Prepared for

**Urban Renewal Authority**

Prepared by

**Ramboll Hong Kong Limited**

# TWO DEVELOPMENT SCHEMES - MING LUN STREET/ MA TAU KOK ROAD (KC-018) AND TO KWA WAN ROAD/ MA TAU KOK ROAD (KC-019)

# AIR VENTILATION ASSESSMENT (EXPERT EVALUATION)

| | |
|---|---|
| Date | **21 September 2022** |
| Prepared by | **Casey Chan**<br>**Environmental Consultant** |
| Signed |  |
| Approved by | **Calvin Chiu**<br>**Senior Manager** |
| Signed |  |
| Project Reference | **URAKCAA2EI01** |
| Document No. | **R8529_v1.2** |



Ramboll Hong Kong Limited

21/F, BEA Harbour View Centre
56 Gloucester Road, Wan Chai, Hong Kong

Tel: (852) 3465 2888
Fax: (852) 3465 2899
Email: hkinfo@ramboll.com

Q:\Projects\URAKCAA2EI01\04 Deliverables\02 AVA-EE Report\R8529_v1.2.docx

# CHAPTERS



# TABLES



# FIGURES

# APPENDICES

# 1. INTRODUCTION

## 1.1 Project Background

**1.2** Under a holistic planning approach, the URA has proposed two Development Schemes at Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) (the Schemes). URA's intention is to implement the 2 Schemes as 1 inclusive redevelopment. A comprehensive notional scheme is prepared considering the 2 connecting sites as one redevelopment.

1.2.1 This Air Ventilation Assessment (AVA) Study report – Expert Evaluation is prepared to support the two draft Development Scheme Plans (DSPs) submission to the Town Planning Board (TPB) under Section 25 of the Urban Renewal Authority Ordinance. This Report covers and supports both Schemes as one comprehensive redevelopment.

1.2.2 Ramboll Hong Kong Limited is commissioned by the Applicant to prepare an Air Ventilation Assessment (AVA) Study report – Expert Evaluation (EE) to support the DSP submission for KC-018 and KC-019 sites. Architectural drawings and technical information are provided by the project architect.

## 1.3 Objectives

1.3.1 This AVA-EE report has been prepared to evaluate if the proposed redevelopment would have any significant impact on the overall air ventilation performance of the assessment area by comparing the Proposed Scheme and OZP Conforming Baseline Scheme.

## 1.4 Application Site and its Environs

1.4.1 The Application Site (i.e. KC-018 site & KC-019 site) has a total gross site area of 20,189m$^2$ (with net site areas of 11,430 m$^2$ and 8,759 m$^2$ respectively). It is situated in Kowloon City area and about bounded by Hong Kong Housing Society's reserved site for Dedicated Rehousing Estate (DRE) to the north, To Kwa Wan Road to the west, existing Grand Waterfront (residential use) to the south and Ma Tau Kok waterfront to the east. **Figure 1** shows the location of the Application Site and its environs.

1.4.2 The Application Site currently is composed of ageing residential buildings (more than 60 years old) of 8 storeys with ground level shops within KC-018 site, and Newport Centre within KC-019 site.

1.4.3 Ma Tau Kok Gas Work North Plant is situated on the opposite side of To Kwa Wan Road. Developments further away include Cattle Depot Art Park and Artiest Village, To Kwa Wan Recreation Ground, a number of industrial/commercial buildings (e.g. Merit Industrial Centre, Kapok Industrial Building, New Lee Wah Centre) along To Kwa Wan Road, Wyler Gardens (residential uses) and a ferry pier.

## 1.5 The OZP Conforming Baseline Scheme

1.5.1 The KC-018 consists of 2 residential towers above podium level (+13.6 mPD) and has a maximum plot ratio of 6 (as recommended in DURF) and a maximum building height of 28 storeys (which is approximately +110 mPD for the main roof) under the OZP Conforming Baseline Scheme. A low-rise building (which is approximately +8.6 mPD) for the use of retails is located at the southeast of T2. The two residential towers within KC-018 (i.e. T1 and T2) are located with a 43m of separation. A 10m wide non-building area (NBA) is reserved between the Application Site and Grand Waterfront.

1.5.2 The KC-019 Site consists of 2 residential towers erected at grade and has a maximum plot ratio of 5 and a maximum building height of 19 storeys (which is approximately +65 mPD for the main roof) under the OZP Conforming Baseline Scheme. A low-rise

building (which is approximately +8.0 mPD) for the use of retails is located at the southeast of T2. The two residential towers within KC-019 (i.e. T1 and T2) has an L-shaped layout, with a low-rise building (which is approximately +8.0 mPD) for the use of retail development located at the southeast of T2. A 20m building setback of the residential towers from the southeast boundary of KC-019 site is proposed. A 10m wide of NBA is reserved within the Schemes.

1.5.3 An indicative MLP of the OZP Conforming Baseline Scheme as shown in **Appendix 1**.

## 1.6 Proposed Scheme

1.6.1 The Proposed Development at the Schemes consists of 4 residential towers (5AT1, 5AT2, 5BT1 and 5BT2) with the lowest 3 floors for retail/clubhouse/GIC (+18.6 mPD) and 31 domestic storeys above. There is a maximum BH (measured at the main roof of the tower) of +120 mPD.

1.6.2 The design of the Proposed Scheme has due consideration of the waterfront site nature and prevailing wind directions (to be discussed in subsequent chapter). Under the Proposed Development, the layout has provided building setbacks ranging from 2 to 20m from the northeast, southeast, southwest and northwest boundaries of the Schemes. The building towers are disposited and oriented to minimise wind blockage impact with respect to sea breeze from east to southeast direction which are prevailing annually. The towers of 5AT1 and 5AT2 are shifted closer to the southern boundary in order to create a wind corridor with better connection to Ma Tau Kok Road on the west to northwest side. A 20m building setback of the residential towers from the southeast boundaries of KC-018 and KC-019 are retained to serve as waterfront promenade.

1.6.3 Referring to the OZP, two 10m wide of NBAs within the "CDA' site, one abutting the existing "R(A)1" site to the south and another near the middle aligning with Ma Tau Kok Road, are maintained to enhance visual and physical permeability at the waterfront area, as well as to enhance ventilation. Both 10m wide NBA are reserved within the Schemes. In addition, the 2-storey retail belt along the eastern site boundaries as stated in the OZP will be retained.

1.6.4 The Master Layout Plan (MLP) and section of the Proposed Development are shown in **Appendix 2**.

# 2. SITE WIND AVAILABILITY

## 2.1 Site Wind Availability Data

RAMS

2.1.1 According to the Planning Department's website, a meso-scale Regional Atmospheric Modeling System (RAMS) was used to produce a simulated 10-year wind climate at the horizontal resolution of 0.5 km x 0.5 km covering the whole territory of Hong Kong. The simulated wind data represents the annual, winter and summer wind condition at various levels, i.e. 200 m, 300 m, and 500 m above terrain.

2.1.2 The RAMS data of the grid (X: 084, Y: 042) has been extracted from the Site Wind Availability Data of Planning Department's website.

