

## **Appendix E – Sewerage Impact Assessment**



**Application for Permission under  
Section 16 of the Town Planning  
Ordinance (Cap. 131) for Proposed  
“Flat” with “Commercial (1)” Zone of  
STTL626 and STTL627 in Shatin**

Preliminary Sewerage Impact Assessment (SIA)

July 2026



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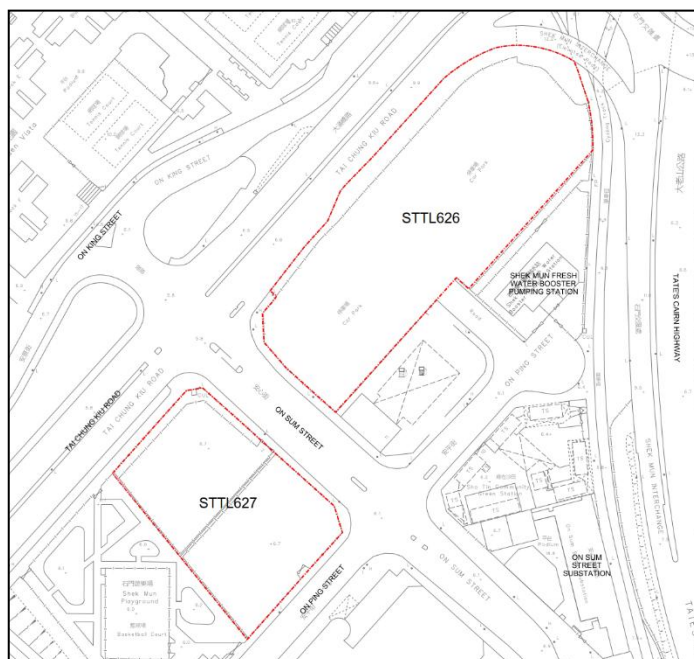
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# 1 INTRODUCTION

## 1.1 Study Background

- 1.1.1 The Government is committed to facilitating steady and continued land supply. The Government will continue to optimise the use of built-up land and its surrounding areas to meet the demand for housing and other development purposes in the short to medium term.
- 1.1.2 To achieve this objective, the Government has identified potential sites for conversion from commercial to residential use. Upon confirmation of the technical feasibility, a planning application will be submitted under section 16 of Town Planning Ordinance for consideration by the Town Planning Board.
- 1.1.3 On 15 August 2023, Mott MacDonald Hong Kong Limited (Mott) was commissioned by the CEDD's Housing Projects 3, Civil Engineering Office to undertake the "Term Consultancy for Site Formation and Infrastructure Works for Proposed Housing and Other Developments in Zone 1 (2023 – 2027) – Feasibility Study". Zone 1 mainly covers Shatin, Ma On Shan, Tsuen Wan and Kwai Ching, Lantau and outlying islands. On 31 October 2025, Task Order No. 4 (TO4) was instructed to conduct various technical assessments to support the town planning application for proposed private residential development at two development sites denoted as STTL626 (also known as ST-9353N) and STTL627 (also known as ST-9353S) respectively, located on the north and south sides of the section of On Sum Street between Tai Chung Kiu Road and On Ping Street in Shek Mun, Sha Tin. Location of the Site is shown in **Diagram 1-1** and **Appendix A**.

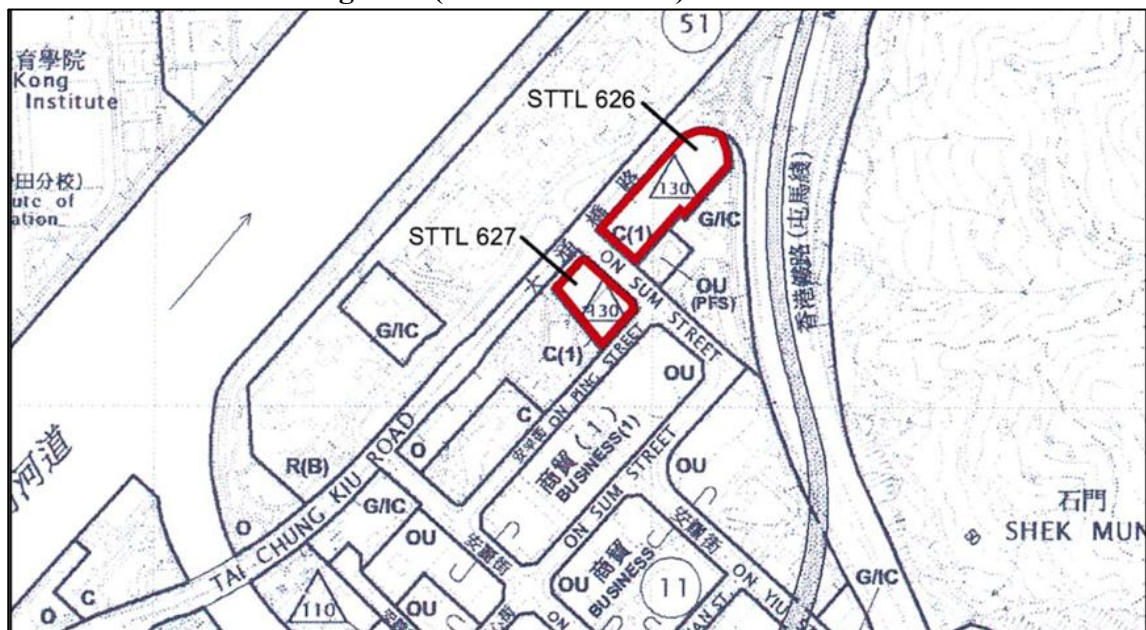
**Diagram 1-1 Location of the Site**



## 1.2 Site Description and Major Scope of Works

- 1.2.1 The two subject sites of this assignment STTL626 and STTL627, currently zoned "Commercial (1)" ("C(1)") on the approved Sha Tin Outline Zoning Plan (OZP) no. S/ST/40, cover a site area of approximately 0.80ha and 0.41ha respectively. Located at the northern fringe of the Shek Mun Business Area (Planning Area 11 in the OZP), the sites are generally bounded by Shek Mun Interchange to the north, Tai Chung Kiu Road (TCKR) to the northwest, Shek Mun Playground to the south, and On Ping Street (OPS) to the east, with On Sum Street (OSS) running along a corridor that separates the two sites. A hotel (Courtyard by Marriot Hong Kong Shatin) is located to the further southwest. Currently the STTL626 site is used as a fee-paying carpark (FPC) whereas the STTL627 site is vacant Government land. Both sites are formed flat ground, with an existing ground level at approximately +6mPD.
- 1.2.2 The proposed sites are covered by the approved Sha Tin Outline Zoning Plan (OZP) No. S/ST/40 and zoned as "C(1)", as shown in **Diagram 1-2**.

**Diagram 1-2** Boundaries of the two sites under Approved Sha Tin Outline Zoning Plan (Plan No. S/ST/40)



Source: Sha Tin Outline Zoning Plan (Plan No. S/ST/40), Town Planning Board Portal

- 1.2.3 The design parameters of the Indicative Scheme for the Proposed Development are summarised in **Table 1.1** below.

**Table 1.1 Target Design Parameters of the Indicative Scheme**

|                                                             | Development Parameters |         |
|-------------------------------------------------------------|------------------------|---------|
|                                                             | STTL626                | STTL627 |
| Application Site Area                                       | 0.80Ha                 | 0.41Ha  |
| Planned Housing Type                                        | Private Housing        |         |
| No. of Flats<br>(Total No. of Flats : 1,456) <sup>(1)</sup> | 962                    | 494     |

Note:

- (1) For technical assessment purpose, the adopted flat nos. for STTL626 and STTL627 are 1,100 and 451 (including 10% buffer) respectively. This is on conservative side since the total flat nos. of 1,551 (and consequently the design population) are larger than that in the Indicative Scheme.

- 1.2.4 This EFS aims to conduct the necessary technical assessments to support the town planning application for the proposed private residential developments for the two sites STTL626 and STTL627 in Shek Mun. The scope of work includes the followings:

- To conduct the technical assessments related to traffic and transport, drainage, sewerage, water supply and utilities;
- To assess environmental impacts and conduct quantitative risk assessments; and
- To prepare a Planning Report and to provide all necessary inputs to support and complete the planning application procedure.

- 1.2.5 Based on the information available, the technical assessments are currently scheduled for completion in March 2026 to initiate the Section 16 town planning application procedure in Q2 or Q3 2026. It is targeted that both sites will be included in the 2026/27 Land Sale Programme for private housing development.

### 1.3 Scope and Structure of this Report

- 1.3.1 In accordance with Clause 6.7 of the Brief, this Preliminary Sewerage Impact Assessment Report was prepared to present the following:

- Derive and agree with EPD and DSD on the methodologies, findings, proposals, recommendations and conclusions including the agreed sewerage impact mitigation measures;
- Projection of population in-take and the sewage flow build-up (both Average Dry Weather Flow and Peak Flow), by taking into account the sewage discharging from all other existing/committed/planned developments within the affected sewerage catchments up to the design year agreed by EPD;
- Assessment of sewerage impact on all existing/committed/planned sewage collection, treatment and disposal facilities (including sewerage network, associated

pumping stations and sewage treatment plants) affected by the Development(s) and associated Infrastructure Works, with sensitivity analysis of such facilities to the change of development parameters of the Development(s);

- (d) Assessment in accordance with the latest version of Planning Department's Territorial Population and Employment Data Matrices (TPEDM) or other planning datasets as determined by DR and the standards set out in DSD Sewerage Manual, the latest version of the EPD's "Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning;
- (e) Inventory of the existing, planned and proposed sewerage elements and capacities;
- (f) Recommendation of all necessary measures to mitigate adverse sewerage impacts arising from the Development(s) and the Infrastructure Works and demonstration of the effectiveness and acceptability of such measures;
- (g) Schematic design of the proposed improvement schemes and measures on plans and sections in enough details to illustrate their feasibility with respect to the topography and surrounding developments/structures etc. and for proceeding with statutory procedures of amendment to OZPs and EIAO, where applicable;
- (h) Proposal of sewerage connection points and prepare preliminary sewerage layout plan for the Development(s) to illustrate the hydraulic feasibility of the proposed sewerage scheme;
- (i) Implementation programme of the proposed sewerage scheme to support the Development(s); and
- (j) Issues of key concern in planning, design, construction and operation stages which are likely to influence decisions on the Development(s) and the Infrastructure Works.

1.3.2 Following this introductory Section, this SIA has the following remaining Sections:

- **Section 2:** - presents the methodology and design parameters for Sewerage Impact Assessment;
- **Section 3:** - describes the existing and planned sewerage system as well as estimation of Sewage Flow from the proposed development;
- **Section 4:** - examines the existing sewerage network with the proposed development, potential sewage disposal scheme, sewerage infrastructures for this Project, and assess the sewerage impact to the downstream sewerage utilities; and
- **Section 5:** - concludes the findings on the Preliminary Sewerage Impact Assessment.

## 1.4 Abbreviations

| Abbreviations | Term                                                     |
|---------------|----------------------------------------------------------|
| ADWF          | Average Dry Weather Flow                                 |
| CEDD          | Civil Engineering and Development Department             |
| CIF           | Catchment Inflow Factor                                  |
| CIFSUS        | Commercial and Industrial Floor Space Utilization Survey |
| DSD           | Drainage Services Department                             |
| EFS           | Engineering Feasibility Study                            |
| EIAO          | Environmental Impact Assessment Ordinance                |
| EPD           | Environmental Protection Department                      |
| GESF          | Guidelines for Estimating Sewage Flows                   |
| GLA           | Government Land Allocation                               |
| HKPSG         | Hong Kong Planning Standards and Guidelines              |
| Mott          | Mott MacDonald Hong Kong Limited                         |
| STSTW         | Sha Tin Sewage Treatment Works                           |
| OZP           | Outline Zoning Plan                                      |
| PR            | Plot Ratio                                               |
| SIA           | Sewerage Impact Assessment                               |
| SPS           | Sewage Pumping Station                                   |
| SSF           | Subsidised Sale Flat                                     |
| STT           | Short-Term Tenancy                                       |
| STW           | Sewage Treatment Works                                   |
| TPEDM         | Territorial Population and Employment Data Matrix        |
| UFF           | Unit Flow Factor                                         |
| UU            | Underground Utilities                                    |
| UUIS          | Underground Utilities Information System                 |

## **2 METHODOLOGY AND DESIGN PARAMETERS FOR SEWERAGE IMPACT ASSESSMENT**

### **2.1 General Approach**

- 2.1.1 This SIA is carried out to identify, assess, and propose mitigation measure to any potential sewerage impacts due to the proposed private housing development.

### **2.2 Methodology**

#### Assessment Approach

- 2.2.1 The following approach and methodology have been adopted in this sewerage impact assessment: -

- Carry out desktop study to collect the relevant information for the assessment, relevant information for the assessment to be collected included sewerage record plans from DSD and assessment reports;
- Based on desktop information, identify the existing and planned sewerage systems in the vicinity of the development site;
- Estimate the additional sewage flow arising from the Private Housing Development site due to the development; and
- Assess the sewerage impacts arising from the proposed private housing site and provide mitigation measure.

#### Design Standards, Guidelines and Reference

- 2.2.2 The sewage flow generated from the Private Housing Development site is based on the following standards, guidelines and reference for the sewerage design: -

- Sewerage Manual and its Corrigendum No. 1/2024 published by Drainage Services Department (DSD);
- Guidelines for Estimating Sewage Flows (GESF) for Sewerage Infrastructure (EPD);
- 2021 Population By-census
- Hong Kong Planning Standards and Guidelines (HKPSG);
- Commercial and Industrial Floor Space Utilization Survey (CIFSUS); and
- 2021-based Territorial Population and Employment Data Matrix (TPEDM)

## 2.3 Design Parameters and Assumptions

### Design Population

2.3.1 The design population for the Private Housing Development is shown in **Table 2.1**.

**Table 2.1 - Population Data for the Private Housing Development Site**

| Development Parameter                                                                                     | Plot Ratio | Type                                        | Development Details                                                        | Design Population (persons) <sup>(i)(ii)</sup> |
|-----------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------|
| <b>Domestic Flow</b>                                                                                      |            |                                             |                                                                            |                                                |
| Private Housing                                                                                           | 6.0        | Domestic (Residential R2)                   | 1,000 units for STTL626<br>410 units for STTL627                           | 3,080 for STTL626<br>1,263 for STTL627         |
| <b>Non-Domestic Flow</b>                                                                                  |            |                                             |                                                                            |                                                |
| Retail                                                                                                    | 0.2        | J4 – Wholesale & Retail                     | 2,420m <sup>2</sup> GFA for STTL626<br>1,230m <sup>2</sup> GFA for STTL627 | 93 for STTL626<br>47 for STTL627               |
| Integrated Children and Youth Services Centres (ICYSC)                                                    | -          | J11 - Community, Social & Personal Services | 163m <sup>2</sup> GFA                                                      | 11                                             |
| Remark: -                                                                                                 |            |                                             |                                                                            |                                                |
| i. Average Domestic Household size (Sha Tin) of 2.8 is obtained with reference to 2021 Population Census. |            |                                             |                                                                            |                                                |
| ii. 10% allowance of design population is assumed.                                                        |            |                                             |                                                                            |                                                |

### Unit Flow Factor

2.3.2 The sewage flow under the Existing Condition and the Condition for the Development will be estimated based on the following Unit Flow Factor (UFF) from GESF as indicated in **Table 2.2:-**

**Table 2.2 - Unit Flow Factors**

| Category / Use                                                  | Unit                           | Unit Flow Factor |
|-----------------------------------------------------------------|--------------------------------|------------------|
| Domestic - Residential (R2)                                     | m <sup>3</sup> /d per person   | 0.27             |
| Industrial Activity J1 – Sha Tin                                | m <sup>3</sup> /d per employee | 0.45             |
| Industrial Employee                                             | m <sup>3</sup> /d per employee | 0.08             |
| Commercial Activity J3 - Transport, Storage & Communication     | m <sup>3</sup> /d per employee | 0.10             |
| Commercial Activity J4 – Wholesale & Retail                     | m <sup>3</sup> /d per employee | 0.20             |
| Commercial Activity J10 – Restaurant & Hotels                   | m <sup>3</sup> /d per employee | 1.50             |
| Commercial Activity J11 – Community, Social & Personal Services | m <sup>3</sup> /d per employee | 0.20             |
| General – Territorial Average                                   | m <sup>3</sup> /d per employee | 0.20             |
| Commercial Employee                                             | m <sup>3</sup> /d per employee | 0.08             |



### **Catchment Inflow Factors**

- 2.3.3 The Catchment Inflow Factors ( $P_{cif}$ ) cater for the net overall ingress of water or wastewater to the sewerage system. They are catchment-dependent and applicable to major sewerage facilities of a catchment. They are not applicable to new catchments which are deemed to be free from misconnections and pipe defects. For the existing sewerage system in Shatin,  $P_{cif}$  of 1.15 will be adopted in accordance with Table T-4 of the GESF.

