing



S16-Proposed



Annex C Design Checking of Existing Sewer

Node ID	Ground Level (mAD)	Existing		S16		Increase in Water Level (m)
		Max. Water Level (mAD)	Freeboard (m)	Max. Water Level (mAD)	Freeboard (m)	
Development	29	26.439	2.561	26.441	2.559	0.003
FMH4052476	27.43	25.116	2.314	25.118	2.312	0.003
FMH4052477	25.77	24.404	1.366	24.340	1.430	-0.063
FMH4052478	25.48	24.033	1.447	23.704	1.776	-0.329
FMH4052479	26.54	23.530	3.010	23.452	3.088	-0.078
FMH4052480	25.01	23.221	1.789	23.212	1.798	-0.010
FMH4052458	25.13	22.641	2.489	22.475	2.655	-0.166
FMH4052459	24.73	22.279	2.451	22.212	2.518	-0.067
FMH4052460	24.38	22.139	2.241	22.058	2.322	-0.081
FSH4001720	26.25	21.988	4.262	21.874	4.376	-0.114
FSH4001721	26.05	21.640	4.410	21.238	4.812	-0.402
FSH4001722	24.93	20.692	4.238	20.174	4.756	-0.518
FSH4001723	23.84	19.859	3.981	19.823	4.017	-0.036
FSH4001724	22.45	19.356	3.094	19.300	3.150	-0.056
FMH4052466	21.05	18.716	2.334	18.673	2.377	-0.043
FMH4052467	19.34	18.050	1.290	17.550	1.790	-0.500
FMH4052468	18.62	17.308	1.312	16.876	1.744	-0.432
FMH4052469	17.08	16.130	0.950	15.715	1.365	-0.416
FMH4052470	16.6	15.476	1.124	15.224	1.376	-0.252
FMH4052471	15.67	14.475	1.195	14.449	1.221	-0.026
FMH4052472	15.34	14.075	1.265	14.019	1.321	-0.056
FMH4052541	15.48	13.456	2.024	13.436	2.044	-0.019
FMH4052473	16.2	13.064	3.136	13.044	3.156	-0.019
SPS	16.3	12.879	3.421	12.855	3.445	-0.023

Project Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Subject Annex D Estimated Sewage Generated by Catchments A to G

Design Assumptions

1. Unit flow factor is adopted in accordance with *Guideline Guidelines for Estimating Sewage Flows (GESF)* published by EPD in March 2005.
2. Average Household Size of 2.7 in Tsuen Wan District is adopted in accordance with 2020 Population Census.

Sewage Flow from Ting Kau Sewage Pumping Station

Provided by DSD	Average Daily Flow	=	155.00	m^3/d
Provided by DSD	Designed Daily Flow	=	3974.00	m^3/d
Provided by DSD	Flow Rate of Pump	=	46.00	L/s
		=	**0.0460**	m^3/s

It is assumed that the pump will work at its design flow rate (as shown above) under peak flow condition, thus, the flow rate of pump has been adopted as peak flow from SPS in the design checking in Annex C.

Estimated Sewage generated by Lindo Green

	Total number of Residential units	=	3	unit(s)
	Total number of residents	=	9	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**3.33**	m^3/d
		=	0.00004	m^3/s

Number of residential units is extracted from: https://www.midland.com.hk/zh-hk/estate/%E6%96%B0%E7%95%8C-%E8%8D%83%E7%81%A3-Lindo-Green-E000013893

Estimated Sewage generated by Grand Riviera

	Total number of Residential units	=	13	unit(s)
	Total number of residents	=	36	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**13.32**	m^3/d
		=	0.0002	m^3/s

Number of residential units is extracted from: http://hk.centadata.com/TransactionHistory.aspx?type=1&code=AAPPWAPEPK

Estimated Sewage generated by Planned Development (A/TWW/110)

	Total number of Residential units	=	2	unit(s)
	Total number of residents	=	5	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**2.00**	m^3/d
		=	0.0000	m^3/s

Data for Planned Development as in A/TWW/110 received by TPB on 20 November, 2018.