2.1.3 Based on the wind roses with different heights (200, 300 or 500m) available, the 200m site wind availability data represents wind data that takes into account the topographical effect around the Application Site. Therefore, a lower level of wind roses at 200 m height is selected to study the prevailing wind condition as it represents the incoming wind to the Application Site and considers the influence on the prevailing winds by the surrounding topography.

2.1.4 According to the wind roses at 200m altitude, the annual prevailing wind directions for the Application Site are ENE, E and ESE; whereas the summer prevailing wind directions are E, SSW and SW.

2.1.5 **Figure 2a** shows the relevant wind roses diagrams representing the frequency and wind speed distribution at 200m height in annual and summer conditions. The wind frequency data is provided in **Table 2.1** below.

**Table 2.1 Summary of RAMS Data and Wind Direction at 200m**

| Wind Direction | Probability for Annual Condition (%) | Probability for Summer Condition (%) |
|---|---|---|
| N | 3.5% | 1.2% |
| NNE | 9.1% | 1.4% |
| NE | 6.1% | 1.3% |
| ENE | **12.2%** | 3.7% |
| E | **28.4%** | **11.6%** |
| ESE | **9.7%** | 10.3% |
| SE | 4.3% | 7.9% |
| SSE | 2.9% | 6.4% |
| S | 3.2% | 7.4% |
| SSW | 5.5% | **12.7%** |
| SW | 5.4% | **14.6%** |
| WSW | 3.7% | 10.2% |
| W | 2.7% | 6.2% |
| WNW | 1.3% | 2.5% |
| NW | 0.8% | 1.3% |
| NNW | 1.2% | 1.2% |

Note: Bolded characters highlighted in grey represent the selected prevailing wind directions for evaluation.

Simulated Site Wind Availability Data from Term Consultancy for Expert Evaluation on Ma Tau Kok Area

2.1.6 According to the wind availability data from the Term Consultancy for Provision of Advisory Services on Air Ventilation Assessment Submissions - Expert Evaluation on Ma Tau Kok Area", published by the Planning Department in March 2008 (referred as

Ma Tau Kok -EE), it stated that the annual wind of the study area is mainly from the NNE, E and ENE directions. The Summer wind is mainly coming from the E, ESE and SE directions. The relevant Site Wind Availability Data (SWAD) from Ma Tau Kok-EE is presented in **Figure 2b.**

2.1.7 Based on both sets of wind data, it is considered that the annual prevailing winds come from **NNE, ENE, E, and ESE directions**. While in summer condition, the prevailing winds mainly come from **E, ESE, SE, SW and SSW directions**.

## 2.2 Topography and Building Morphology

*Topography*

2.2.1 The Schemes is located at and adjacent to the waterfront and the topography is generally flat. Ho Man Tin Hill with the hill-top around +100mPD is located around 800m to the southwest of the Schemes.

2.2.2 In general, the Application Site is a waterfront site. The ground level at the waterfront area is about +3.6mPD. It is expected that east to southeast prevailing winds towards the Application Site is the least obstructed and wind availability from these directions are considered to be optimal.

*Building Morphology*

2.2.3 Based on checking by site visit for existing developments and the published information in Statutory Planning Portal under the Town Planning Board regarding planned / committed developments, the Schemes is surrounded by high- to medium-rise developments, e.g. the Committed Government, Institution or Community (G/IC) Site, and proposed building blocks in Dedicated Rehousing Estate at Ma Tau Kok to the northeast, Grand Waterfront to the south, and planned developments at Residential (Group (A) (R(A)) Site (max. building height +100mPD[1]) & G/IC Site (proposed building height +67.75mPD[2]) to the further northwest. **Figure 1** shows the planned/committed developments adjacent the Schemes. It is confirmed that all major noise barriers, elevated structure, planned and committed development in the surrounding, if any, have been taken into account.

2.2.4 The building height information of identified existing developments was extracted from Geo-Reference Database (BG1000) provided by Survey and Mapping Office/ Lands Department, and as shown in **Table 2.2** below. As higher building masses are concentrated to the south, southwest and northwest of the site, it is likely that annual prevailing wind availability will be lowered due to the existing building morphology.

2.2.5 There are some existing open areas or relatively low-rise buildings in the surrounding, i.e. Cattle Deport Artists Village and To Kwa Wan Recreation Ground to the southwest of the Schemes. In addition, to the further north-east and east of the Schemes across Sung Wong Toi Road, a large open space is planned in the Kai Tak Development Area.

**Table 2.2 Building Height of Surrounding Developments**

| Name of Development | Maximum Building Height mPD | Location from Application Site |
|---|---|---|
| Dedicated Rehousing Estate at Ma Tau Kok | ~100 | Northeast |
| Grand Waterfront | ~175 | Southeast |

[1] The maximum building height of the Proposed Redevelopment at the R(A) Site, which is partly vacant and partly occupied by the Kowloon Animal Management Centre was made reference to the building height restriction stated in MPC Paper No. 2/15.
[2] The proposed building height of the Proposed Redevelopment at the G/IC Site, which is currently occupied by the Hong Kong Society of the Blind Workshop and Hostel was made reference to the indicative layout & development parameters stated in MPC Paper No. 2/15.

| Name of Development | Maximum Building Height mPD | Location from Application Site |
|---|---|---|
| Proposed Commercial Building Application no. A/K22/3 | ~100 | Southeast |
| Planned Development at G/IC Site [2] | ~67.75 | Northwest |
| Planned Development at R(A) Site [1] | ~100 | Northwest |
| Ma Tau Kok Gas Work North Plant | ~14 to 36 | West |
| Proposed Comprehensive Residential and Commercial Development "CDA(2)" Application no. A/K10/256 & A/K10/259 | ~100 | Further Northwest |
| Proposed Comprehensive Residential and Commercial Development "CDA(3)" Application no. A/K10/265 | ~100 | Further Northwest |

## 2.3 Findings in Relevant Air Ventilation Studies

2.3.1 There are two relevant air ventilation studies completed in nearby area, i.e.

- "Term Consultancy for Provision of Advisory Services on Air Ventilation Assessment Submissions - Expert Evaluation on Ma Tau Kok Area", published by the Planning Department in March 2008; and
- Agreement No. CE 35/2006 (CE) Kai Tak Development Engineering Study Cum Design and Construction of Advance Works – Investigation, Design and Construction, Additional Services for Technical Study on Increasing the Development Density in Kai Tak, Air Ventilation Assessment – Initial Study" published by Civil Engineering Development Department in November 2014.

2.3.2 The following findings, which are relevant to the Application Site and its surrounding areas, are extracted below:

- Kowloon City Road (over 300m from the Schemes) is considered as main wind corridor in the Ma Tau Kok area under annual condition, where Sung Wong Toi Road, Mok Cheong Street, San Shan Road and Ma Tau Kok Road (adjacent to the Schemes) are considered as air paths in the area under summer condition;
- The street pattern of Ma Tau Kok Area is irregular and therefore result in relatively poor wind performance;
- The relatively taller buildings (e.g. Grand Waterfront) would induce wake area on the downwind sides; and
- Apart from east and south-easterly wind directions, other wind directions are sheltered by the surrounding existing building clusters.