### **Peaking Factors**

- 2.3.4 Peaking factors cater for seasonal / diurnal fluctuation and normal amount of infiltration and inflow. The peaking factors shall be in accordance to Table T-5 of the GESF and are shown in **Table 2.3**.

**Table 2.3 - Peaking Factors for Various Population Ranges**

| Population Range                                                                                                                                                                        | Peaking Factor<br>(including stormwater allowance)<br>for facility with existing upstream<br>sewerage | Peaking Factor<br>(excluding stormwater allowance)<br>for facility with new upstream<br>sewerage |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| (a) Sewers                                                                                                                                                                              |                                                                                                       |                                                                                                  |
| < 1,000                                                                                                                                                                                 | 8                                                                                                     | 6                                                                                                |
| 1,000 – 5,000                                                                                                                                                                           | 6                                                                                                     | 5                                                                                                |
| 5,000 – 10,000                                                                                                                                                                          | 5                                                                                                     | 4                                                                                                |
| 10,000 – 50,000                                                                                                                                                                         | 4                                                                                                     | 3                                                                                                |
| > 50,000                                                                                                                                                                                | Max ( $7.3/N^{0.15}$ , 2.4)                                                                           | Max ( $6/N^{0.175}$ , 1.6)                                                                       |
| (b) Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations                                                                                                            |                                                                                                       |                                                                                                  |
| < 10,000                                                                                                                                                                                | 4                                                                                                     | 3                                                                                                |
| 10,000 – 25,000                                                                                                                                                                         | 3.5                                                                                                   | 2.5                                                                                              |
| 25,000 – 50,000                                                                                                                                                                         | 3                                                                                                     | 2                                                                                                |
| > 50,000                                                                                                                                                                                | Max ( $3.9/N^{0.065}$ , 2.4)                                                                          | Max ( $2.6/N^{0.065}$ , 1.6)                                                                     |
| Note:<br>N = Contributing population in thousands<br><br>$\text{Contributing Population} = \frac{\text{Calculated total average flow (m}^3\text{/day)}}{0.27 \text{ (m}^3\text{/day)}}$ |                                                                                                       |                                                                                                  |

- 2.3.5 For conservative approach, peaking factors (including stormwater allowance) have been adopted in this assessment.
- 2.3.6 The peak dry weather flow (PDWF) is estimated by the following equation:

$$Q_{PEAK} = Q_{AVERAGE} \times P$$

Where:

$$\begin{aligned} Q_{PEAK} &= \text{Peak Dry Weather Flow (PDWF)} \\ Q_{AVERAGE} &= \text{Average Dry Weather Flow (ADWF)} \\ P &= \text{Peaking Factor} \end{aligned}$$

### **Assessment for Sewer Capacity**

- 2.3.7 The hydraulic capacity of the proposed sewer is controlled by its size, shape, gradient and friction resistance. In the hydraulic analysis, Colebrook-White Equation shall be used for the sewer capacity. Details are as follows:-

Colebrook-White Equation:

$$\bar{V} = -\sqrt{32gRS_f} \log \left[ \frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}} \right]$$

Where:

|           |   |                                                 |
|-----------|---|-------------------------------------------------|
| $\bar{V}$ | = | Cross-sectional mean velocity (m/s)             |
| $R$       | = | Hydraulic radius (m)                            |
| $S_f$     | = | Friction gradient (dimensionless)               |
| $k_s$     | = | Surface roughness (m)                           |
| $v$       | = | Kinematic viscosity (m <sup>2</sup> /s)         |
| $g$       | = | Acceleration due to gravity (m/s <sup>2</sup> ) |

- 2.3.8 The required pipe/channel size using the Discharge and Mean Velocity formula as follows:

$$Q = AV$$

Where:

|     |   |                                           |
|-----|---|-------------------------------------------|
| $Q$ | = | Rate of flow, m <sup>3</sup> /s           |
| $A$ | = | Pipe cross-sectional area, m <sup>2</sup> |
| $V$ | = | Cross-sectional mean velocity (m/s)       |

### **Roughness**

- 2.3.9 For the existing and potential sewers, a roughness value of  $k_s = 3\text{mm}$  for slimed concrete sewer in poor condition have been adopted in the hydraulic calculation for conservative approach.

### 3 EXISTING SEWERAGE CONDITION

#### 3.1 Existing Sewerage System

- 3.1.1 Based on the existing drainage and sewerage record provided by DSD, the existing sewerage pipelines in the vicinity of the sites are located at On Ping Street, On Lai Street and On Sum Street. The size of pipelines ranges from 225mm dia. to 450mm dia. Ultimately, the sewage would be discharged to STSTW. The existing sewerage system in vicinity of the Development is shown in **Appendix B**.

#### 3.2 Estimated Sewage Flow for Existing Condition

- 3.2.1 The sewage catchment covers the existing developments in vicinity of the site. The developments include residential areas, commercial, community and recreation area in Sha Tin District. The estimated sewage flow discharging to the existing sewers is summarised in **Table 3.1** and details refer to **Appendix C**, where the location of sub-catchments are shown in **Appendix D**.

**Table 3.1 - Summary Table of Estimated Sewage Flows from Sub-Catchments under Existing Condition**

| Sub-Catchment ID | Average Dry Weather Flow |                   | Discharge Manhole |
|------------------|--------------------------|-------------------|-------------------|
| 1                | 2.2                      | m <sup>3</sup> /d | FMH4038216        |
| 2                | 3.3                      | m <sup>3</sup> /d | FMH4038217        |
| 3                | 108.2                    | m <sup>3</sup> /d | FMH4038218        |
| 4                | 2.2                      | m <sup>3</sup> /d | FMH4038219        |
| 5                | 286.3                    | m <sup>3</sup> /d | FMH4038185        |
| 6                | 888.6                    | m <sup>3</sup> /d | FMH4038186        |
| 7                | 128.6                    | m <sup>3</sup> /d | FMH4038188        |
| 8                | 0.7                      | m <sup>3</sup> /d | FMH4038189        |
| 9                | 219.0                    | m <sup>3</sup> /d | FMH4038190        |
| 10               | 1019.6                   | m <sup>3</sup> /d | FMH4038191        |

#### 3.3 Planned Sewerage Works

- 3.3.1 Based on the information available, there is no planned sewerage works in the vicinity of the Study Area.

## 4 SEWERAGE IMPACT ASSESSMENT AND POTENTIAL SEWERAGE CONNECTION

### 4.1 Estimated Sewage Flow under Development

- 4.1.1 Based on the design population for the Development and sewage unit flow factors as mentioned in **Section 2**, the estimated ADWF are in total of 1215.0m<sup>3</sup>/d, including 857.7m<sup>3</sup>/d sewage flow generated by private housing development and retail facilities at STTL626 and 357.3m<sup>3</sup>/d sewage flow generated by private housing development, retail facilities and social welfare facilities at STTL627. The detail calculation can be referred to **Appendix E** and summarized as **Table 4.1** below.

**Table 4.1 – Estimated Sewage Flow by Development**

| Development                                                         | Parameters            | Population | Unit Flow Factor | Sewage Flow (m3/d) |
|---------------------------------------------------------------------|-----------------------|------------|------------------|--------------------|
| <b>Domestic Flow</b>                                                |                       |            |                  |                    |
| STTL626                                                             | 1,000 Flats           | 3,080      | 0.27             | 831.6              |
| STTL627                                                             | 410 Flats             | 1,263      | 0.27             | 341.0              |
| <b>Non-Domestic Flow</b>                                            |                       |            |                  |                    |
| Retail at STTL626                                                   | 2,420m <sup>2</sup>   | 93         | 0.28             | 26.1               |
| Retail at STTL627                                                   | 1,230m <sup>2</sup>   | 47         | 0.28             | 13.3               |
| Integrated Children and Youth Services Centres (ICYSC)              | 163m <sup>2</sup> GFA | 11         | 0.28             | 3.1                |
| Remark:<br>- Social welfare facilities are located at STTL627 Site. |                       |            |                  |                    |

### 4.2 Potential Impact on the Existing Sewerage System

- 4.2.1 It is assumed that sewage flow generated from STTL626 Site would be discharged to the existing manhole no. FMH4038216 while sewage flow generated from STTL627 Site would be discharged to the existing tapping point no. FTH4002224.
- 4.2.2 The hydraulic capacities of the existing public sewers laid along Shing Mun River to the south, existing sewerage system with and without the sewage flow from the development, have been assessed using Colebrook- White equation and the results are summarised in **Table 4.2** below. The detailed calculation is enclosed in **Appendix F** and **G**.

**Table 4.2 – Utilization of Existing Sewer with and without Private Housing Development**

| Existing Sewerage System                                                                                                                                                                                                                                                     |            |                |                    |                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|--------------------|-------------------------------------|
| Pipe Information                                                                                                                                                                                                                                                             |            |                | Utilization (%)    |                                     |
| From                                                                                                                                                                                                                                                                         | To         | Pipe Size (mm) | Existing Condition | Existing Condition with Development |
| FMH4038216                                                                                                                                                                                                                                                                   | FMH4038217 | 225            | 1%                 | <b>216%</b>                         |
| FMH4038217                                                                                                                                                                                                                                                                   | FMH4038218 | 225            | 1%                 | <b>124%</b>                         |
| FMH4038218                                                                                                                                                                                                                                                                   | FMH4038219 | 375            | 14%                | <b>101%</b>                         |
| FMH4038219                                                                                                                                                                                                                                                                   | FMH4038185 | 375            | 9%                 | 63%                                 |
| FMH4038185                                                                                                                                                                                                                                                                   | FMH4038186 | 375            | 24%                | 81%                                 |
| FMH4038186                                                                                                                                                                                                                                                                   | FMH4038187 | 375            | 57%                | 89%                                 |
| FMH4038187                                                                                                                                                                                                                                                                   | FMH4038188 | 375            | 51%                | 79%                                 |
| FMH4038188                                                                                                                                                                                                                                                                   | FMH4038189 | 375            | 52%                | 77%                                 |
| FMH4038189                                                                                                                                                                                                                                                                   | FMH4038190 | 450            | 41%                | 61%                                 |
| FMH4038190                                                                                                                                                                                                                                                                   | FMH4038191 | 450            | 69%                | 92%                                 |
| FMH4038191                                                                                                                                                                                                                                                                   | FMH4038192 | 450            | 59%                | 86%                                 |
| FTH4002224                                                                                                                                                                                                                                                                   | FMH4038218 | 225            | -                  | 45%                                 |
| Remark:<br>1. For assessing the pipeline, some are found that the invert level of pipeline in between was not shown in DSD record plan. Hence, the invert level for the aforesaid pipeline is estimated by the interpolation from the invert level of manholes at both ends. |            |                |                    |                                     |

4.2.3 According to the utilization shown in **Table 4.2**, section of existing sewer from FMH4038216 to FMH4038219 are found to be fully utilised under scenario of existing condition with development. Hence, discharging additional sewage flow from STTL626 to this section of existing sewer should be justified having regard to the future development parameters.

4.2.4 For sewerage connection to the south-eastern side of STTL627 site, it is found that the existing sewer (i.e. FTH4002224 to FMH4038218) could cater for additional sewage demand from private housing development and social welfare facilities at STTL627 site.

### 4.3 Potential Sewerage Connection to Existing Sewerage System

4.3.1 The sewage generated from the STTL626 site (Private Housing Development) including 1,000 flats and some retail facilities to be conveyed by a series of 300mm dia. gravity sewer from manhole TM01 to the manhole no. SM06 near Shek Mun Playground, then conveyed by a series of existing 375mm dia. gravity sewer along On Ping Street. The sewage from the Development will be subsequently discharged to STSTW via the existing sewerage system as mentioned in **Section 3**. Addressing the likely inadequacy in sewerage capacity as mentioned in **Section 4.2.3** above, a potential sewerage connection from STTL626 site to existing sewerage system is suggested and shown in **Appendix H**.

- 4.3.2 The sewage generated from the STTL627 site (Private Housing Development) including 410 flats, some retail and social welfare facilities to be discharged to the terminal manhole TM02 replacing the existing tapping point no. FTH4002224 with associated 225mm dia. gravity sewer, then conveyed by a series of existing 375mm dia. gravity sewer along On Ping Street. The sewage from the Development will be subsequently discharged to STSTW via the existing sewerage system as mentioned in **Section 3**. The potential sewerage connection from STTL627 site to existing sewerage system is also suggested and shown in **Appendix H**.
- 4.3.3 The above potential sewerage connections to existing sewerage system are technically feasible and preliminarily suggested, which would be subject to planning by relevant construction parties in the future.

#### 4.4 Impact on Potential Sewerage Connection to Existing Sewerage System

- 4.4.1 As discussed above, a potential series of 300mm dia. sewers are suggested to connect from the STTL626 site to the existing sewer no. FWD4041669 by constructing new manhole SM06. The potential sewerage connection to existing sewerage system are shown in **Appendix H**.
- 4.4.2 The hydraulic capacities of the potential sewerage connection (as shown in **Appendix H**) with the sewage flow from the development, have been assessed by using Colebrook-White equation and the results are summarised in **Table 4.3**. The detailed calculation is enclosed in **Appendix I**.

**Table 4.3 – Utilization of Existing and Potential Sewers with Private Housing Development**

| Existing and Potential Sewers |            |                |                 |
|-------------------------------|------------|----------------|-----------------|
| Pipe Information              |            |                | Utilization (%) |
| From                          | To         | Pipe Size (mm) |                 |
| Potential Sewers              |            |                |                 |
| TM01                          | SM01       | 300            | 73%             |
| SM01                          | SM02       | 300            | 73%             |
| SM02                          | SM03       | 300            | 73%             |
| SM03                          | SM04       | 300            | 73%             |
| SM04                          | SM05       | 300            | 73%             |
| SM05                          | SM06       | 300            | 73%             |
| Existing Sewers               |            |                |                 |
| FMH4038216                    | FMH4038217 | 225            | 1%              |
| FMH4038217                    | FMH4038218 | 225            | 1%              |
| FMH4038218                    | FMH4038219 | 375            | 43%             |
| FMH4038219                    | SM06       | 375            | 25%             |

| Existing and Potential Sewers                                                                                                                                                                                                                                                |            |                |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|-----------------|
| Pipe Information                                                                                                                                                                                                                                                             |            |                | Utilization (%) |
| From                                                                                                                                                                                                                                                                         | To         | Pipe Size (mm) |                 |
| SM06                                                                                                                                                                                                                                                                         | FMH4038185 | 375            | 59%             |
| FMH4038185                                                                                                                                                                                                                                                                   | FMH4038186 | 375            | 81%             |
| FMH4038186                                                                                                                                                                                                                                                                   | FMH4038187 | 375            | 89%             |
| FMH4038187                                                                                                                                                                                                                                                                   | FMH4038188 | 375            | 79%             |
| FMH4038188                                                                                                                                                                                                                                                                   | FMH4038189 | 375            | 77%             |
| FMH4038189                                                                                                                                                                                                                                                                   | FMH4038190 | 450            | 61%             |
| FMH4038190                                                                                                                                                                                                                                                                   | FMH4038191 | 450            | 92%             |
| FMH4038191                                                                                                                                                                                                                                                                   | FMH4038192 | 450            | 86%             |
| TM02                                                                                                                                                                                                                                                                         | FMH4038218 | 225            | 45%             |
| Remark:<br>1. For assessing the pipeline, some are found that the invert level of pipeline in between was not shown in DSD record plan. Hence, the invert level for the aforesaid pipeline is estimated by the interpolation from the invert level of manholes at both ends. |            |                |                 |

## 4.5 Implementation Programme

- 4.5.1 The detailed construction / implementation programme for the sewerage connection works would be subject to planning by the construction parties in the future.