Estimated Sewage generated by Planned Development (A/TWW/124)

	Total number of Residential units	=	2	unit(s)
	Total number of residents	=	5	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**2.00**	m^3/d
		=	0.0000	m^3/s

Data for Planned Development as in A/TWW/124 received by TPB on 20 January 2023.

Estimated Sewage generated by Planned Development (A/TWW/103)

	Total number of Residential units	=	2	unit(s)
	Total number of residents	=	5	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**2.00**	m^3/d
		=	0.0000	m^3/s

Data for Planned Development (A/TWW/103) extracted from Town Planning Portal on 15 October 2024.

Binnies Hong Kong Limited

Project Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Subject Annex D Estimated Sewage Generated by Catchments A to G

Design Assumptions

1. Unit flow factor is adopted in accordance with *Guideline Guidelines for Estimating Sewage Flows (GESF)* published by EPD in March 2005.
2. Average Household Size of 2.7 in Tsuen Wan District is adopted in accordance with 2020 Population Census.

Estimated Sewage generated by Planned Development (A/TWW/127)

	Total number of Residential units	=	2	unit(s)
	Total number of residents	=	5	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**2.00**	m^3/d
		=	0.0000	m^3/s

Data for Planned Development (A/TWW/127) extracted from Town Planning Portal on 15 October 2024.

Estimated Sewage generated by Planned Development (A/TWW/128)

	Total GFA of Restaurant	=	113	m^2
CIFSUS Fig. 9	Worker Density	=	5.1	employees/100m^2
	Total number of residents	=	6	employees
GESF Table T-2	Unit Flow Factor	=	1.58	m^3/d per employee
	Average Dry Weather Flow, ADWF	=	**9.11**	m^3/d
		=	0.0001	m^3/s

Data for Planned Development (A/TWW/128) extracted from Town Planning Portal on 15 October 2024.

Sub-total for Catchment A

	Average Dry Weather Flow, ADWF	=	188.75	m^3/d
	Peak Flow from Ting Kau SPS	=	0.046	m^3/s

Estimated Sewage generated by Sea-Cliff Lodge

	Total number of Residential units	=	6	unit(s)
	Total number of residents	=	17	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**6.29**	m^3/d
		=	0.0001	m^3/s

Number of residential units is extracted from: https://hk.centanet.com/estate/%E6%B5%B7%E6%80%A1%E5%B1%85/1-QQRSFRDRRU

Estimated Sewage generated by Aztec Lodge

	Total number of Residential units	=	7	unit(s)
GESF Table T-1	Total number of residents	=	19	persons
	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**7.03**	m^3/d
		=	0.0001	m^3/s

Number of residential units is extracted from: https://hk.centanet.com/estate/en/Aztec-Lodge/2-AAPPWPPJPK

Estimated Sewage generated by The Proposed Development

	Average Dry Weather Flow, ADWF	=	**527.39**	m^3/d
		=	0.0061	m^3/s

Sub-total for Catchment B

	Average Dry Weather Flow, ADWF	=	540.71	m^3/d

Binnies Hong Kong Limited

Project Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Subject Annex D Estimated Sewage Generated by Catchments A to G

Design Assumptions

1. Unit flow factor is adopted in accordance with *Guideline Guidelines for Estimating Sewage Flows (GESF)* published by EPD in March 2005.
2. Average Household Size of 2.7 in Tsuen Wan District is adopted in accordance with 2020 Population Census.

Sewage Flow from Lido Beach Sewage Pumping Station

Provided by DSD	Average Daily Flow	=	38.00	m^3/d
Provided by DSD	Designed Daily Flow	=	1037.00	m^3/d
Provided by DSD	Flow Rate of Pump	=	15.20	L/s
		=	**0.0152**	m^3/s

It is assumed that the pump will work at its design flow rate (as shown above) under peak flow condition, thus, the flow rate of pump has been adopted as peak flow from SPS in the design checking in Annex C.