## 2.4 Summary of Existing Site Wind Availability

2.4.1 According to the wind availability data, the annual wind directions of the area are easterlies.

2.4.2 From **Figure 2 (a & b)**, the wind probability from the E & ENE directions are dominant under both references and considered to be the dominant wind directions for the area under annual condition, particularly E wind. In addition, NNE and ESE wind are also dominant other than the E and ENE winds.

2.4.3 There is no high topography in the upwind surrounding area under ENE, E and ESE wind, thus it is considered that the potential blocking effect by the topography will not be significant.

2.4.4 For the NNE annual prevailing wind direction, there are some low- to mid-rise building structures and planned Dedicated Rehousing Estate at northeast side of the Schemes and therefore the wind blockage is considered as medium to high. To Kwa Wan Road

is considered as an air path in the area under the annual NNE condition. The presence of the future Kai Tak Development at the further upwind direction would slightly obstruct wind along To Kwa Wan Road to reach the Schemes and downwind areas including Grand Waterfront, San Ma Tau Street.

2.4.5 In summer condition, E wind is also prevailing under both references. In addition, ESE, SE, SSW and SW wind are also important. There is no high topography in the upwind surrounding area under E, ESE and SE wind, thus it is considered that the potential blocking effect by the topography will not be significant.

2.4.6 On the other hand, the building cluster near to the southwest of the Application Site and high-rise Grand Waterfront along San Ma Tau Street would obstruct the wind coming from the southwest quarter reaching the Application Site (i.e. under SSW and SW wind). Therefore, To Kwa Wan Road would serve as important air path under these summer prevailing wind directions.

2.4.7 As the Application Site is a waterfront site, the E, ESE and SE (annual and/or summer) prevailing winds towards the Application Site is least obstructed. Ma Tau Kok Road is considered an air path allowing sea breeze from these directions to inland area.

# 3. EXPERT EVALUATION OF AIR VENTIALTION PERFORMACE OF THE PROPOSED DEVELOPMENT

## 3.1 Important Pedestrian Areas

3.1.1 Important surrounding areas that the public would often access have been identified as the following:

- To Kwa Wan Recreation Ground;
- Ma Tau Kok Road;
- Mok Cheong Street;
- Cattle Depot Artist Village;
- Future Kai Tak Development;
- To Kwa Wan Road;
- Ferry Pier and Public Transport Terminus; and
- San Ma Tau Street.

## 3.2 Evaluation of Merit/Demerit of Design Features of the Proposed Scheme

*Air corridors/ Air paths*

3.2.1 **Figure 3** and **Figure 4** illustrate the prevailing wind from annual and summer wind directions for the OZP Conforming Baseline Scheme. The prevailing wind from annual and summer wind directions are illustrated in **Figure 5** and **Figure 6** for the Proposed Scheme respectively.

3.2.2 Under both Schemes, NE-SW oriented To Kwa Wan Road and SE-NW oriented Ma Tau Kok Road and San Shan Road (together with San Ma Tau Street) are major wind corridors nearby the Schemes. San Shan Road is separated from the Subject Site so that it is least affected by the proposed development. The building separation from To Kwa Wan Road is similar for both schemes. However, the proposed widened To Kwa Wan Road under the Proposed Scheme should further enhance the ventilation in the area. Regarding Ma Tau Kok Road, both schemes provide a 10m non-building area.

3.2.3 Under the OZP Conforming Baseline Scheme, while there are setback distances (around 5m to 20m) from the southeast and northwest sides of site boundaries. In addition, there are two 10m building setbacks located along the southwest side of the boundary and within the Site. It will act as air paths to allow wind penetration.

3.2.4 Under the Proposed Scheme, two high-rise towers (5AT1 and 5AT2) at KC-018 are located close to the southern boundary. Moreover, 5AT2 is of narrow frontage facing waterfront to vacate more area on the northern side with good connection to Ma Tau Kok Road, which facilitate more E, ESE and SE wind flow through the Site and towards the downward areas (e.g. the section of Ma Tau Kok Road to the west of To Kwa Wan Road).

3.2.5 For KC-019 Site, two high-rise towers (5BT1 and 5BT2) are designed, elongated and in parallel to the sea breeze direction (from ESE) under the Proposed Scheme. They are located relatively close to the northeastern boundary to vacate more area on the southwestern side with good connection to Ma Tau Kok Road, which also facilitate more E, ESE and SE wind flow through the Site and towards the downward areas (e.g. the section of Ma Tau Kok Road on the opposite side of To Kwa Wan Road).

3.2.6 Moreover, large building separation (not less than 25m) at 5AT1/5BT1 and 5AT2/5BT2 of the Schemes will be provided when compared to the OZP Conforming Baseline

Scheme, it would further improve wind connection between the area at the waterfront, the Schemes and downwind areas.

3.2.7 In addition, a 20m building setback along southeast boundary of the Application Site is provided under both schemes. This waterfront promenade also serves as an air path for improving pedestrian ventilation performance.

*Building Disposition*

3.2.8 Under the OZP Conforming Baseline Scheme, the building disposition of two T2 of the KC-018 and KC-019 are perpendicular to the sea breeze and would block more portion of E/ESE/SE wind flow to the Application Site and its surrounding areas. It is anticipated that there will be slightly lower wind availability to the downstream areas of the Site, including Ma Tau Kok Gas Works North Plant.

3.2.9 However, building separations (about 24m at KC-019 and 43m at KC-018) between residential blocks are proposed to be incorporated into the building design under the OZP Conforming Baseline Scheme to allow annual prevailing NNE wind penetration in principle. However, it is noted that another planned development (Dedicated Housing Estate at Ma Tau Kok elevated up to 100mPD) to the immediate north of the Application Site is of narrower gap (11m gap above 21.4mPD). The gap is also slightly block by another tower of the same development on northern side. It will restricting wind flow and reduce the effectiveness of the 24m and 43m gap.

3.2.10 Under the Proposed Scheme, the building disposition of high-rise 5AT1 and 5AT2 located close to the southern boundary and 5BT1 and 5BT2 located close to the northeast boundary, resulting in more open spaces within the Application Site. It would facilitate more E/ESE/SE wind flow through the proposed development and further penetrates surrounding areas when compared to the OZP Conforming Baseline Scheme. In addition, there are provision of building setback (not less than 5m) along the northeast side of the boundary, more portion of E/ESE/SE will flow through the Site and towards downwards areas. Moreover, building separation is provided between residential blocks with respect to NNE wind direction. As NNE wind is mostly blocked by planned development on upwind direction, the increased blockage impact due to smaller building gap may not be significant.

*Building Height*

3.2.11 Under the Proposed Scheme, the building heights for KC- 18 and KC-019 under the OZP Conforming Baseline Scheme should be 110mPD and 65mPD respectively and hence, the maximum building height under proposed scheme would be similar to that of KC-018 under the OZP Conforming Baseline Scheme and considerably higher when for KC-019. However, as for typical urbanised area, air ventilation usually relies on availability of open space and air corridor at pedestrian level as well as low-podium design. The possible impact due to higher building height at KC-019 can be offset by other good design features.