## 5 CONCLUSION

- 5.1.1 The total ADWF of the proposed development from the 2 sites are estimated as 1215.0m<sup>3</sup>/d, including 857.7m<sup>3</sup>/d generated from private housing development and retail facilities at STTL626 and 357.3m<sup>3</sup>/d generated from private housing development, retail facilities and social welfare facilities at STTL627, which are designed to be discharge to public sewerage system. Based on the hydraulic check on the existing pipe capacity, the existing sewer pipelines at east side of the 2 sites (i.e. from manhole nos. FMH4038216 to FMH4038219) are incapable to cater the additional sewage from the proposed development.
- 5.1.2 Addressing the likely inadequacy in sewerage capacity mentioned above, potential series of 300mm dia. sewers (approximately 170m) is suggested from STTL626 site to the existing sewer no. FWD4041669 near Shek Mun Playground for discharging the additional sewage from the proposed development at the STTL626 Site, which would be subject to planning by relevant construction parties in the future.
- 5.1.3 A potential terminal manhole no. TM02 replacing the existing tapping point no. FTH4002224 is suggested for discharging the additional sewage from the proposed development at the STTL627 Site to the existing 225mm dia. sewers, which would be subject to planning by relevant construction parties in the future.
- 5.1.4 The additional ADWF of 1215.0m<sup>3</sup>/d generated from the proposed development at the subject sites would be discharged to STSTW for sewage treatment.

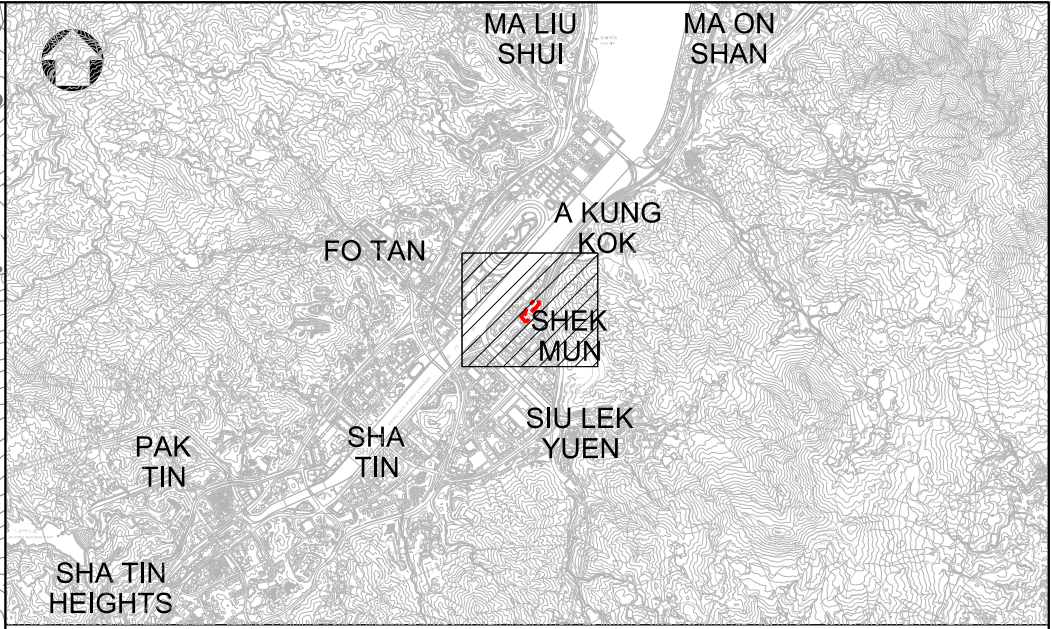
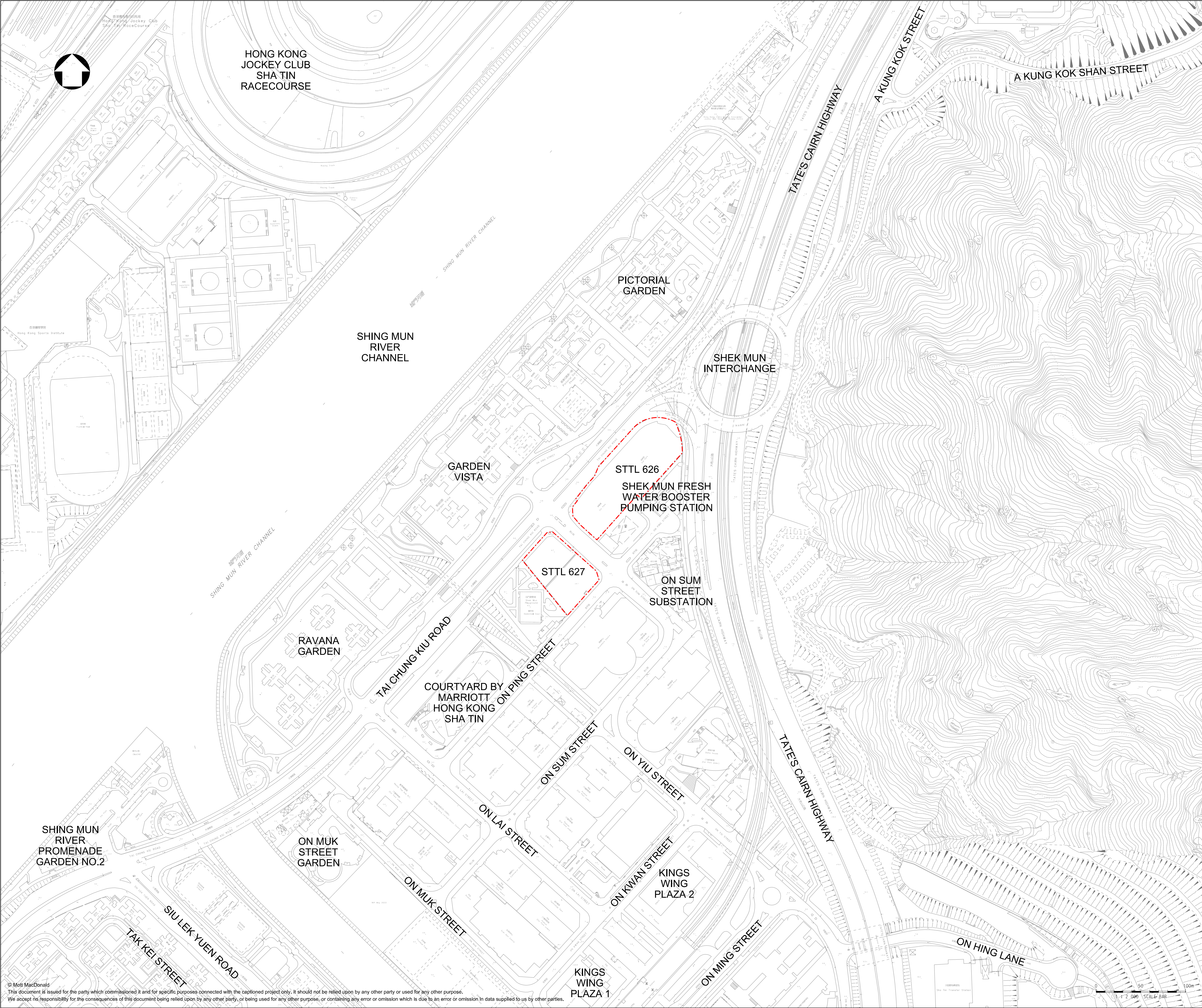


# Appendices

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# A. General Layout Plan





KEY PLAN

|         |                           |
|---------|---------------------------|
| LEGEND: |                           |
|         | APPLICATION SITE BOUNDARY |

|     |          |       |             |        |       |
|-----|----------|-------|-------------|--------|-------|
| P1  | JAN 2026 | TL    | FIRST ISSUE | VF     | DN    |
| Rev | Date     | Drawn | Description | Ch'k'd | App'd |

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AND INFRASTRUCTURE WORKS FOR  
PROPOSED HOUSING AND  
OTHER DEVELOPMENTS IN ZONE 1 (2023-2027)  
TASK ORDER NO.4

Title

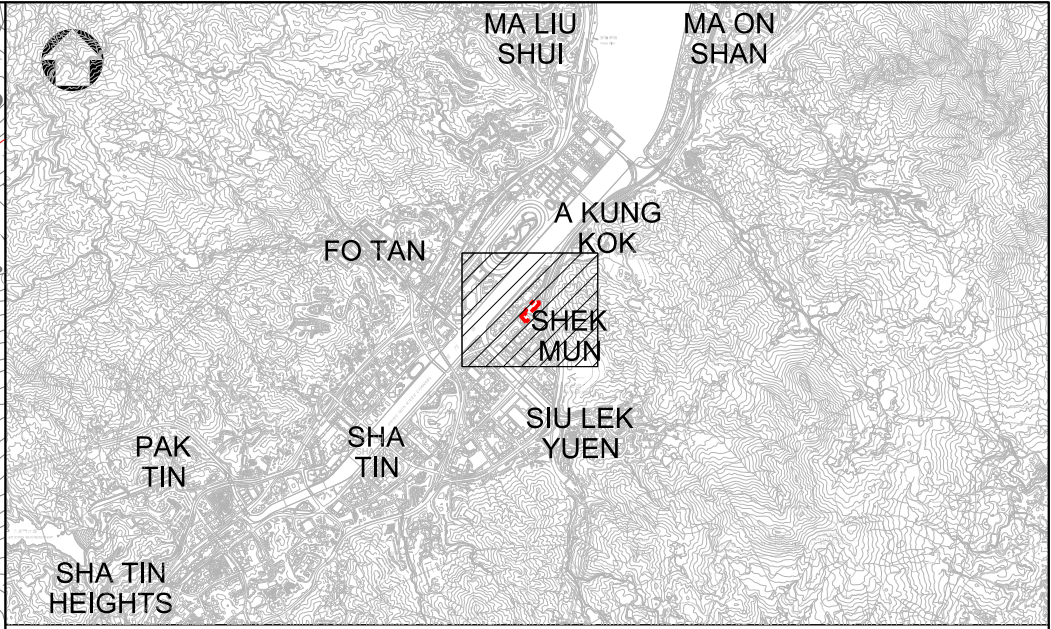
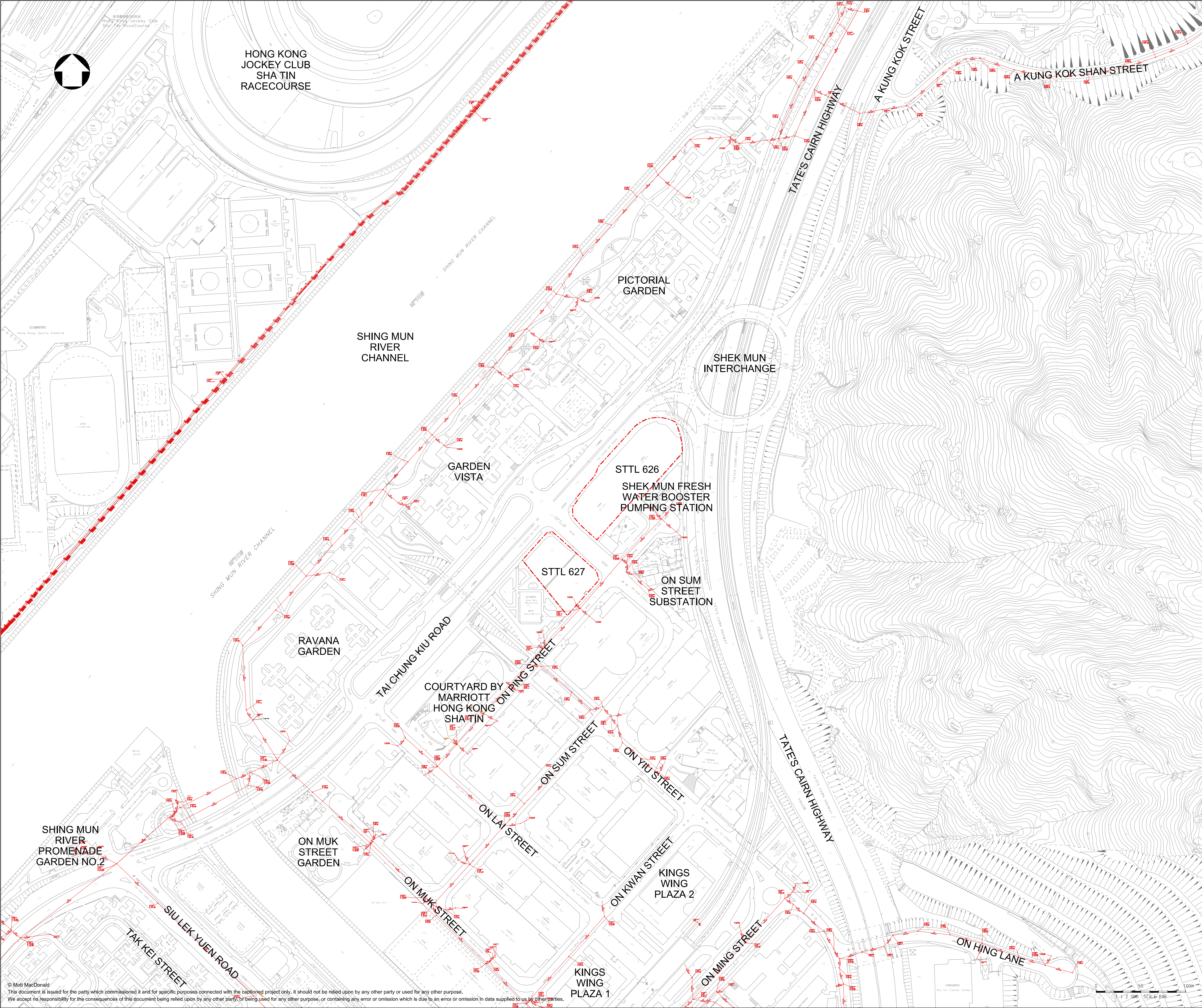
GENERAL LAYOUT PLAN

|                          |    |        |              |    |  |
|--------------------------|----|--------|--------------|----|--|
| Designed                 | TC |        | Eng check    | VF |  |
| Drawn                    | TL |        | Coordination | VF |  |
| Dwg check                | AT |        | Approved     | DN |  |
| Scale at A1              |    | Status | Rev          |    |  |
| 1:2000                   |    | PRE    |              | P1 |  |
| Drawing Number           |    |        |              |    |  |
| MMH/CE19/TO4/SIA/FIG/1.1 |    |        |              |    |  |



## **B. Existing Sewerage System**





**KEY PLAN**

LEGEND:

APPLICATION SITE BOUNDARY

EXISTING SEWER

EXISTING MANHOLE

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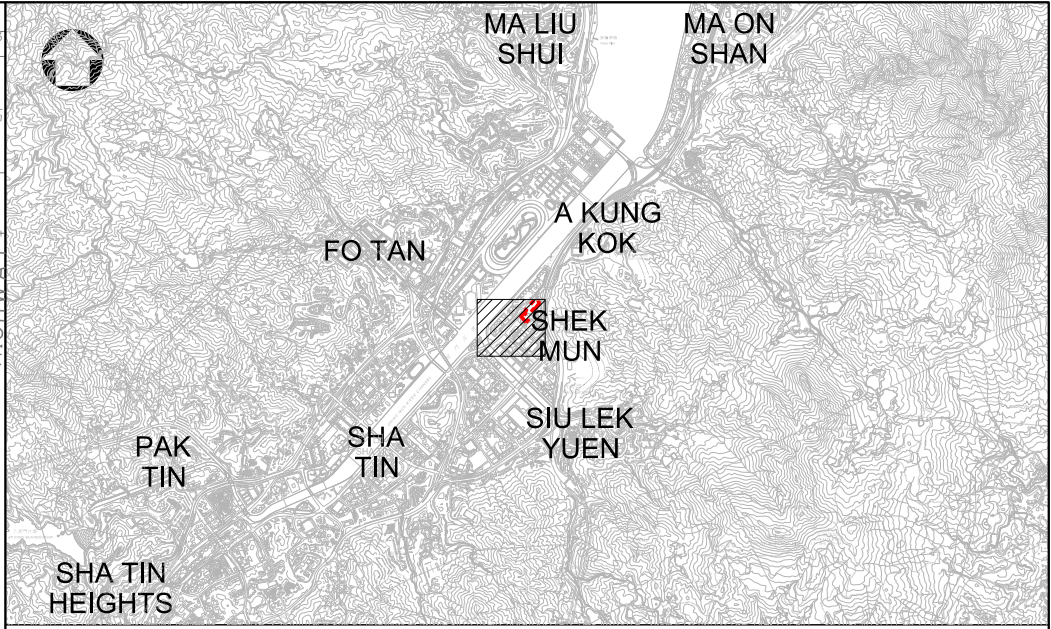
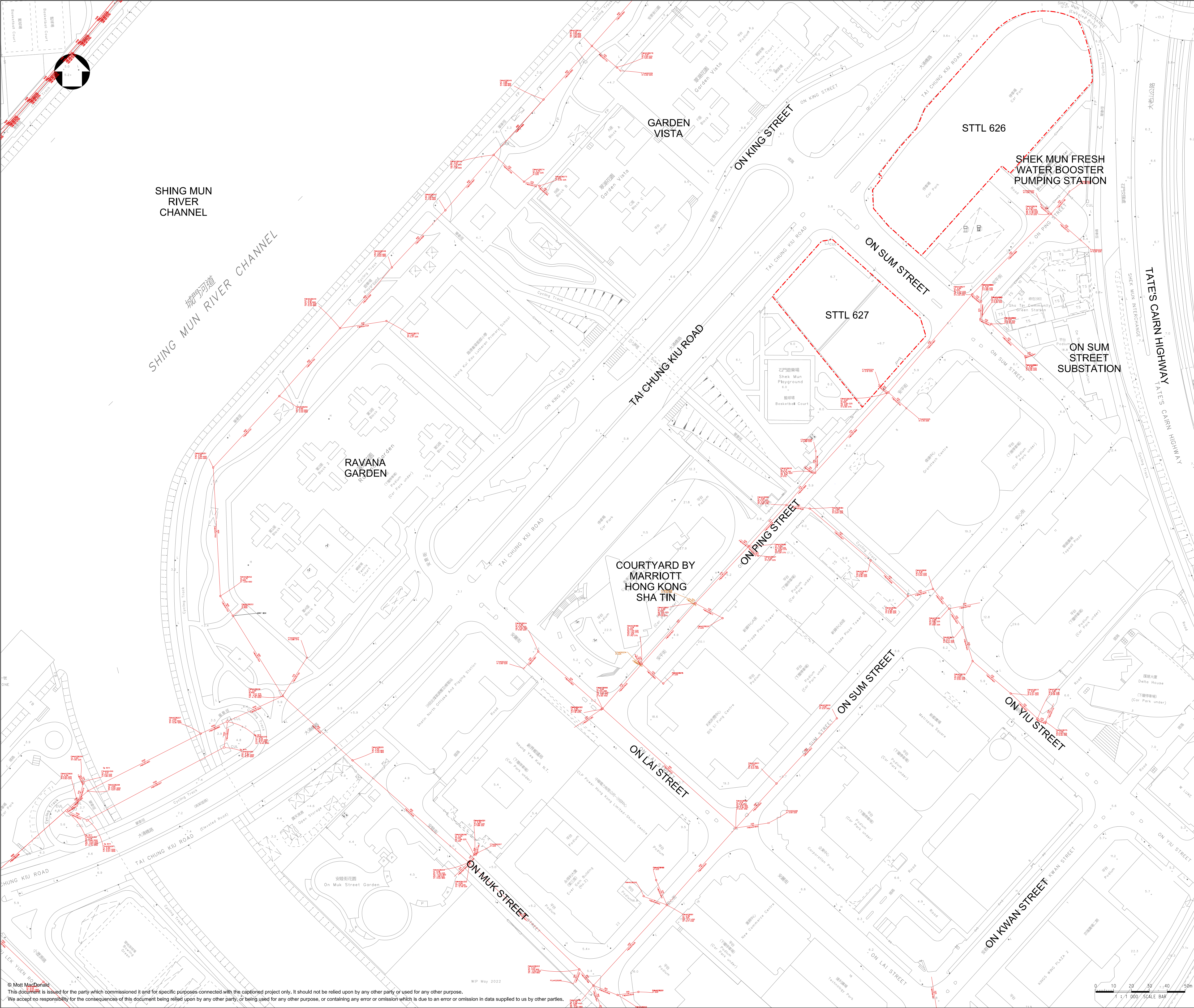
Title

EXISTING SEWERAGE SYSTEM (SHEET 1)

Drawing Number

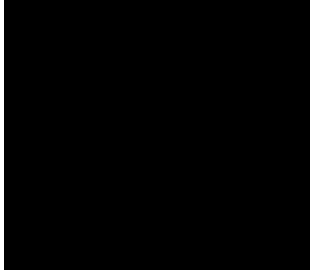
MMH/CE19/TO4/SIA/FIG/2.1





| KEY PLAN |                           |  |  |  |  |
|----------|---------------------------|--|--|--|--|
| LEGEND:  |                           |  |  |  |  |
|          | APPLICATION SITE BOUNDARY |  |  |  |  |
|          | EXISTING SEWER            |  |  |  |  |
|          | EXISTING MANHOLE          |  |  |  |  |
|          | EXISTING TAPPING POINT    |  |  |  |  |

|     |          |       |             |        |       |
|-----|----------|-------|-------------|--------|-------|
| P1  | JAN 2026 | TL    | FIRST ISSUE | VF     | DN    |
| Rev | Date     | Drawn | Description | Ch'k'd | App'd |





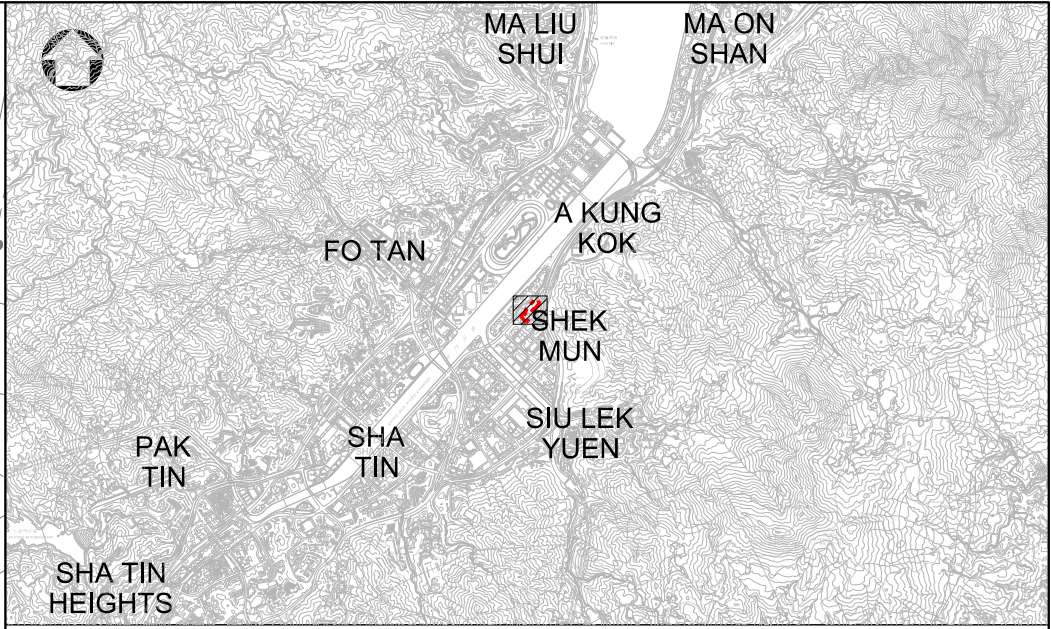
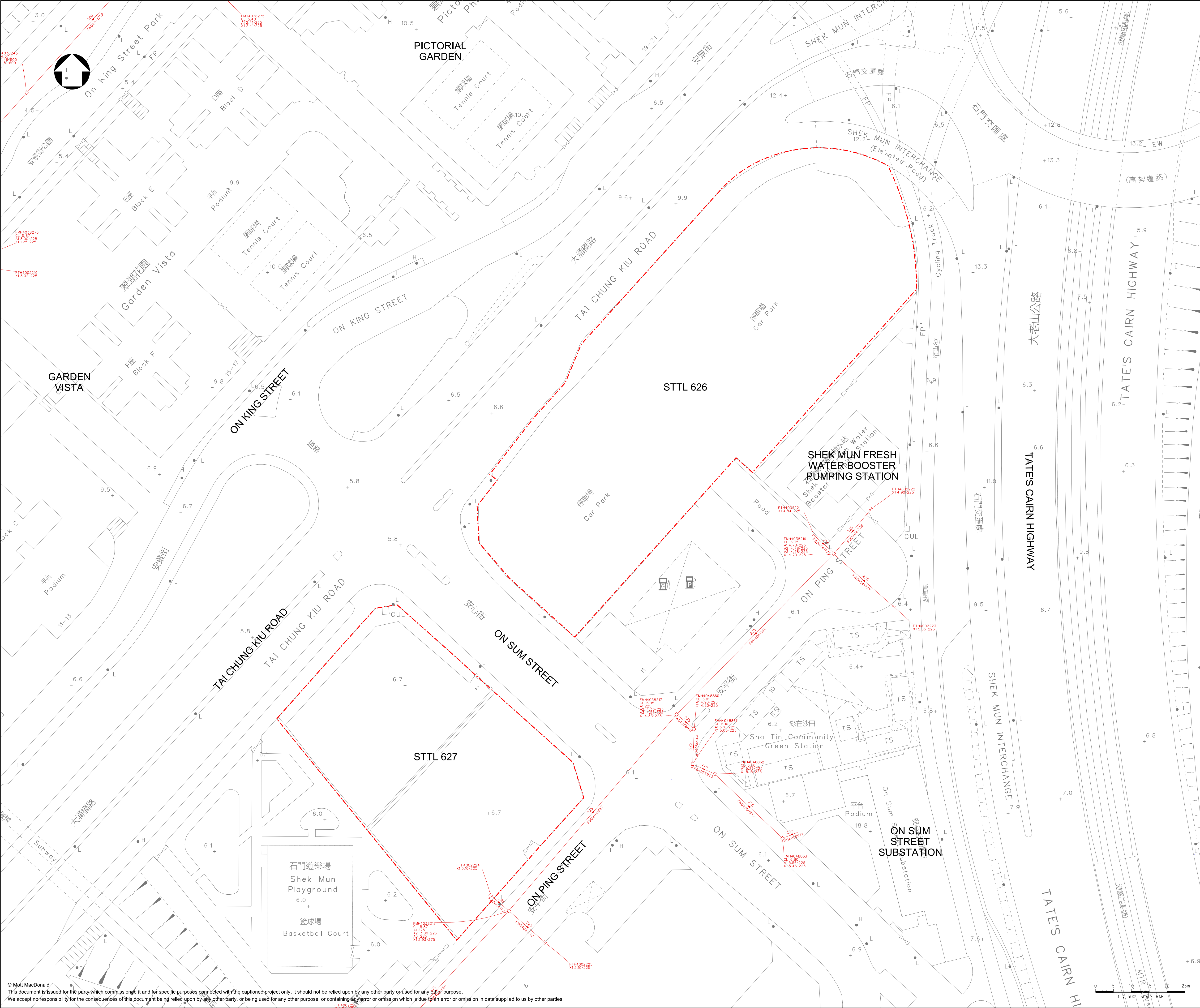
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AND INFRASTRUCTURE WORKS FOR  
PROPOSED HOUSING AND  
OTHER DEVELOPMENTS IN ZONE 1 (2023-2027)  
TASK ORDER NO.4

Title  
EXISTING SEWERAGE SYSTEM  
(SHEET 2)

|                                            |               |              |    |
|--------------------------------------------|---------------|--------------|----|
| Designed                                   | TC            | Eng check    | VF |
| Drawn                                      | TL            | Coordination | VF |
| Dwg check                                  | AT            | Approved     | DN |
| Scale at A1<br>1:1000                      | Status<br>PRE | Rev<br>P1    |    |
| Drawing Number<br>MMH/CE19/TO4/SIA/FIG/2.2 |               |              |    |





KEY PLAN

LEGEND:

APPLICATION SITE BOUNDARY

EXISTING SEWER

EXISTING MANHOLE

EXISTING TAPPING POINT

P1JAN 2026TLFIRST ISSUEVF DN

RevDateDrawnDescriptionCh'k'dApp'd

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Title

EXISTING SEWERAGE SYSTEM (SHEET 3)

DesignedTCEng checkVF

DrawnTLCoordinationVF

Dwg checkATApprovedDN

Scale at A11:500PREP1

Status

Rev

Drawing Number

MMH/CE19/TO4/SIA/FIG/2.3

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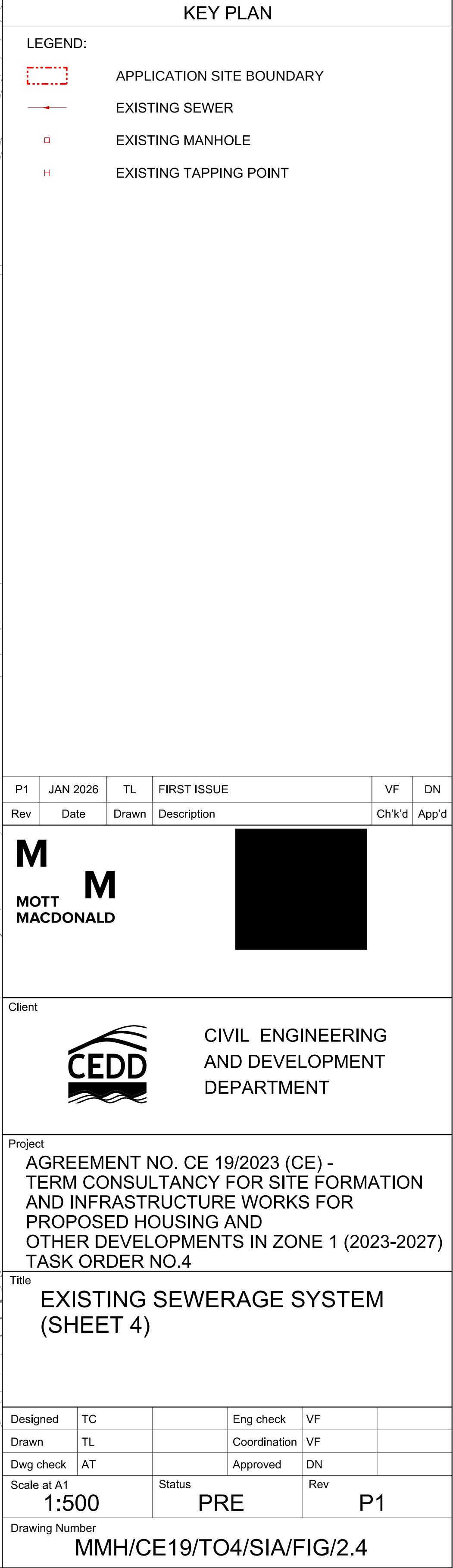
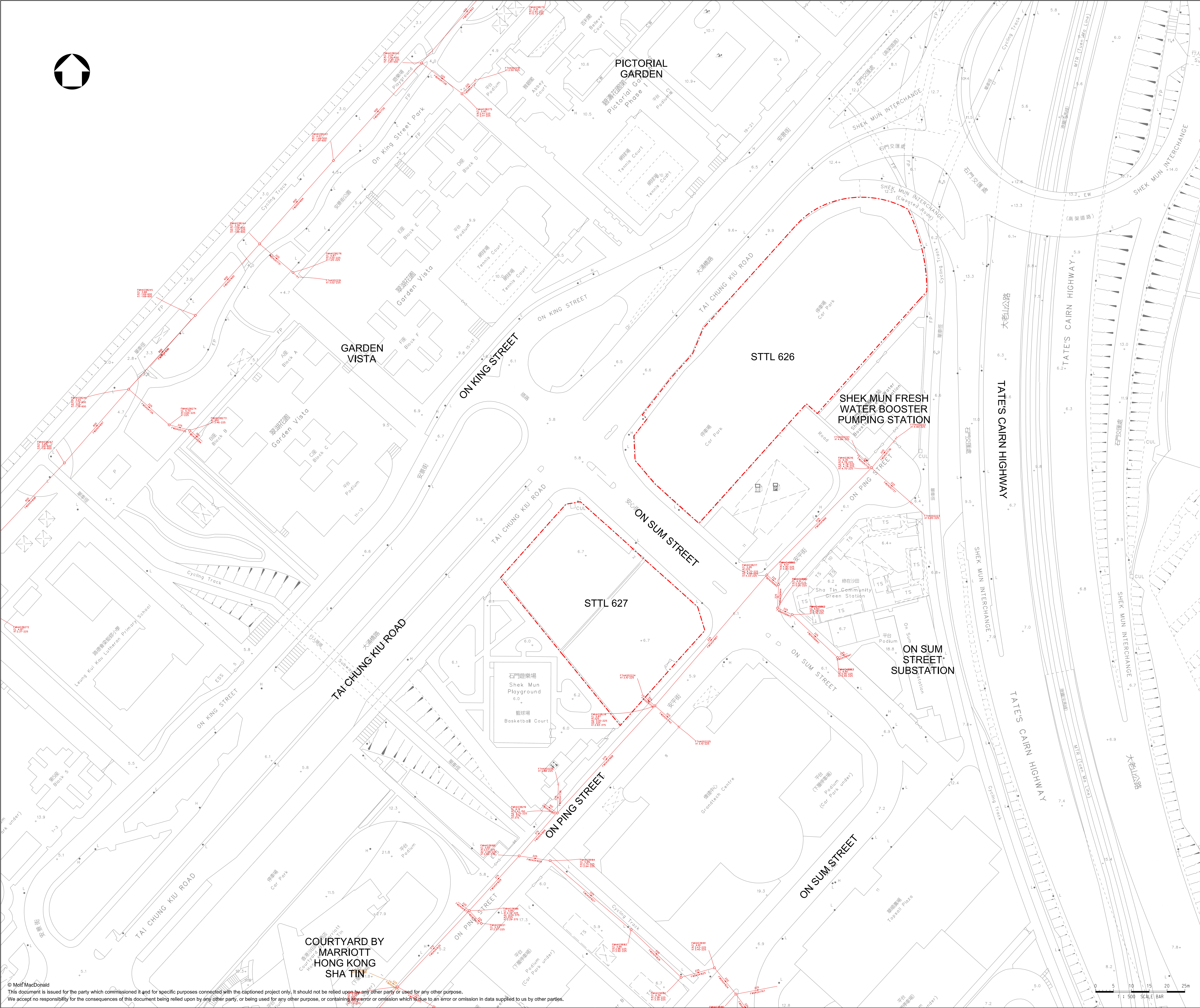
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## **C. Estimation of Sewage Flow for Existing Catchments**