Sub-total for Catchment C

Average Dry Weather Flow, ADWF	=	38.00	m^3/d
Peak Flow from Lido Beach SPS	=	0.0152	m^3/s

Estimated Sewage generated by Edinburgh Villa

	Total number of resident units	=	4	unit(s)
	Total number of residents	=	11	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**4.07**	m^3/d
		=	0.0000	m^3/s

Number of resident units is extracted from: https://hk.centanet.com/estate/%E6%A1%82%E7%9B%A7/1-AABKWPYAPE

Estimated Sewage generated by Deauville

	Total number of resident units	=	33	unit(s)
	Total number of residents	=	90	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**33.30**	m^3/d
		=	0.0004	m^3/s

Number of resident units is extracted from: https://hk.centanet.com/estate/%E6%98%9F%E5%B2%B8/2-AAPPWPPHPK

Sub-total for Catchment D

Average Dry Weather Flow, ADWF	=	37.37	m^3/d

Estimated Sewage generated by Riviera Apartment

	Total number of Residential units	=	9	unit(s)
	Total number of residents	=	25	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**9.25**	m^3/d
		=	0.0001	m^3/s

Number of resident units is extracted from: https://hk.centanet.com/estate/%E9%BA%97%E6%B5%B7%E5%88%A5%E5%A2%85/1-DDTLTHIAHM

Estimated Sewage generated by Casam Beach

	Total number of staffs	=	4	persons
GESF Table T-2	Unit Flow Factor	=	0.28	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**1.12**	m^3/d
		=	0.0000	m^3/s

Sub-total for Catchment E

Average Dry Weather Flow, ADWF	=	10.37	m^3/d

Binnies Hong Kong Limited

Project Section 16 Planning Application for Submission of Layout Plan for Permitted 'Flat' and 'Social Welfare Facility' Uses at TWIL 5 and Lot No. 429 in D.D. 399, Ting Kau, Tsuen Wan

Subject Annex D Estimated Sewage Generated by Catchments A to G

Design Assumptions

1. Unit flow factor is adopted in accordance with *Guideline Guidelines for Estimating Sewage Flows (GESF)* published by EPD in March 2005.
2. Average Household Size of 2.7 in Tsuen Wan District is adopted in accordance with 2020 Population Census.

Estimated Sewage generated by Villamar

	Total number of Residential units	=	1	unit(s)
	Total number of residents	=	3	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**1.11**	m^3/d
		=	0.0000	m^3/s

Number of resident units is extracted from: https://hk.centanet.com/estate/en/Villamar/1-QQDSQRCJRU

Sub-total for Catchment F

Average Dry Weather Flow, ADWF	=	1.11	m^3/d

Estimated Sewage generated by Vista Del Mar

	Total number of Residential units	=	9	unit(s)
	Total number of residents	=	25	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**9.25**	m^3/d
		=	0.0001	m^3/s

Number of resident units is extracted from: https://hk.centanet.com/estate/%E8%A7%80%E6%B5%B7%E5%88%A5%E5%A2%85/2-AADKGPWXPE

Estimated Sewage generated by Fung Loi

	Total number of Residential units	=	1	unit(s)
	Total number of residents	=	3	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**1.11**	m^3/d
		=	0.0000	m^3/s

Number of resident units is extracted from: https://www.midland.com.hk/zh-hk/estate/%E6%96%B0%E7%95%8C-%E6%B7%B1%E4%BA%95-%E9%9D%92%E9%BE%8D%E9%A0%AD-%E8%93%AC%E8%90%8A-E000013895

Estimated Sewage generated by Planned Development (A/TWW/125)

	Total number of Residential units	=	1	unit(s)
	Total number of residents	=	3	persons
GESF Table T-1	Unit Flow Factor	=	0.37	m^3/d per person
	Average Dry Weather Flow, ADWF	=	**1.00**	m^3/d
		=	0.0000	m^3/s

Data for Planned Development as in A/TWW/124 received by TPB on 20 January 2023.

Sub-total for Catchment G

Average Dry Weather Flow, ADWF	=	11.36	m^3/d