## 3.3 Directional Analysis of the development

3.3.1 As discussed in Section 2.1 & 2.2, winds from NNE, ENE, E, and ESE direction are prevailing annually whereas winds from E, ESE, SE, SSW and SW are dominant in summer.

E, ESE and SE Winds

3.3.2 Under E, ESE & SE winds, the proposed development of the Schemes would obstruct winds from reaching the downstream areas such as Ma Tau Kok Road to the west of To Kwa Wan Road, Ma Tau Kok Gas Work North Plant and Cattle Depot Art Park and Artiest Village. The decline of wind environment at the downstream areas would be expected at immediate downwind location. However, the optimised Proposed Scheme

and the OZP Conforming Baseline Scheme already minimised potential blockage under these wind directions with narrow frontage perpendicular to these directions.

3.3.3 An approximately 5m to 10m building setbacks along the northeast and southwest site boundary are proposed within the Schemes in order to alleviate any possible air ventilation impacts from the Development on the surrounding areas by increasing the wind penetration of the Schemes. In addition, another 10m of non-building area is reserved within the Schemes in connection with Ma Tau Kok Road. It would facilitate E, ESE and SE wind flow along this building separation and reach the Schemes and its surroundings. In other words, wind can come from and flow around both sides of the development to inland area so that the effective wake area will be minimised.

3.3.4 As shown **Figure 6**, building setbacks is provided along northeast side of the boundary under Proposed Scheme and could enhance E, ESE and SE flow through this building setback distance and reach the Schemes and its surrounding when compared to the OZP Conforming Baseline Scheme. In addition, there are provisions of building separation (not less than 25m) at 5AT1/5BT1 and 5AT2/5BT2, more wind from E/ESE/SE directions can flow through the Site and towards its surrounding areas. Hence the wind blockage effect with respect to sea breeze could be significantly reduced when compared to the OZP Conforming Baseline Scheme.

ENE Wind

3.3.5 Similar to E/ESE/SE wind, ENE wind will more likely come and reach the Application Site from sea side. However, roads like Ma Tau Kok Road and San Shan Road are not oriented with ENE wind so that less wind is expected to be able to penetrate through these roads. All in all, the widened building separation within the Site under the Proposed Scheme can welcome more ENE wind.

NNE Wind

3.3.6 Under NNE prevailing winds, the Dedicated Housing Estate at Ma Tau Kok (+100mPD) and future Kai Tak Development are expected to impose wind blockage impacts on the Application Site and its surrounding areas under both Schemes. It is anticipated that there will be lower wind availability in the Proposed Development.

3.3.7 The Dedicated Housing Estate at Ma Tau Kok provides a gap of 11m width above +21.4mPD but also shielded by another block of the same development. In the Proposed Scheme for KC-019 site, building separations between two residential towers is provided. These gaps are orienting with NNE wind. Some portion of NNE wind may flow through Dedicated Housing Estate at Ma Tau Kok, then KC-019 site and eventually to the KC-018 site. With the already limited NNE wind flow to the Application Site, the impact of the proposed development would further block the NNE/ENE wind from reaching its downwind area (Grand Waterfront). Slight reduction of wind availability at the downstream areas would be expected.

SW and SSW Winds

3.3.8 Under SW and SSW wind directions, the wind environment to the Schemes will be limited due to the presence of existing medium to high- rise development to the southwest of the Schemes. To Kwa Wan Road acts as SW and SSW wind corridor. The existing high-rise Grand Waterfront obstruct wind flow to the Schemes and its downstream areas. With the already limited SSW and SW wind flow to the Schemes and further downwind area, there will not be any significant difference among both schemes.

## 3.4 Summary of Relative Air Ventilation Performance

3.4.1 The air ventilation performance of the OZP Conforming Baseline Scheme and the Proposed Scheme has been assessed. Both Schemes consist of two building blocks at

podium level. The Proposed Scheme has been provided additional building setbacks along southeast side of the Schemes.

3.4.2 Under the Proposed Scheme, there are optimised regarding disposition and orientation, and provided additional building setbacks from the identified air corridors for prevailing wind penetration and create additional air corridor between the Schemes and Grand Waterfront which can allow more sea breeze (prevailing E/ESE/SE wind) penetrating to inland area.

3.4.3 To conclude, with good design measures to minimise frontage, etc, the Proposed Scheme is considered unlikely to impose adverse impacts on the surrounding areas in air ventilation perspective when compared to the OZP Conforming Baseline Scheme. Building dispositions and building/podium setbacks and separations incorporated into proposed development should also be regarded as good design measures.

# 4. CONCLUSION

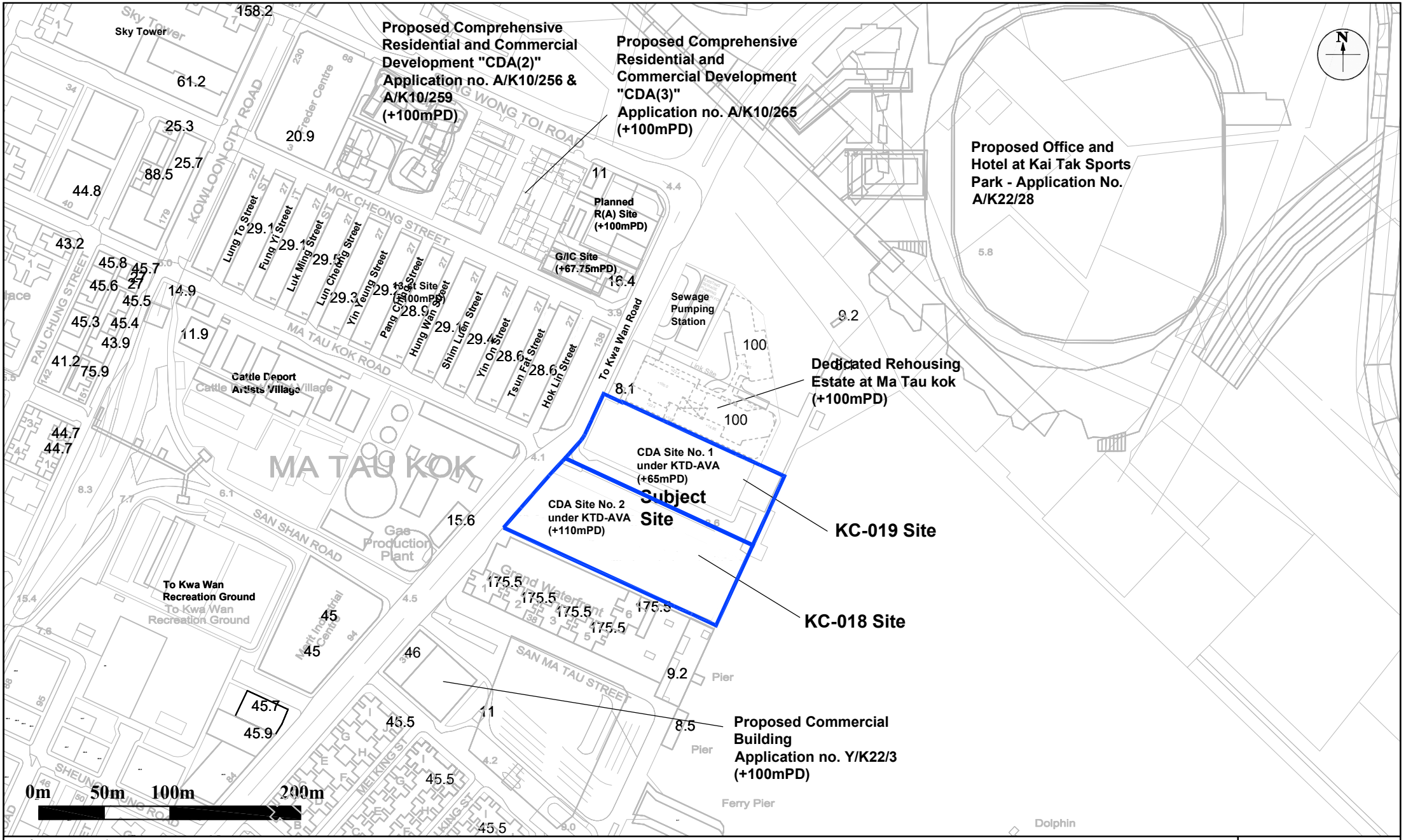
4.1.1 A qualitative assessment of the wind performance of the proposed residential development at KC-018 and KC-019 sites has been carried out.