## Appendix C - Existing Sewage Demand Estimation

\*The location of Sub-Catchments are shown in Appendix D

### Sub-catchment 1

#### 1A Esso - Shek Mun Petrol and LPG Filling Station

|                            |      |                              |
|----------------------------|------|------------------------------|
| Total No. of Employees =   | 5    | persons                      |
| Global Unit Flow Factors = | 0.18 | m <sup>3</sup> /employee/day |

Assumed 5 staffs per station  
Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3).

|                             |             |                        |
|-----------------------------|-------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>0.83</b> | <b>m<sup>3</sup>/d</b> |
|                             | <b>0.01</b> | <b>l/s</b>             |

Considered percentage change from 2021 to 2032 = -7.56%

#### 1B Sha Tin Community Green Station

|                            |         |                               |
|----------------------------|---------|-------------------------------|
| Plan Area =                | 1990.49 | m <sup>2</sup>                |
| Assumed Worker Density =   | 0.4     | persons per 100m <sup>2</sup> |
| Total No. of Employees =   | 8       | persons                       |
| Global Unit Flow Factors = | 0.18    | m <sup>3</sup> /employee/day  |

Measured from GeoInfo Map  
According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m<sup>2</sup>.

|                             |             |                        |
|-----------------------------|-------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>1.33</b> | <b>m<sup>3</sup>/d</b> |
|                             | <b>0.02</b> | <b>l/s</b>             |

Considered percentage change from 2021 to 2032 = -7.56%

|                                                      |             |                        |
|------------------------------------------------------|-------------|------------------------|
| <b>Total Sewage Flow (ADWF) of Sub-catchment 1 =</b> | <b>2.16</b> | <b>m<sup>3</sup>/d</b> |
|                                                      | <b>0.03</b> | <b>l/s</b>             |

**Sewage discharge to FMH4038216**

### Sub-catchment 2

#### 2 On Sum Street Substation

|                          |         |                               |
|--------------------------|---------|-------------------------------|
| Plan Area =              | 1601.17 | m <sup>2</sup>                |
| Total No. of Floors =    | 3       | floors                        |
| Total GFA of Building =  | 4803.51 | m <sup>2</sup>                |
| Assumed Worker Density = | 0.4     | persons per 100m <sup>2</sup> |

Measured from GeoInfo Map  
Assumption

|                            |      |                              |
|----------------------------|------|------------------------------|
| Total No. of Employees =   | 20   | persons                      |
| Global Unit Flow Factors = | 0.18 | m <sup>3</sup> /employee/day |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m<sup>2</sup>.

|                             |             |                        |
|-----------------------------|-------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>3.33</b> | <b>m<sup>3</sup>/d</b> |
|                             | <b>0.04</b> | <b>l/s</b>             |

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3).

Considered percentage change from 2021 to 2032 = -7.56%

|                                                      |             |                        |
|------------------------------------------------------|-------------|------------------------|
| <b>Total Sewage Flow (ADWF) of Sub-catchment 2 =</b> | <b>3.33</b> | <b>m<sup>3</sup>/d</b> |
|                                                      | <b>0.04</b> | <b>l/s</b>             |

**Sewage discharge to FMH4038217**

### Sub-catchment 3

#### 3 Grandtech Centre

**Commercial**  
Total GFA of Building = 37500 m<sup>2</sup>

55.9% of GFA to Storage Use = 20963 m<sup>2</sup>

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                          |      |                               |
|------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                 | 0.4  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Storage Use = | 84   | persons                       |
| Global Unit Flow Factors =               | 0.18 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>15.12</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)

26.8% of GFA to Business Use = 10050 m<sup>2</sup>

|                                           |      |                               |
|-------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                  | 4.4  | person per 100m <sup>2</sup>  |
| Total No. of Employees for Business Use = | 443  | persons per 100m <sup>2</sup> |
| Global Unit Flow Factors =                | 0.08 | m <sup>3</sup> /employee/day  |

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>35.44</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).

4.2% of GFA to Manufacturing Use = 1575 m<sup>2</sup>

|                                                |      |                               |
|------------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                       | 3.3  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Manufacturing Use = | 52   | persons                       |
| Global Unit Flow Factors =                     | 0.53 | m <sup>3</sup> /employee/day  |

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>27.56</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).

8.6% of GFA to Other Use = 3225 m<sup>2</sup>

|                                        |      |                               |
|----------------------------------------|------|-------------------------------|
| Assumed Worker Density =               | 4.3  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Other Use = | 139  | persons                       |
| Global Unit Flow Factors =             | 0.28 | m <sup>3</sup> /employee/day  |

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>38.92</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)

|                                   |               |                        |
|-----------------------------------|---------------|------------------------|
| <b>Total Sewage flow (ADWF) =</b> | <b>108.19</b> | <b>m<sup>3</sup>/d</b> |
|                                   | <b>1.25</b>   | <b>l/s</b>             |

Considered percentage change from 2021 to 2032 = -7.56%

|                                                      |               |                        |
|------------------------------------------------------|---------------|------------------------|
| <b>Total Sewage Flow (ADWF) of Sub-catchment 3 =</b> | <b>108.19</b> | <b>m<sup>3</sup>/d</b> |
|                                                      | <b>1.25</b>   | <b>l/s</b>             |

**Sewage discharge to FMH4038218**



**Sub-catchment 4****4 Public Toilet at Shek Mun Playground**

|                            |      |                              |
|----------------------------|------|------------------------------|
| Toilet Users =             | 30   | persons                      |
| Global Unit Flow Factors = | 0.08 | m <sup>3</sup> /employee/day |

Assumption  
Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee)

|                             |             |                        |
|-----------------------------|-------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>2.22</b> | <b>m<sup>3</sup>/d</b> |
|                             | <b>0.03</b> | <b>l/s</b>             |

|                                                      |             |                        |
|------------------------------------------------------|-------------|------------------------|
| <b>Total Sewage Flow (ADWF) of Sub-catchment 4 =</b> | <b>2.22</b> | <b>m<sup>3</sup>/d</b> |
|                                                      | <b>0.03</b> | <b>l/s</b>             |

**Sewage discharge to FMH4038219**

**Sub-catchment 5****5A Topsail Plaza**

|                         |       |                  |
|-------------------------|-------|------------------|
| Average Floor Area =    | 35568 | ft. <sup>2</sup> |
| Floor Area =            | 3304  | m <sup>2</sup>   |
| Total No. of Floors =   | 15    |                  |
| Total GFA of Building = | 49566 | m <sup>2</sup>   |

According to website by Centaline Commercial

|                               |       |                |
|-------------------------------|-------|----------------|
| 55.9% of GFA to Storage Use = | 27707 | m <sup>2</sup> |
|-------------------------------|-------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                          |      |                               |
|------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                 | 0.4  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Storage Use = | 111  | persons                       |
| Global Unit Flow Factors =               | 0.18 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>19.98</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)

|                                |       |                |
|--------------------------------|-------|----------------|
| 26.8% of GFA to Business Use = | 13284 | m <sup>2</sup> |
|--------------------------------|-------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                           |      |                               |
|-------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                  | 4.4  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Business Use = | 585  | persons                       |
| Global Unit Flow Factors =                | 0.08 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>46.80</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).

|                                    |      |                |
|------------------------------------|------|----------------|
| 4.2% of GFA to Manufacturing Use = | 2082 | m <sup>2</sup> |
|------------------------------------|------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                                |      |                               |
|------------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                       | 3.3  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Manufacturing Use = | 69   | persons                       |
| Global Unit Flow Factors =                     | 0.53 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>36.57</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).

|                            |      |                |
|----------------------------|------|----------------|
| 8.6% of GFA to Other Use = | 4263 | m <sup>2</sup> |
|----------------------------|------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                        |      |                               |
|----------------------------------------|------|-------------------------------|
| Assumed Worker Density =               | 4.3  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Other Use = | 184  | persons                       |
| Global Unit Flow Factors =             | 0.28 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>51.52</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)

|                                   |               |                        |
|-----------------------------------|---------------|------------------------|
| <b>Total Sewage flow (ADWF) =</b> | <b>143.16</b> | <b>m<sup>3</sup>/d</b> |
|                                   | <b>1.66</b>   | <b>l/s</b>             |

Considered percentage change from 2021 to 2032 = -7.56%

**5B Delta House**

|                         |        |                  |
|-------------------------|--------|------------------|
| Total GFA of Building = | 343163 | ft. <sup>2</sup> |
| Total GFA of Building = | 31881  | m <sup>2</sup>   |

According to website by Propwiser Consultants Limited

|                               |       |                |
|-------------------------------|-------|----------------|
| 55.9% of GFA to Storage Use = | 17821 | m <sup>2</sup> |
|-------------------------------|-------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                          |      |                               |
|------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                 | 0.4  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Storage Use = | 72   | persons                       |
| Global Unit Flow Factors =               | 0.18 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>12.96</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)

|                                |      |                |
|--------------------------------|------|----------------|
| 26.8% of GFA to Business Use = | 8544 | m <sup>2</sup> |
|--------------------------------|------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                           |      |                               |
|-------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                  | 4.4  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Business Use = | 376  | persons                       |
| Global Unit Flow Factors =                | 0.08 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>30.08</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).

|                                    |      |                |
|------------------------------------|------|----------------|
| 4.2% of GFA to Manufacturing Use = | 1339 | m <sup>2</sup> |
|------------------------------------|------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                                |      |                               |
|------------------------------------------------|------|-------------------------------|
| Assumed Worker Density =                       | 3.3  | persons per 100m <sup>2</sup> |
| Total No. of Employees for Manufacturing Use = | 45   | persons                       |
| Global Unit Flow Factors =                     | 0.53 | m <sup>3</sup> /employee/day  |

According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m<sup>2</sup>.

|                             |              |                        |
|-----------------------------|--------------|------------------------|
| <b>Sewage flow (ADWF) =</b> | <b>23.85</b> | <b>m<sup>3</sup>/d</b> |
|-----------------------------|--------------|------------------------|

Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).

|                            |      |                |
|----------------------------|------|----------------|
| 8.6% of GFA to Other Use = | 2742 | m <sup>2</sup> |
|----------------------------|------|----------------|

According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16

|                                        |              |                               |                                                                                                                                                                     |
|----------------------------------------|--------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assumed Worker Density =               | 4.3          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> . |
| Total No. of Employees for Other Use = | 118          | persons                       |                                                                                                                                                                     |
| Global Unit Flow Factors =             | 0.28         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                     |
| <b>Sewage flow (ADWF) =</b>            | <b>33.04</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                     |
| <b>Total Sewage flow (ADWF) =</b>      | <b>92.38</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                     |
|                                        | <b>1.07</b>  | <b>l/s</b>                    | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                             |

#### 5C W Luxe

|                                                      |                   |                               |                                                                                                                                                                                           |
|------------------------------------------------------|-------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Floor Area =                                         | 7214              | ft. <sup>2</sup>              | According to website by Centaline Commercial                                                                                                                                              |
| Floor Area =                                         | 670               | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                                | 26                |                               |                                                                                                                                                                                           |
| Total GFA of Building =                              | 17425             | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =                        | 9740              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 0.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =             | 39                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.18              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>                          | <b>7.02</b>       | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                       | 4670              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =            | 206               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>                          | <b>16.48</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =                   | 732               | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =       | 25                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                          | <b>13.25</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                           | 1499              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =               | 65                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.28              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                          | <b>18.20</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>                    | <b>50.80</b>      | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                      | <b>0.59</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Total Sewage Flow (ADWF) of Sub-catchment 5 =</b> | <b>286.33</b>     | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
|                                                      | <b>3.31</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Sewage discharge to</b>                           | <b>FMH4038185</b> |                               |                                                                                                                                                                                           |

#### Sub-catchment 6

##### 6A Courtyard By Marriott Hong Kong Sha Tin

|                             |               |                               |                                                                                                                                                                    |
|-----------------------------|---------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total GFA of Building =     | 36400         | m <sup>2</sup>                | According to website by P&T Group                                                                                                                                  |
| Assumed Worker Density =    | 1.4           | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of hotel is 1.4 worker/ 100 m <sup>2</sup> . |
| Population =                | 510           | persons                       |                                                                                                                                                                    |
| Global Unit Flow Factors =  | 1.58          | m <sup>3</sup> /d per person  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J10).                                 |
| <b>Sewage flow (ADWF) =</b> | <b>744.30</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                    |
|                             | <b>8.61</b>   | <b>l/s</b>                    |                                                                                                                                                                    |

##### 6B New Trade Plaza Tower A

|                                           |              |                               |                                                                                                                                                                                           |
|-------------------------------------------|--------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Floor Area =                              | 12436        | ft. <sup>2</sup>              | According to website by Centaline Commercial                                                                                                                                              |
| Floor Area =                              | 1155         | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                     | 21           |                               |                                                                                                                                                                                           |
| Total GFA of Building =                   | 24262        | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =             | 13563        | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                  | 0.4          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =  | 55           | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                | 0.18         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>               | <b>9.90</b>  | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =            | 6502         | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                  | 4.4          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use = | 287          | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                | 0.08         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>               | <b>22.96</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |



|                                                |              |                               |                                                                                                                                                                                           |
|------------------------------------------------|--------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.2% of GFA to Manufacturing Use =             | 1019         | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 3.3          | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use = | 34           | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.53         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                    | <b>18.02</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                     | 2087         | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 4.3          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =         | 90           | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.28         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                    | <b>25.20</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>              | <b>70.33</b> | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                | <b>0.81</b>  | <b>l/s</b>                    |                                                                                                                                                                                           |

#### 6C New Trade Plaza Tower B

|                                                      |                   |                               |                                                                                                                                                                                           |
|------------------------------------------------------|-------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Floor Area =                                         | 12469             | ft. <sup>2</sup>              | According to website by Centaline Commercial                                                                                                                                              |
| Floor Area =                                         | 1158              | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                                | 22                |                               |                                                                                                                                                                                           |
| Total GFA of Building =                              | 25485             | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =                        | 14246             | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 0.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =             | 57                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.18              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>                          | <b>10.26</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                       | 6830              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =            | 301               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>                          | <b>24.08</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =                   | 1070              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =       | 36                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                          | <b>19.08</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                           | 2192              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =               | 95                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.28              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                          | <b>26.60</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>                    | <b>73.97</b>      | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                      | <b>0.86</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Total Sewage Flow (ADWF) of Sub-catchment 6 =</b> | <b>888.60</b>     | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
|                                                      | <b>10.28</b>      | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Sewage discharge to</b>                           | <b>FMH4038186</b> |                               |                                                                                                                                                                                           |