4.1.2 According to the findings of this AVA-EE, the annual prevailing wind comes from NNE, ENE, E and ESE directions while the summer prevailing wind comes from E, ESE, SE, SSW and SW directions.

4.1.3 After considering the potential air ventilation impacts of the Schemes, the layout of the Proposed Development has incorporated design measures to enhance its air ventilation performance. It is considered that the Proposed Development would not have any significant adverse impact on the surrounding environment.

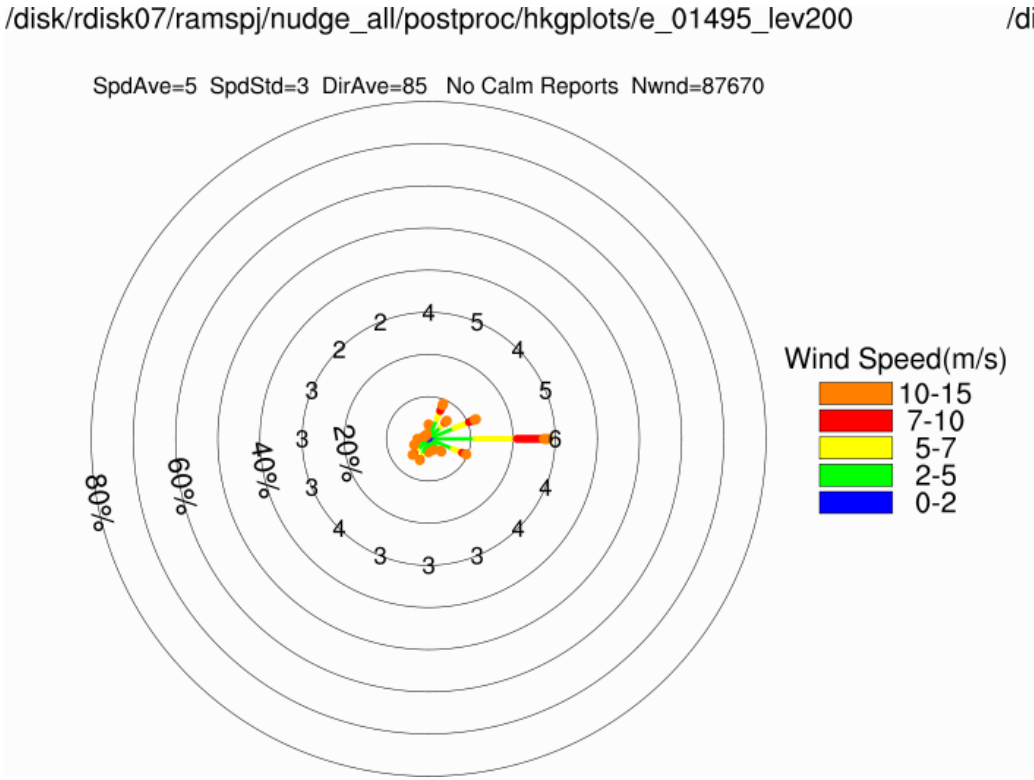
4.1.4 The Proposed Scheme has incorporated effective mitigation measures such as reduced frontage towards the waterfront, additional setbacks along the northeast/southwest side and from waterfront. Building dispositions and building/podium setbacks and separations incorporated into proposed development should also be regarded as good design measures. Therefore, the Proposed Scheme would unlikely impose adverse impacts on the surrounding sites from air ventilation perspective as compared with the OZP Conforming Baseline Scheme.

**Figures**

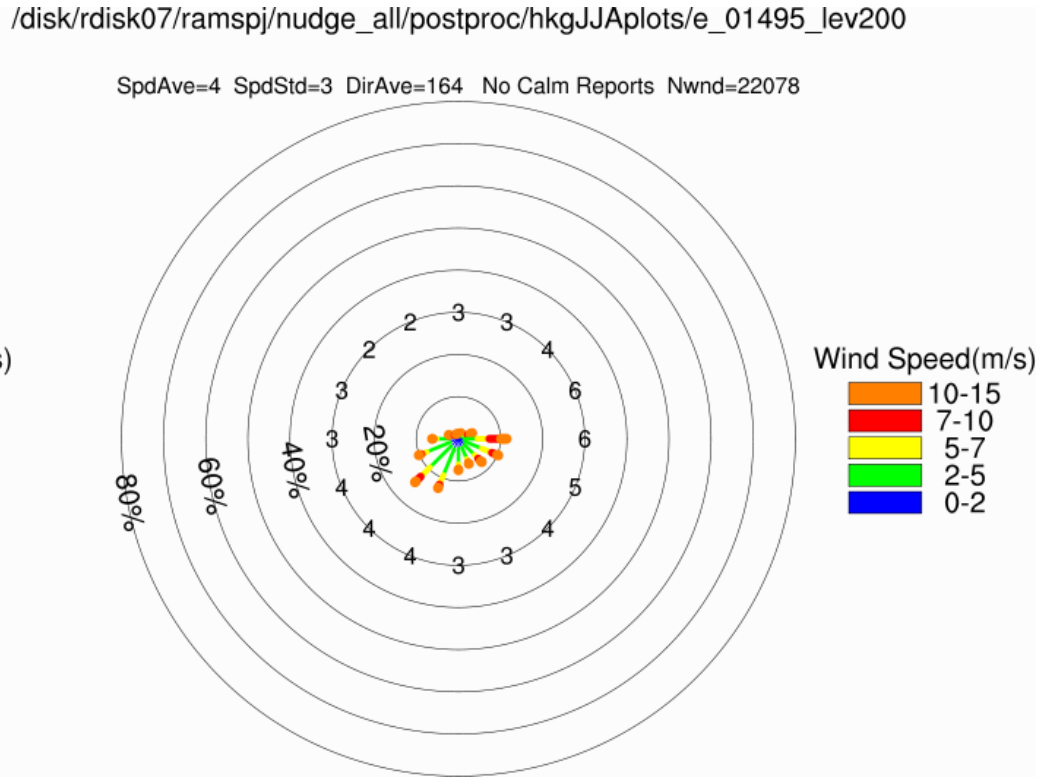



| | |
|---|---|
| **Figure:** 1 | RAMBOLL |
| **Title:** Location of Subject Site and Its Environs | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Jul 2022 |