#### Sub-catchment 7 7 Li Fung Centre

|                                           |              |                               |                                                                                                                                                                                           |
|-------------------------------------------|--------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total GFA of Building =                   | 480000       | ft. <sup>2</sup>              | According to website by Johnson Stokes & Master (JSM)                                                                                                                                     |
| Total GFA of Building =                   | 44593        | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =             | 24928        | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                  | 0.4          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =  | 100          | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                | 0.18         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>               | <b>18.00</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =            | 11951        | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                  | 4.4          | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use = | 526          | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                | 0.08         | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>               | <b>42.08</b> | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |

|                                                      |                   |                               |                                                                                                                                                                                           |
|------------------------------------------------------|-------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.2% of GFA to Manufacturing Use =                   | 1873              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =       | 62                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                          | <b>32.86</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                           | 3835              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =               | 165               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.28              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                          | <b>46.20</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>                    | <b>128.62</b>     | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                      | <b>1.49</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Total Sewage Flow (ADWF) of Sub-catchment 7 =</b> | <b>128.62</b>     | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
|                                                      | <b>1.49</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Sewage discharge to</b>                           | <b>FMH4038188</b> |                               |                                                                                                                                                                                           |
| <b>Sub-catchment 8</b>                               |                   |                               |                                                                                                                                                                                           |
| <b>8 Shatin North Offtake And Piggling Station</b>   |                   |                               |                                                                                                                                                                                           |
| Total No. of Employees =                             | 10                | persons                       | Assumed 10 staffs                                                                                                                                                                         |
| Global Unit Flow Factors =                           | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J2).                                                         |
| <b>Sewage flow (ADWF) =</b>                          | <b>0.74</b>       | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                      | <b>0.01</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Total Sewage Flow (ADWF) of Sub-catchment 8 =</b> | <b>0.74</b>       | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
|                                                      | <b>0.01</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Sewage discharge to</b>                           | <b>FMH4038189</b> |                               |                                                                                                                                                                                           |
| <b>Sub-catchment 9</b>                               |                   |                               |                                                                                                                                                                                           |
| <b>9A Metropole Square</b>                           |                   |                               |                                                                                                                                                                                           |
| Total GFA of Building =                              | 440000            | ft. <sup>2</sup>              | According to website by Propwiser Consultants Limited                                                                                                                                     |
| Total GFA of Building =                              | 40877             | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =                        | 22850             | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 0.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =             | 92                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.18              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>                          | <b>16.56</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                       | 10955             | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =            | 483               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>                          | <b>38.64</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =                   | 1717              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =       | 57                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                          | <b>30.21</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                           | 3515              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                             | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =               | 152               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                           | 0.28              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                          | <b>42.56</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>                    | <b>118.30</b>     | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                      | <b>1.37</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>9B Corporation Park</b>                           |                   |                               |                                                                                                                                                                                           |
| Floor Area =                                         | 17000             | ft. <sup>2</sup>              | According to website by Sino Group                                                                                                                                                        |
| Floor Area =                                         | 1579              | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                                | 22                |                               |                                                                                                                                                                                           |
| Total GFA of Building =                              | 34746             | m <sup>2</sup>                |                                                                                                                                                                                           |



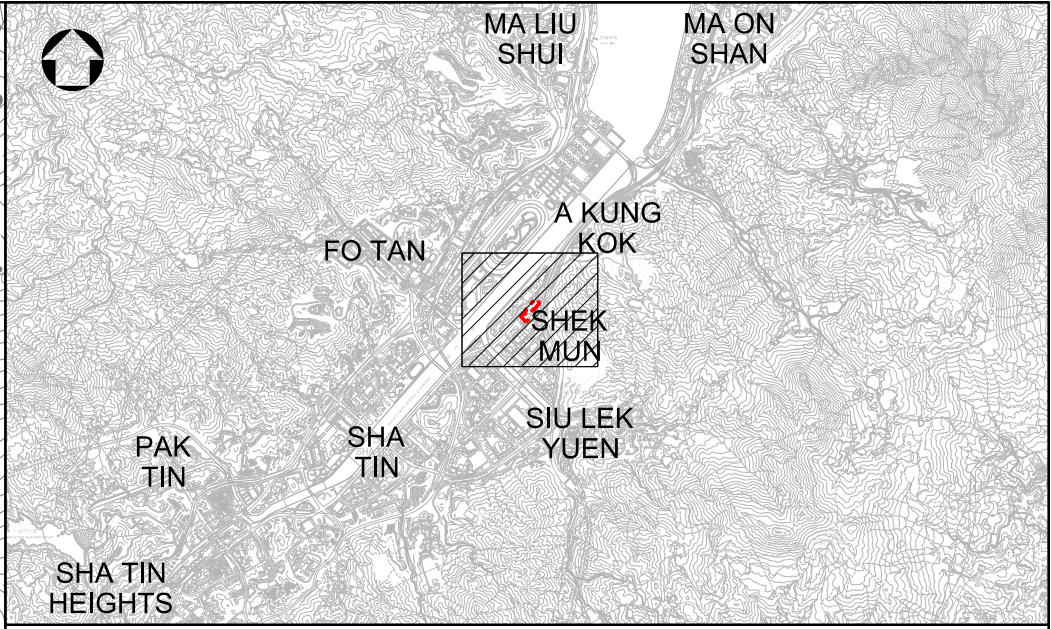
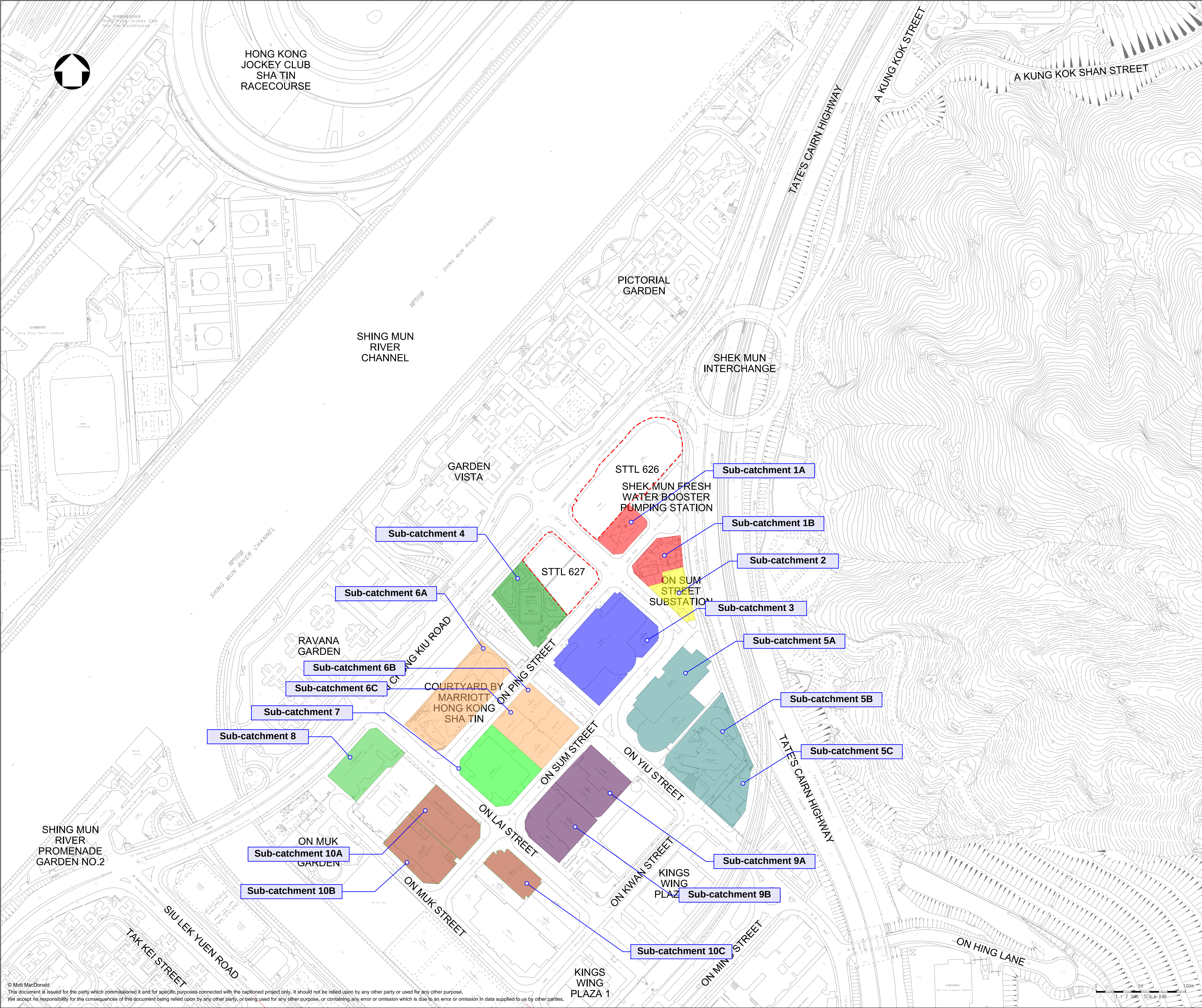
|                                                        |                   |                               |                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 55.9% of GFA to Storage Use =                          | 19423             | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 0.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =               | 78                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.18              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>                            | <b>14.04</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                         | 9312              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 4.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =              | 410               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>                            | <b>32.80</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =                     | 1459              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =         | 49                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                            | <b>25.97</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                             | 2988              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =                 | 129               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.28              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| <b>Sewage flow (ADWF) =</b>                            | <b>36.12</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| <b>Total Sewage flow (ADWF) =</b>                      | <b>100.69</b>     | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                        | <b>1.17</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Total Sewage Flow (ADWF) of Sub-catchment 9 =</b>   | <b>218.99</b>     | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
|                                                        | <b>2.53</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>Sewage discharge to</b>                             | <b>FMH4038190</b> |                               |                                                                                                                                                                                           |
| <b>Sub-catchment 10</b>                                |                   |                               |                                                                                                                                                                                           |
| <b>10A CLP Power Hong Kong Limited - Shatin Centre</b> |                   |                               |                                                                                                                                                                                           |
| Floor Area =                                           | 3398              | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                                  | 19                |                               | According to information provided in Open3Dhk                                                                                                                                             |
| Total GFA of Building =                                | 64562             | m <sup>2</sup>                |                                                                                                                                                                                           |
| Assumed Worker Density =                               | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of All Economic Activities is 4.3 worker/ 100 m <sup>2</sup> .      |
| Total No. of Employees for Storage Use =               | 2777              | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.33              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J2)                                                          |
| <b>Sewage flow (ADWF) =</b>                            | <b>847.13</b>     | <b>m<sup>3</sup>/d</b>        | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                        | <b>9.80</b>       | <b>l/s</b>                    |                                                                                                                                                                                           |
| <b>10B Ever Gain Building (No.3)</b>                   |                   |                               |                                                                                                                                                                                           |
| Floor Area =                                           | 2074              | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                                  | 15                |                               | According to information provided in Open3Dhk                                                                                                                                             |
| Total GFA of Building =                                | 31110             | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =                          | 17390             | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 0.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =               | 70                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.18              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| <b>Sewage flow (ADWF) =</b>                            | <b>12.60</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                         | 8337              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 4.4               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =              | 367               | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.08              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| <b>Sewage flow (ADWF) =</b>                            | <b>29.36</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =                     | 1307              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 3.3               | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use =         | 44                | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                             | 0.53              | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| <b>Sewage flow (ADWF) =</b>                            | <b>23.32</b>      | <b>m<sup>3</sup>/d</b>        |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                             | 2675              | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                               | 4.3               | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |

|                                                |            |                               |                                                                                                                                                                                           |
|------------------------------------------------|------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total No. of Employees for Other Use =         | 116        | persons                       | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| Global Unit Flow Factors =                     | 0.28       | m <sup>3</sup> /employee/day  |                                                                                                                                                                                           |
| Sewage flow (ADWF) =                           | 32.48      | m <sup>3</sup> /d             |                                                                                                                                                                                           |
| Total Sewage flow (ADWF) =                     | 90.37      | m <sup>3</sup> /d             | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                | 1.05       | l/s                           |                                                                                                                                                                                           |
| Commerce Centre                                |            |                               |                                                                                                                                                                                           |
| Floor Area =                                   | 17889      | ft. <sup>2</sup>              | According to website by Centaline Commercial                                                                                                                                              |
| Floor Area =                                   | 1662       | m <sup>2</sup>                |                                                                                                                                                                                           |
| Total No. of Floors =                          | 17         |                               |                                                                                                                                                                                           |
| Total GFA of Building =                        | 28253      | m <sup>2</sup>                |                                                                                                                                                                                           |
| 55.9% of GFA to Storage Use =                  | 15793      | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 0.4        | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Storage is 0.4 worker/ 100 m <sup>2</sup> .                      |
| Total No. of Employees for Storage Use =       | 64         | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.18       | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (J3)                                                          |
| Sewage flow (ADWF) =                           | 11.52      | m <sup>3</sup> /d             |                                                                                                                                                                                           |
| 26.8% of GFA to Business Use =                 | 7572       | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 4.4        | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of business is 4.4 worker/ 100 m <sup>2</sup> .                     |
| Total No. of Employees for Business Use =      | 334        | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.08       | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (Commercial Employee).                                        |
| Sewage flow (ADWF) =                           | 26.72      | m <sup>3</sup> /d             |                                                                                                                                                                                           |
| 4.2% of GFA to Manufacturing Use =             | 1187       | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 3.3        | person per 100m <sup>2</sup>  | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of manufacturing is 3.3 worker/ 100 m <sup>2</sup> .                |
| Total No. of Employees for Manufacturing Use = | 40         | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.53       | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-3 Industrial Activities (J1 Manufacturing - Sha Tin).           |
| Sewage flow (ADWF) =                           | 21.20      | m <sup>3</sup> /d             |                                                                                                                                                                                           |
| 8.6% of GFA to Other Use =                     | 2430       | m <sup>2</sup>                | According to Report on 2020 Area Assessments of Industrial Land in the Territory - Appendix 4 - Detailed assessments of the individual industrial areas zoned "OU(B)" - Shek Mun Site B16 |
| Assumed Worker Density =                       | 4.3        | persons per 100m <sup>2</sup> | According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of others is 4.3 worker/ 100 m <sup>2</sup> .                       |
| Total No. of Employees for Other Use =         | 105        | persons                       |                                                                                                                                                                                           |
| Global Unit Flow Factors =                     | 0.28       | m <sup>3</sup> /employee/day  | Refer to EPD Technical Paper - Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) - Table T-2 (b)                                                           |
| Sewage flow (ADWF) =                           | 29.40      | m <sup>3</sup> /d             |                                                                                                                                                                                           |
| Total Sewage flow (ADWF) =                     | 82.12      | m <sup>3</sup> /d             | Considered percentage change from 2021 to 2032 = -7.56%                                                                                                                                   |
|                                                | 0.95       | l/s                           |                                                                                                                                                                                           |
| Total Sewage Flow (ADWF) of Sub-catchment 10 = | 1019.62    | m <sup>3</sup> /d             |                                                                                                                                                                                           |
|                                                | 11.80      | l/s                           |                                                                                                                                                                                           |
| Sewage discharge to                            | FMH4038191 |                               |                                                                                                                                                                                           |



# D. Locations of Existing Catchments





KEY PLAN

LEGEND:

APPLICATION SITE BOUNDARY

|     |          |       |             |        |       |
|-----|----------|-------|-------------|--------|-------|
| P1  | JAN 2026 | TL    | FIRST ISSUE | VF     | DN    |
| Rev | Date     | Drawn | Description | Ch'k'd | App'd |

M

MOTT MACDONALD

Client

CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

CATCHMENT LOCATION PLAN

|             |        |              |    |
|-------------|--------|--------------|----|
| Designed    | TC     | Eng check    | VF |
| Drawn       | TL     | Coordination | VF |
| Dwg check   | AT     | Approved     | DN |
| Scale at A1 | Status | Rev          |    |
| 1:2000      | PRE    | P1           |    |

Drawing Number

APPENDIX D



## **E. Estimation of Sewage Flow for the Development**



## Appendix E - Estimation of Sewage Flow of the Development

| Development   | Discharge Manhole No. | Plot Ratio | Classification | Nos. of Units | Estimated Population <sup>(1)</sup> | Design Population (with 10% contingency) | Unit Flow Factor (m³/d) | Estimated Sewage Discharge (m³/d) | Average Discharge at Manhole (l/s) |
|---------------|-----------------------|------------|----------------|---------------|-------------------------------------|------------------------------------------|-------------------------|-----------------------------------|------------------------------------|
| Domestic Flow |                       |            |                |               |                                     |                                          |                         |                                   |                                    |
| STTL626       | Proposed TM01         | 6.0        | Private R2     | 1000          | 2800                                | 3080                                     | 0.27                    | 831.6                             | 9.63                               |
| STTL627       | Proposed TM02         |            |                | 410           | 1148                                | 1263                                     | 0.27                    | 341.0                             | 3.95                               |
|               |                       |            |                |               |                                     |                                          | Total                   | 1172.56                           | 13.57                              |

| Development                                                           | Discharge Manhole No. | GFA (m <sup>2</sup> ) | Classification                              | Nos. of Units | Estimated Population | Design Population (with 10% contingency) | Unit Flow Factor (m <sup>3</sup> /d) | Estimated Sewage Discharge (m <sup>3</sup> /d) | Average Discharge at Manhole (l/s) |
|-----------------------------------------------------------------------|-----------------------|-----------------------|---------------------------------------------|---------------|----------------------|------------------------------------------|--------------------------------------|------------------------------------------------|------------------------------------|
| <b>Non-Domestic Flow</b>                                              |                       |                       |                                             |               |                      |                                          |                                      |                                                |                                    |
| Retail at STTL626                                                     | Proposed TM01         | 2420                  | J4 - Wholesale & Retail                     | -             | 85 <sup>(2)</sup>    | 93                                       | 0.28 <sup>(3)</sup>                  | 26.1                                           | 0.30                               |
| Retail at STTL627                                                     | Proposed TM02         | 1230                  |                                             | -             | 43 <sup>(2)</sup>    | 47                                       | 0.28 <sup>(3)</sup>                  | 13.3                                           | 0.15                               |
| Integrated Children and Youth Services Centres (ICYSC) <sup>(4)</sup> | Proposed TM02         | 163                   | J11 - Community, Social & Personal Services | -             | 10 <sup>(5)</sup>    | 11                                       | 0.28 <sup>(6)</sup>                  | 3.1                                            | 0.04                               |
|                                                                       |                       |                       |                                             |               |                      |                                          | <b>Total</b>                         | <b>42.43</b>                                   | <b>0.49</b>                        |

Notes: -

1. According to 2021 Population Census, average domestic household size of 2.8 at Sha Tin District on 2021 is assumed for assessment.
2. According to Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by PlanD, the worker density of Retail is 3.5 worker/ 100 m<sup>2</sup> which is adopted for the assessment.
3. UFF of 0.28 considered J4 - Wholesale & Retail (0.20) & Commercial Employees (0.08).
4. Social welfare facilities are located at STTL627 Site.
5. Assumed 10 persons for Integrated Children and Youth Services Centres (ICYSC).
6. UFF of 0.28 considered J11 - Community, Social & Personal Services (0.20) & Commercial Employees (0.08).