Q:\Projects\URAKCAA2EI01\04 Deliverables\02 AVA-EE Report\01 Figures\R8529_v1.2\Fig1.dwg

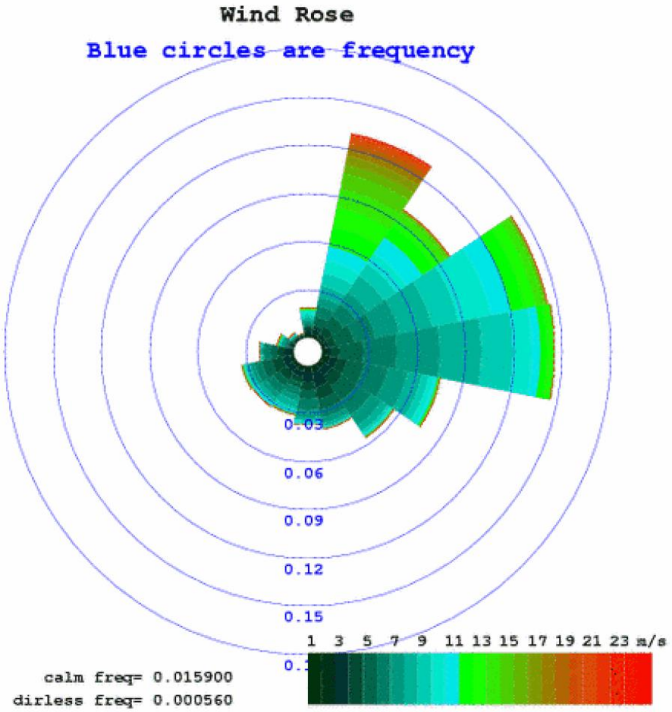



Annual Wind

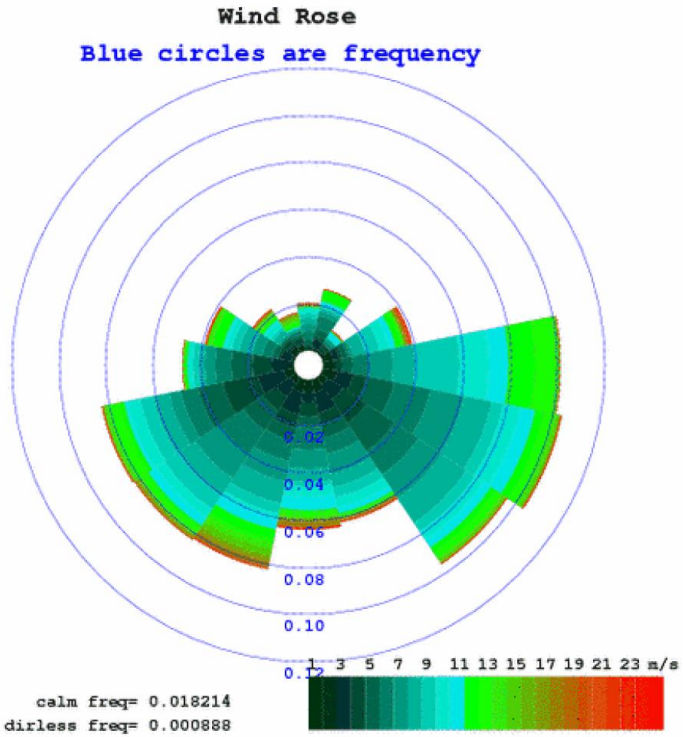



Summer Wind

| | |
|---|---|
| **Figure:** 2a | RAMBOLL |
| **Title:** Windrose Diagram representing V∞ of the Area under Concern at 200m above ground (X:084, Y:042) | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Jul 2022 |

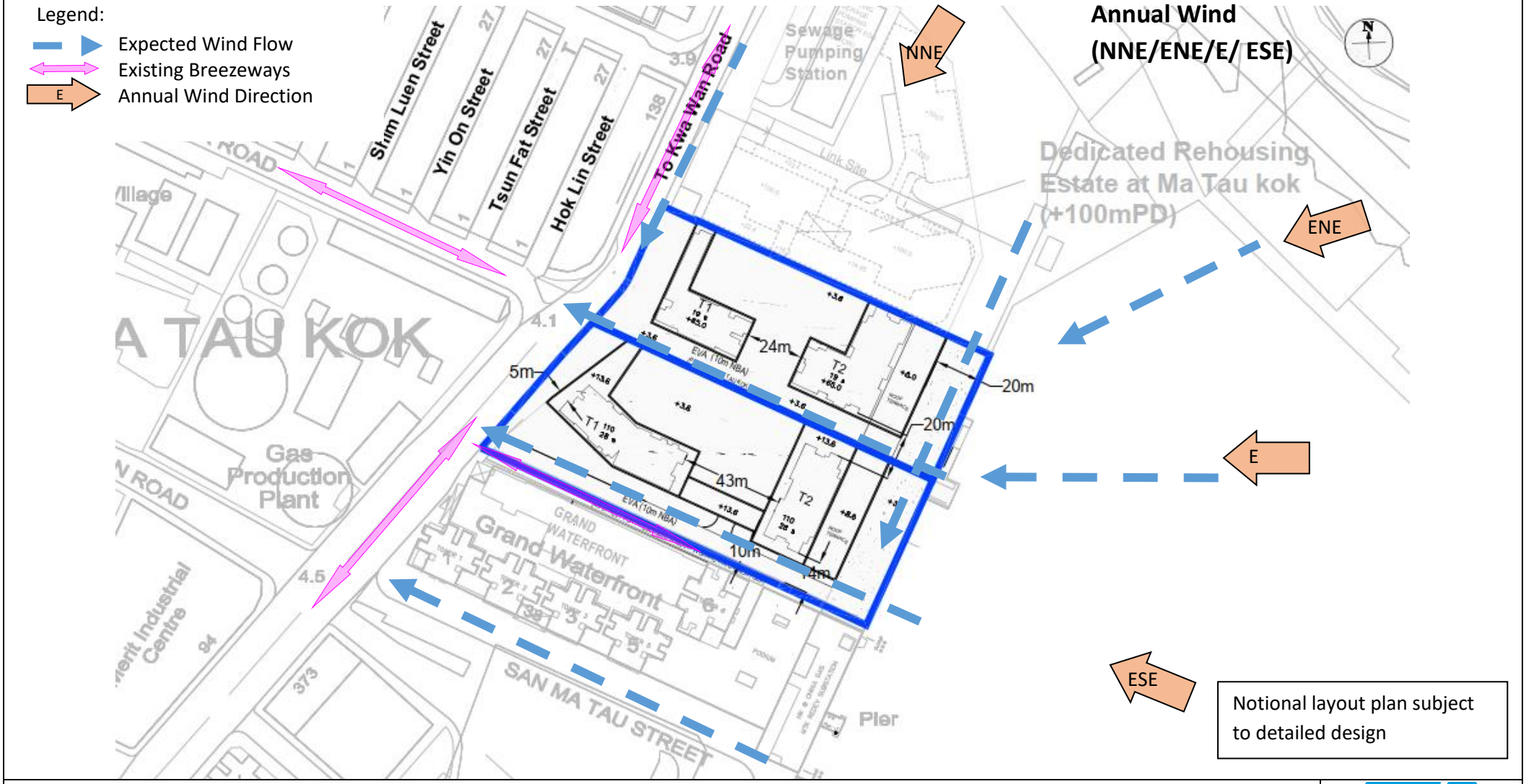



Annual Windrose: 230m



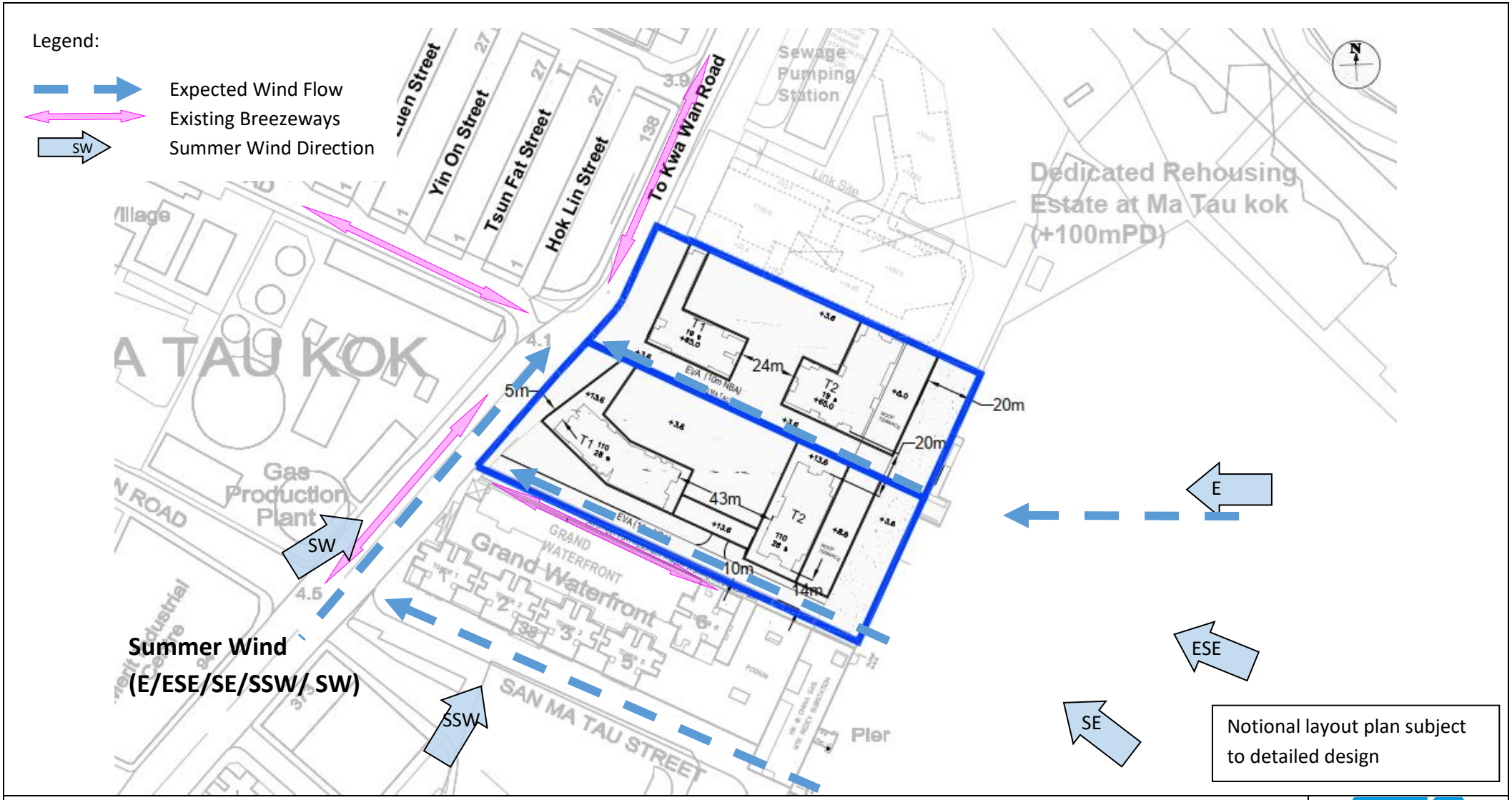

Summer Windrose: 230m

| | | |
|---|---|---|
| **Figure:** | 2b | RAMBOLL |
| **Title:** | Term Consultancy for Provision of Advisory Services on Air Ventilation Assessment Submissions - Expert Evaluation on Ma Tau Kok Area at 230m | Drawn by: CC<br>Checked by: CC |
| **Project:** | Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Jul 2022 |