## **F. Sewer Pipeline Information and Hydraulic Check (Existing Sewers)**



Appendix F - Sewer Pipeline Information and Hydraulic Check (Existing Sewers)

Peaking Factor based on Factor:   
Foulwater Drains Capacity Design Check (By Colebrook White Equation)

where V = velocity (m/s)

$$g = 9.81 \text{ (ms}^{-2}\text{)}$$

R = hydraulic radius (m)

s = Slope of pipe / hydraulic gradient

v = kinematic viscosity (m<sup>2</sup>/s)

Ks = pipe roughness (mm)

For circular pipes flowing full,

$$V' = -\sqrt{(8gDs)} \log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

For partially full pipes or pipes with non-circular cross-sections,

$$V' = -\sqrt{(32gRs)} \log\left(\frac{ks}{14.8R} + \frac{1.255v}{R\sqrt{(32gRs)}}\right)$$

Assumptions:

Pipe roughness for Existing Sewage Pipeline = 3 mm (refer to Sewerage Manual Part 1 - Table 5: for Slimed Concrete Pipes under Poor Condition)

| Population Range                                                               | Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage | Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| (a) For sewers:                                                                |                                                                                              |                                                                                         |
| <1,000                                                                         | 8                                                                                            | 6                                                                                       |
| 1,000 – 5,000                                                                  | 6                                                                                            | 5                                                                                       |
| 5,000 – 10,000                                                                 | 5                                                                                            | 4                                                                                       |
| 10,000 – 50,000                                                                | 4                                                                                            | 3                                                                                       |
| >50,000                                                                        | $\text{Max}\left(\frac{2.3}{N}, 2.4\right)$                                                  | $\text{Max}\left(\frac{6}{N^{0.75}}, 1.6\right)$                                        |
| (b) Sewerage Treatment Works, Preliminary Treatment Works and Pumping Stations |                                                                                              |                                                                                         |
| <10,000                                                                        | 4                                                                                            | 3                                                                                       |
| 10,000 – 25,000                                                                | 3.5                                                                                          | 2.5                                                                                     |
| 25,000 – 50,000                                                                | 3                                                                                            | 2                                                                                       |
| >50,000                                                                        | $\text{Max}\left(\frac{3.9}{N}, 2.4\right)$                                                  | $\text{Max}\left(\frac{2.6}{N}, 1.6\right)$                                             |

Hydraulic Calculation for Sewerage Pipeline

| From Mahole No. | To Manhole No. | Diameter, D (mm) | Length, L (m) | U.S. Invert Level (mPD) | D.S. Invert Level (mPD) | Slope of Pipe, s | Gradient 1 in | Pipe Full Flow Velocity, V (m/s) | Pipe Capacity, Q (l/s) | Catchment ID     | Average Discharge at Manhole (l/s) | Average Discharge from Upstream (l/s) | Catchment Inflow Factor (P <sub>CIF</sub> ) | Total Average Flow (l/s) | Contributing Population | Peaking Factor | Cumulative Peak Sewage Flow (l/s) | Utilization (%) | Flow Capacity Check |
|-----------------|----------------|------------------|---------------|-------------------------|-------------------------|------------------|---------------|----------------------------------|------------------------|------------------|------------------------------------|---------------------------------------|---------------------------------------------|--------------------------|-------------------------|----------------|-----------------------------------|-----------------|---------------------|
| Shek Mun        |                |                  |               |                         |                         |                  |               |                                  |                        |                  |                                    |                                       |                                             |                          |                         |                |                                   |                 |                     |
| FMH4038216      | FMH4038217     | 225              | 60.6          | 4.70                    | 4.33                    | 0.01             | 164           | 0.80                             | 31.79                  | Sub-Catchment 1  | 0.025                              | 0.0250                                | 1.15                                        | 0.0288                   | 9                       | 8.00           | 0.2303                            | 1%              | OK                  |
| FMH4038217      | FMH4038218     | 225              | 70.9          | 4.33                    | 3.00                    | 0.02             | 53            | 1.40                             | 55.78                  | Sub-Catchment 2  | 0.039                              | 0.0636                                | 1.15                                        | 0.0731                   | 23                      | 8.00           | 0.5847                            | 1%              | OK                  |
| FMH4038218      | FMH4038219     | 375              | 60.0          | 2.93                    | 2.75                    | 0.00             | 333           | 0.79                             | 87.14                  | Sub-Catchment 3  | 1.252                              | 1.3158                                | 1.15                                        | 1.5131                   | 484                     | 8.00           | 12.1051                           | 14%             | OK                  |
| FMH4038219      | FMH4038185     | 375              | 22.9          | 2.75                    | 2.57                    | 0.01             | 127           | 1.28                             | 141.27                 | Sub-Catchment 4  | 0.026                              | 1.3414                                | 1.15                                        | 1.5427                   | 494                     | 8.00           | 12.3413                           | 9%              | OK                  |
| FMH4038185      | FMH4038186     | 375              | 30.1          | 2.50                    | 2.29                    | 0.01             | 143           | 1.20                             | 132.98                 | Sub-Catchment 5  | 3.314                              | 4.6555                                | 1.15                                        | 5.3538                   | 1713                    | 6.00           | 32.1229                           | 24%             | OK                  |
| FMH4038186      | FMH4038187     | 375              | 42.9          | 2.29                    | 1.91                    | 0.01             | 113           | 1.36                             | 149.92                 | Sub-Catchment 6  | 10.285                             | 14.9402                               | 1.15                                        | 17.1812                  | 5498                    | 5.00           | 85.9060                           | 57%             | OK                  |
| FMH4038187      | FMH4038188     | 375              | 43.6          | 1.91                    | 1.42                    | 0.01             | 89            | 1.53                             | 168.89                 |                  |                                    | 14.9402                               | 1.15                                        | 17.1812                  | 5498                    | 5.00           | 85.9060                           | 51%             | OK                  |
| FMH4038188      | FMH4038189     | 375              | 32.1          | 1.42                    | 1.00                    | 0.01             | 77            | 1.65                             | 182.21                 | Sub-Catchment 7  | 1.489                              | 16.4288                               | 1.15                                        | 18.8932                  | 6046                    | 5.00           | 94.4658                           | 52%             | OK                  |
| FMH4038189      | FMH4038190     | 450              | 98.7          | 0.93                    | 0.16                    | 0.01             | 128           | 1.44                             | 228.60                 | Sub-Catchment 8  | 0.009                              | 16.4374                               | 1.15                                        | 18.9030                  | 6049                    | 5.00           | 94.5150                           | 41%             | OK                  |
| FMH4038190      | FMH4038191     | 450              | 56.9          | 0.04                    | -0.17                   | 0.00             | 271           | 0.99                             | 157.15                 | Sub-Catchment 9  | 2.535                              | 18.9720                               | 1.15                                        | 21.8178                  | 6982                    | 5.00           | 109.0890                          | 69%             | OK                  |
| FMH4038191      | FMH4038192     | 450              | 60.1          | -0.17                   | -0.68                   | 0.01             | 118           | 1.50                             | 238.51                 | Sub-Catchment 10 | 11.801                             | 30.7732                               | 1.15                                        | 35.3892                  | 11325                   | 4.00           | 141.5567                          | 59%             | OK                  |

## **G. Sewer Pipeline Information and Hydraulic Check (Existing Sewers with Development)**



**Appendix G - Sewer Pipeline Information and Hydraulic Check (Existing Sewers with Development)**

Foulwater Drains Capacity Design Check (By Colebrook White Equation) Peaking Factor based on Factor: Including Stormwater

where V = velocity (m/s)

$$g = 9.81 \text{ (ms}^{-2}\text{)}$$

R = hydraulic radius (m)

s = Slope of pipe / hydraulic gradient

v = kinematic viscosity (m<sup>2</sup>/s)

Ks = pipe roughness (mm)

For circular pipes flowing full,

$$V = -\sqrt{(8gDs)} \log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

For partially full pipes or pipes with non-circular cross-sections,

$$V' = -\sqrt{(32gRs)} \log\left(\frac{Ks}{14.8R} + \frac{1.255v}{R\sqrt{(32gRs)}}\right)$$

Assumptions:

Pipe roughness for Existing Sewage Pipeline = 3 mm (refer to Sewerage Manual Part 1 - Table 5: for Slimed Concrete Pipes under Poor Condition)

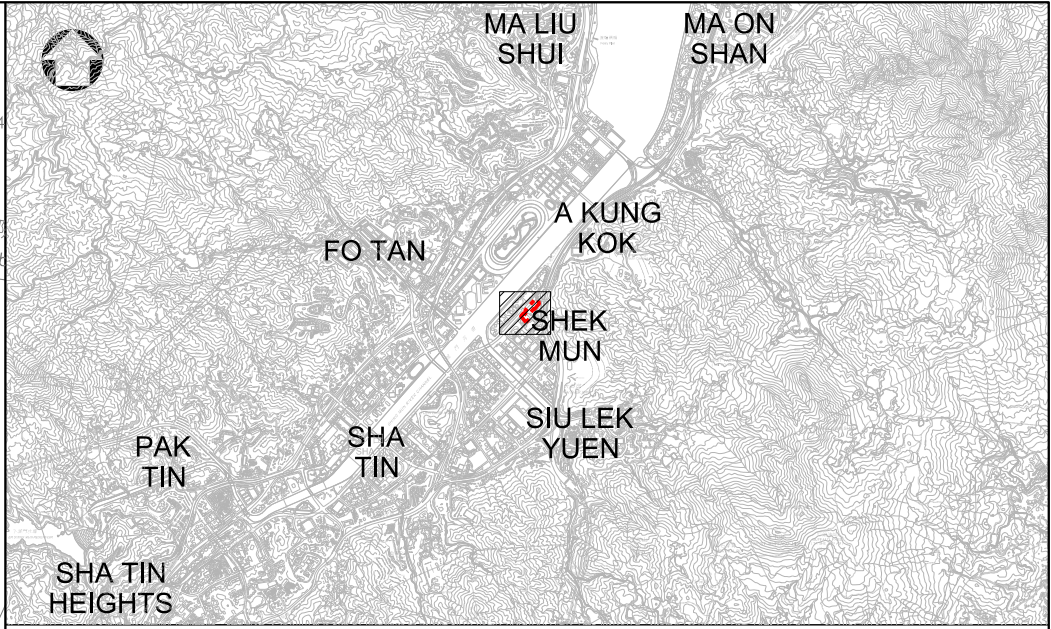
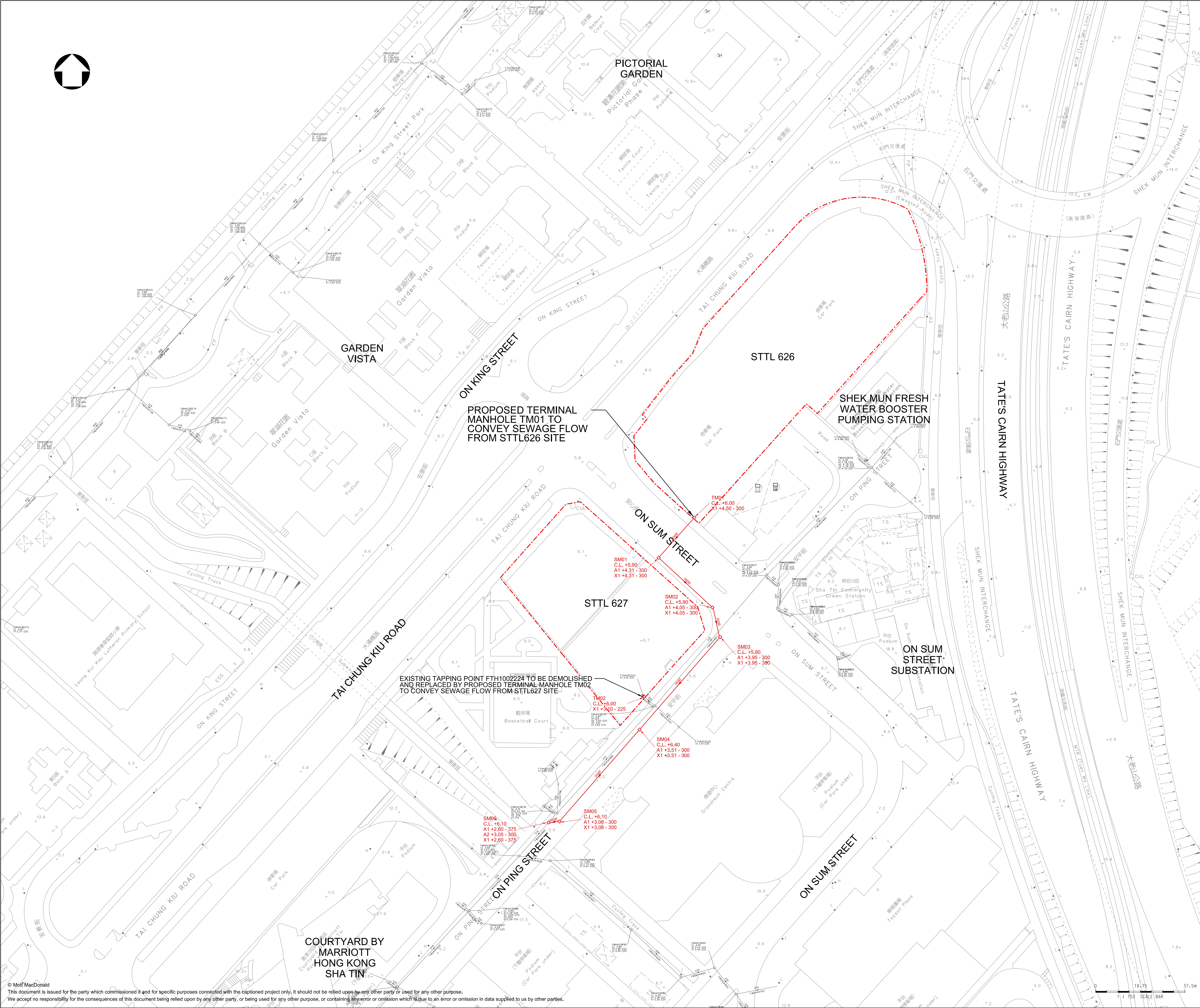
| Population Range                                                                | Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage | Peaking Factor (including stormwater allowance) for facility with new upstream sewerage |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| (a) For sewers:                                                                 |                                                                                              |                                                                                         |
| <1,000                                                                          | 8                                                                                            | 6                                                                                       |
| 1,000 – 5,000                                                                   | 6                                                                                            | 5                                                                                       |
| 5,000 – 10,000                                                                  | 5                                                                                            | 4                                                                                       |
| 10,000 – 50,000                                                                 | 4                                                                                            | 3                                                                                       |
| >50,000                                                                         | $\text{Max}\left(\frac{7.5}{N^{0.015}}, 2.4\right)$                                          | $\text{Max}\left(\frac{6}{N^{0.015}}, 1.8\right)$                                       |
| (b) Sewerage Treatment Works, Preliminary Treatment Works and Pumping Stations: |                                                                                              |                                                                                         |
| <10,000                                                                         | 4                                                                                            | 3                                                                                       |
| 10,000 – 25,000                                                                 | 3.5                                                                                          | 2.5                                                                                     |
| 25,000 – 50,000                                                                 | 3                                                                                            | 2                                                                                       |
| >50,000                                                                         | $\text{Max}\left(\frac{3.9}{N^{0.015}}, 2.4\right)$                                          | $\text{Max}\left(\frac{2.6}{N^{0.015}}, 1.8\right)$                                     |

**Hydraulic Calculation for Sewerage Pipeline**

| From Mahole No. | To Manhole No. | Diameter, D (mm) | Length, L (m) | U.S. Invert Level (mPD) | D.S. Invert Level (mPD) | Slope of Pipe, s | Gradient 1 in | Pipe Full Flow Velocity, V (m/s) | Pipe Capacity, Q (l/s) | Catchment ID              | Average Discharge at Manhole (l/s) | Average Discharge from Upstream (l/s) | Catchment Inflow Factor (P <sub>CIF</sub> ) | Total Average Flow (l/s) | Contributing Population | Peaking Factor | Cumulative Peak Sewage Flow (l/s) | Utilization (%) | Flow Capacity Check |
|-----------------|----------------|------------------|---------------|-------------------------|-------------------------|------------------|---------------|----------------------------------|------------------------|---------------------------|------------------------------------|---------------------------------------|---------------------------------------------|--------------------------|-------------------------|----------------|-----------------------------------|-----------------|---------------------|
| <b>Shek Mun</b> |                |                  |               |                         |                         |                  |               |                                  |                        |                           |                                    |                                       |                                             |                          |                         |                |                                   |                 |                     |
| FMH4038216      | FMH4038217     | 225              | 60.6          | 4.70                    | 4.33                    | 0.01             | 164           | 0.80                             | 31.79                  | Sub-Catchment 1 + STTL626 | 9.952                              | 9.9520                                | 1.15                                        | 11.4448                  | 3662                    | 6.00           | 68.6686                           | 216%            | NOT OK              |
| FMH4038217      | FMH4038218     | 225              | 70.9          | 4.33                    | 3.00                    | 0.02             | 53            | 1.40                             | 55.78                  | Sub-Catchment 2           | 0.039                              | 9.9905                                | 1.15                                        | 11.4891                  | 3677                    | 6.00           | 68.9344                           | 124%            | NOT OK              |
| FMH4038218      | FMH4038219     | 375              | 60.0          | 2.93                    | <b>2.75</b>             | 0.00             | 333           | 0.79                             | 87.14                  | Sub-Catchment 3 + STTL627 | 5.388                              | 15.3781                               | 1.15                                        | 17.6848                  | 5659                    | 5.00           | 88.4239                           | 101%            | NOT OK              |
| FMH4038219      | FMH4038185     | 375              | 22.9          | <b>2.75</b>             | 2.57                    | 0.01             | 127           | 1.28                             | 141.27                 | Sub-Catchment 4           | 0.026                              | 15.4038                               | 1.15                                        | 17.7143                  | 5669                    | 5.00           | 88.5716                           | 63%             | OK                  |
| FMH4038185      | FMH4038186     | 375              | 30.1          | 2.50                    | 2.29                    | 0.01             | 143           | 1.20                             | 132.98                 | Sub-Catchment 5           | 3.314                              | 18.7178                               | 1.15                                        | 21.5255                  | 6888                    | 5.00           | 107.6273                          | 81%             | OK                  |
| FMH4038186      | FMH4038187     | 375              | 42.9          | 2.29                    | 1.91                    | 0.01             | 113           | 1.36                             | 149.92                 | Sub-Catchment 6           | 10.285                             | 29.0025                               | 1.15                                        | 33.3528                  | 10673                   | 4.00           | 133.4114                          | 89%             | OK                  |
| FMH4038187      | FMH4038188     | 375              | 43.6          | 1.91                    | 1.42                    | 0.01             | 89            | 1.53                             | 168.89                 |                           |                                    | 29.0025                               | 1.15                                        | 33.3528                  | 10673                   | 4.00           | 133.4114                          | 79%             | OK                  |
| FMH4038188      | FMH4038189     | 375              | 32.1          | 1.42                    | 1.00                    | 0.01             | 77            | 1.65                             | 182.21                 | Sub-Catchment 7           | 1.489                              | 30.4911                               | 1.15                                        | 35.0648                  | 11221                   | 4.00           | 140.2592                          | 77%             | OK                  |
| FMH4038189      | FMH4038190     | 450              | 98.7          | 0.93                    | 0.16                    | 0.01             | 128           | 1.44                             | 228.60                 | Sub-Catchment 8           | 0.009                              | 30.4997                               | 1.15                                        | 35.0747                  | 11224                   | 4.00           | 140.2986                          | 61%             | OK                  |
| FMH4038190      | FMH4038191     | 450              | 54.0          | 0.04                    | -0.17                   | 0.00             | 248           | 1.03                             | 164.32                 | Sub-Catchment 9           | 2.535                              | 33.0343                               | 1.15                                        | 37.9895                  | 12157                   | 4.00           | 151.9578                          | 92%             | OK                  |
| FMH4038191      | FMH4038192     | 450              | 60.1          | -0.17                   | -0.68                   | 0.01             | 118           | 1.50                             | 238.51                 | Sub-Catchment 10          | 11.801                             | 44.8355                               | 1.15                                        | 51.5608                  | 16499                   | 4.00           | 206.2433                          | 86%             | OK                  |
| FTH4002224      | FMH4038218     | 225              | 5.5           | 3.10                    | 3.00                    | 0.02             | 55            | 1.38                             | 54.92                  | STTL627                   | 4.135                              | 4.1354                                | 1.00                                        | 4.1354                   | 1323                    | 6.00           | 24.8122                           | 45%             | OK                  |

## **H. Potential Sewerage Connection**





KEY PLAN

LEGEND:

APPLICATION SITE BOUNDARY

EXISTING SEWER

EXISTING MANHOLE

EXISTING TAPPING POINT

EXISTING TAPPING POINT TO BE DEMOLISHED

CONNECTION SEWER

CONNECTION MANHOLE

|     |          |       |             |        |       |
|-----|----------|-------|-------------|--------|-------|
| P1  | JAN 2026 | TL    | FIRST ISSUE | VF     | DN    |
| Rev | Date     | Drawn | Description | Ch'k'd | App'd |

M

MOTT

MACDONALD

Client

CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

POTENTIAL SEWERAGE CONNECTION

|             |        |              |    |
|-------------|--------|--------------|----|
| Designed    | TC     | Eng check    | VF |
| Drawn       | TL     | Coordination | VF |
| Dwg check   | AT     | Approved     | DN |
| Scale at A1 | Status | Rev          | P1 |

1:750

PRE

P1

Drawing Number

MMH/CE19/TO4/SIA/FIG/3.2



## **I. Sewer Pipeline Information and Hydraulic Check (Existing and Potential Sewers with Development)**

# Appendix I - Sewer Pipeline Information and Hydraulic Check (Existing and Potential Sewers with Development)

Foulwater Drains Capacity Design Check (By Colebrook White Equation)

where V = velocity (m/s)  
g = 9.81 (ms<sup>-2</sup>)  
R = hydraulic radius (m)  
s = Slope of pipe / hydraulic gradient  
v = kinematic viscosity (m<sup>2</sup>/s)  
Ks = pipe roughness (mm)

$$V = -\sqrt{(8gDs)} \log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

For partially full pipes or pipes with non-circular cross-sections,

$$V' = -\sqrt{(32gRs)} \log\left(\frac{Ks}{14.8R} + \frac{1.255v}{R\sqrt{(32gRs)}}\right)$$

Assumptions:

Pipe roughness for Existing Sewage Pipeline = 3 mm (refer to Sewerage Manual Part 1 - Table 5: for Slimed Concrete Pipes under Poor Condition)

| Population Range                                                              | Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage | Peaking Factor (including stormwater allowance) for facility with new upstream sewerage |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| (a) For sewers:                                                               |                                                                                              |                                                                                         |
| <1,000                                                                        | 8                                                                                            | 6                                                                                       |
| 1,000 - 5,000                                                                 | 6                                                                                            | 5                                                                                       |
| 5,000 - 10,000                                                                | 5                                                                                            | 4                                                                                       |
| 10,000 - 50,000                                                               | 4                                                                                            | 3                                                                                       |
| >50,000                                                                       | $\text{Max}\left(\frac{7.5}{N^{0.075}}, 2.4\right)$                                          | $\text{Max}\left(\frac{6}{N^{0.075}}, 1.8\right)$                                       |
| (b) Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations: |                                                                                              |                                                                                         |
| <10,000                                                                       | 4                                                                                            | 3                                                                                       |
| 10,000 - 25,000                                                               | 3.5                                                                                          | 2.5                                                                                     |
| 25,000 - 50,000                                                               | 3                                                                                            | 2                                                                                       |
| >50,000                                                                       | $\text{Max}\left(\frac{3.9}{N^{0.075}}, 2.4\right)$                                          | $\text{Max}\left(\frac{2.6}{N^{0.075}}, 1.8\right)$                                     |

## Hydraulic Calculation for Sewerage Pipeline

| From Mahole No.        | To Manhole No. | Diameter, D (mm) | Length, L (m) | U.S. Invert Level (mPD) | D.S. Invert Level (mPD) | Slope of Pipe, s | Gradient 1 in | Pipe Full Flow Velocity, V (m/s) | Pipe Capacity, Q (l/s) | Catchment ID              | Average Discharge at Manhole (l/s) | Average Discharge from Upstream (l/s) | Catchment Inflow Factor (P <sub>CIF</sub> ) | Total Average Flow (l/s) | Contributing Population | Peaking Factor | Cumulative Peak Sewage Flow (l/s) | Utilization (%) | Flow Capacity Check |
|------------------------|----------------|------------------|---------------|-------------------------|-------------------------|------------------|---------------|----------------------------------|------------------------|---------------------------|------------------------------------|---------------------------------------|---------------------------------------------|--------------------------|-------------------------|----------------|-----------------------------------|-----------------|---------------------|
| <b>Proposed Sewers</b> |                |                  |               |                         |                         |                  |               |                                  |                        |                           |                                    |                                       |                                             |                          |                         |                |                                   |                 |                     |
| TM01                   | SM01           | 300              | 21.5          | 4.50                    | 4.31                    | 0.01             | 115           | 1.16                             | 81.93                  | STTL626                   | 9.927                              | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| SM01                   | SM02           | 300              | 29.8          | 4.31                    | 4.05                    | 0.01             | 115           | 1.16                             | 81.93                  |                           |                                    | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| SM02                   | SM03           | 300              | 11.7          | 4.05                    | 3.95                    | 0.01             | 115           | 1.16                             | 81.93                  |                           |                                    | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| SM03                   | SM04           | 300              | 50.6          | 3.95                    | 3.51                    | 0.01             | 115           | 1.16                             | 81.93                  |                           |                                    | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| SM04                   | SM05           | 300              | 49.9          | 3.51                    | 3.08                    | 0.01             | 115           | 1.16                             | 81.93                  |                           |                                    | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| SM05                   | SM06           | 300              | 3.3           | 3.08                    | 3.05                    | 0.01             | 115           | 1.16                             | 81.93                  |                           |                                    | 9.9269                                | 1.00                                        | 9.9269                   | 3177                    | 6.00           | 59.5616                           | 73%             | OK                  |
| <b>Existing Sewers</b> |                |                  |               |                         |                         |                  |               |                                  |                        |                           |                                    |                                       |                                             |                          |                         |                |                                   |                 |                     |
| FMH4038216             | FMH4038217     | 225              | 60.6          | 4.70                    | 4.33                    | 0.01             | 164           | 0.80                             | 31.79                  | Sub-Catchment 1           | 0.025                              | 0.0250                                | 1.15                                        | 0.0288                   | 9                       | 8.00           | 0.2303                            | 1%              | OK                  |
| FMH4038217             | FMH4038218     | 225              | 70.9          | 4.33                    | 3.00                    | 0.02             | 53            | 1.40                             | 55.79                  | Sub-Catchment 2           | 0.039                              | 0.0636                                | 1.15                                        | 0.0731                   | 23                      | 8.00           | 0.5847                            | 1%              | OK                  |
| FMH4038218             | FMH4038219     | 375              | 60.0          | 2.93                    | 2.75                    | 0.00             | 333           | 0.79                             | 87.14                  | Sub-Catchment 3 + STTL627 | 5.388                              | 5.4511                                | 1.15                                        | 6.2688                   | 2006                    | 6.00           | 37.6128                           | 43%             | OK                  |
| FMH4038219             | SM06           | 375              | 16.8          | 2.75                    | 2.60                    | 0.01             | 108           | 1.39                             | 153.05                 | Sub-Catchment 4           | 0.026                              | 5.4768                                | 1.15                                        | 6.2983                   | 2015                    | 6.00           | 37.7900                           | 25%             | OK                  |
| SM06                   | FMH4038185     | 375              | 2.8           | 2.60                    | 2.57                    | 0.01             | 112           | 1.36                             | 150.55                 | STTL626                   | 9.927                              | 15.4038                               | 1.15                                        | 17.7143                  | 5669                    | 5.00           | 88.5716                           | 59%             | OK                  |
| FMH4038185             | FMH4038186     | 375              | 30.1          | 2.50                    | 2.29                    | 0.01             | 143           | 1.20                             | 132.98                 | Sub-Catchment 5           | 3.314                              | 18.7178                               | 1.15                                        | 21.5255                  | 6888                    | 5.00           | 107.6273                          | 81%             | OK                  |
| FMH4038186             | FMH4038187     | 375              | 42.9          | 2.29                    | 1.91                    | 0.01             | 113           | 1.36                             | 149.92                 | Sub-Catchment 6           | 10.285                             | 29.0025                               | 1.15                                        | 33.3528                  | 10673                   | 4.00           | 133.4114                          | 89%             | OK                  |
| FMH4038187             | FMH4038188     | 375              | 43.6          | 1.91                    | 1.42                    | 0.01             | 89            | 1.53                             | 168.89                 |                           |                                    | 29.0025                               | 1.15                                        | 33.3528                  | 10673                   | 4.00           | 133.4114                          | 79%             | OK                  |
| FMH4038188             | FMH4038189     | 375              | 32.1          | 1.42                    | 1.00                    | 0.01             | 77            | 1.65                             | 182.21                 | Sub-Catchment 7           | 1.489                              | 30.4911                               | 1.15                                        | 35.0648                  | 11221                   | 4.00           | 140.2592                          | 77%             | OK                  |
| FMH4038189             | FMH4038190     | 450              | 98.7          | 0.93                    | 0.16                    | 0.01             | 128           | 1.44                             | 228.60                 | Sub-Catchment 8           | 0.009                              | 30.4997                               | 1.15                                        | 35.0747                  | 11224                   | 4.00           | 140.2986                          | 61%             | OK                  |
| FMH4038190             | FMH4038191     | 450              | 54.0          | 0.04                    | -0.17                   | 0.00             | 248           | 1.03                             | 164.32                 | Sub-Catchment 9           | 2.535                              | 33.0343                               | 1.15                                        | 37.9895                  | 12157                   | 4.00           | 151.9578                          | 92%             | OK                  |
| FMH4038191             | FMH4038192     | 450              | 60.1          | -0.17                   | -0.68                   | 0.01             | 118           | 1.50                             | 238.51                 | Sub-Catchment 10          | 11.801                             | 44.8355                               | 1.15                                        | 51.5608                  | 16499                   | 4.00           | 206.2433                          | 86%             | OK                  |
| TM02                   | FMH4038218     | 225              | 5.5           | 3.10                    | 3.00                    | 0.02             | 55            | 1.38                             | 54.92                  | STTL627                   | 4.135                              | 4.1354                                | 1.00                                        | 4.1354                   | 1323                    | 6.00           | 24.8122                           | 45%             | OK                  |