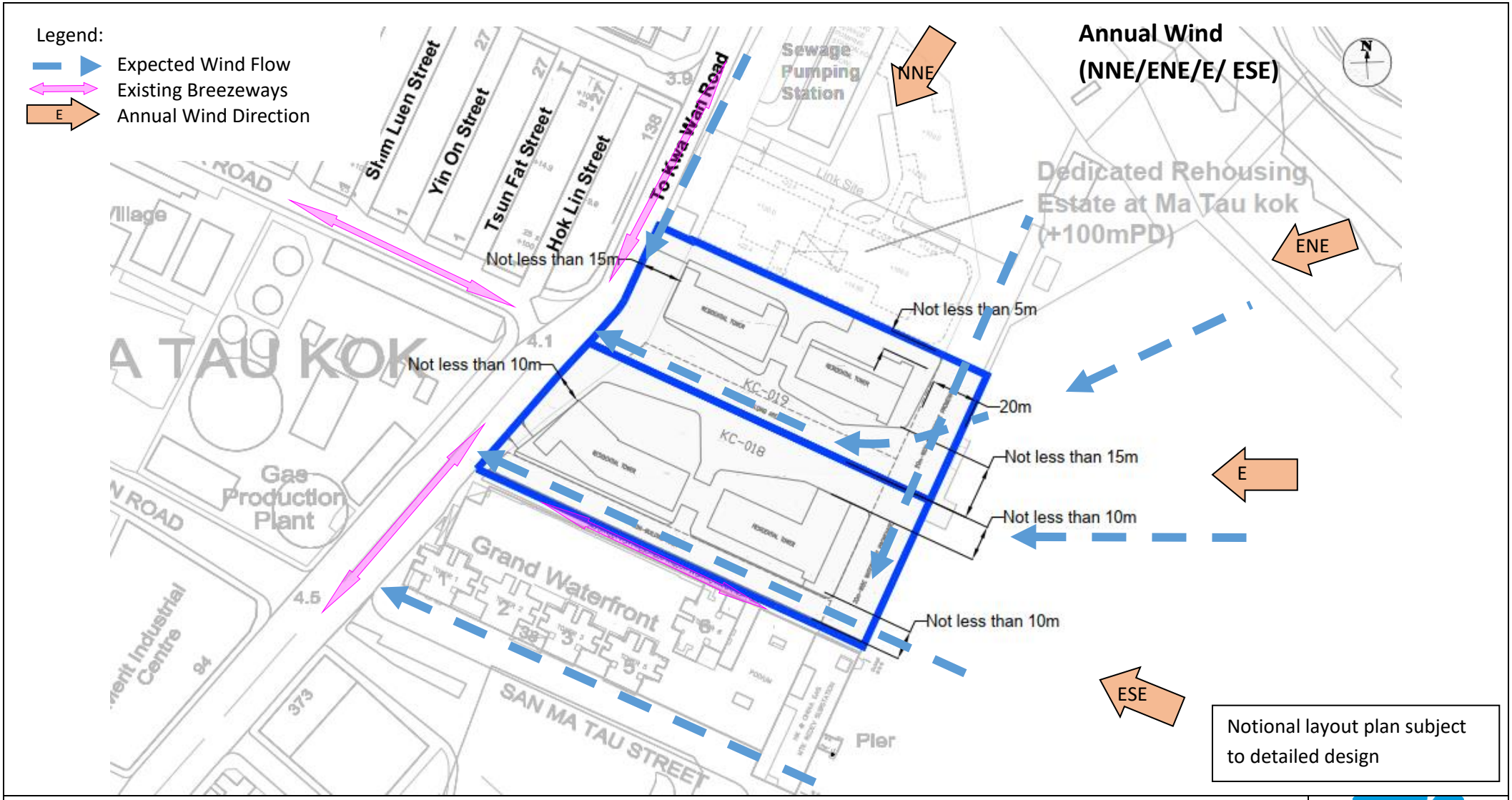



| | |
|---|---|
| **Figure:** 3 | RAMBOLL |
| **Title:** Illustration of Wind Flow from Annual Wind Directions for OZP Conforming Baseline Scheme | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Jul 2022 |

Q:\Projects\URAKCAA2EI01\04 Deliverables\02 AVA-EE Report\01 Figures\R8529_v1.2\Fig3_4.docx

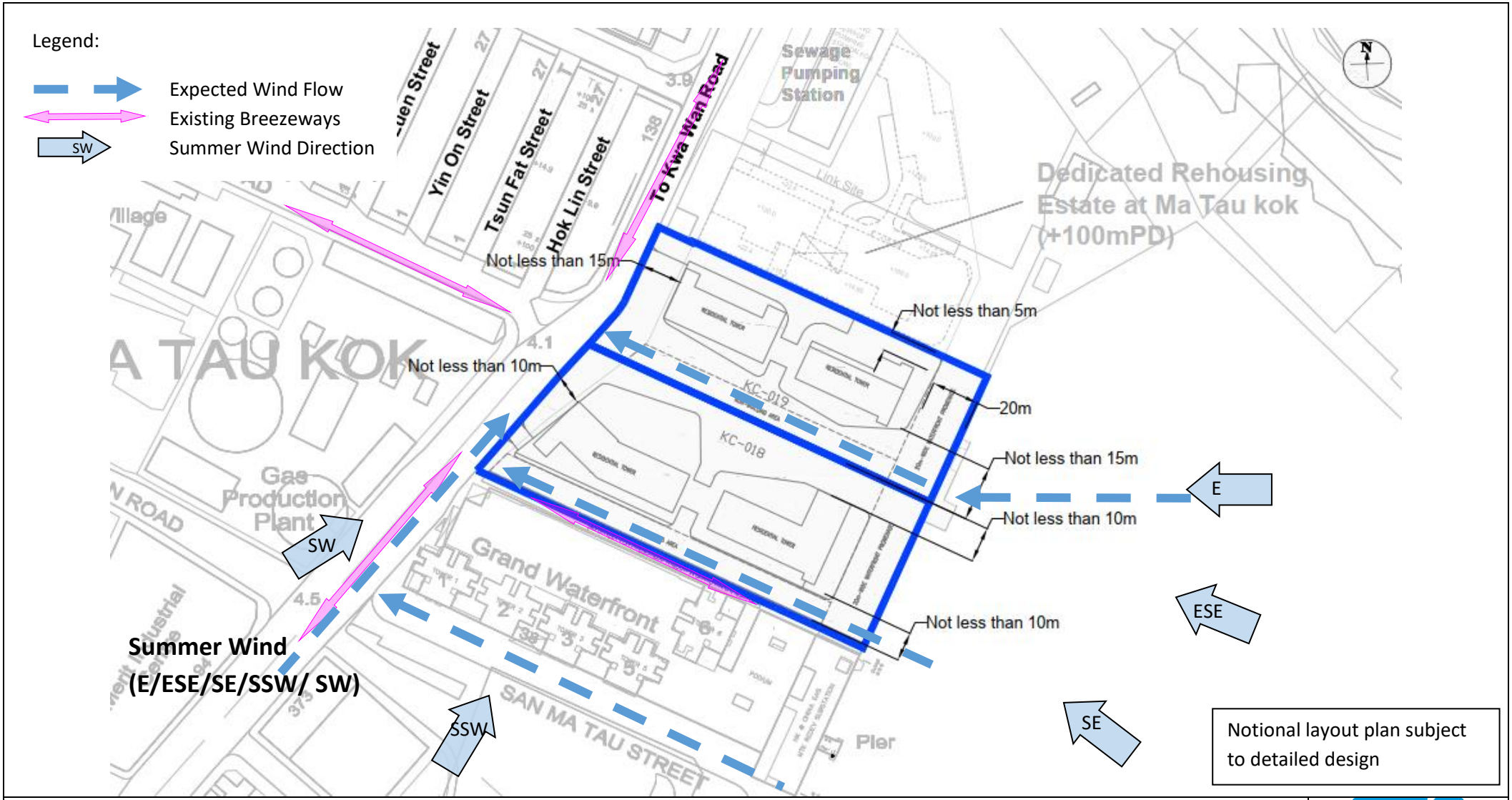



| | |
|---|---|
| **Figure:** 4 | RAMBOLL |
| **Title:** Illustration of Wind Flow from Summer Wind Directions for OZP Conforming Baseline Scheme | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Jul 2022 |




| | |
|---|---|
| **Figure:** 5 | RAMBOLL |
| **Title:** Illustration of Wind Flow from Annual Wind Directions for Proposed Scheme | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Aug 2022 |

Q:\Projects\URAKCAA2EI01\04 Deliverables\02 AVA-EE Report\01 Figures\R8529_v1.2\Fig5_6.doc

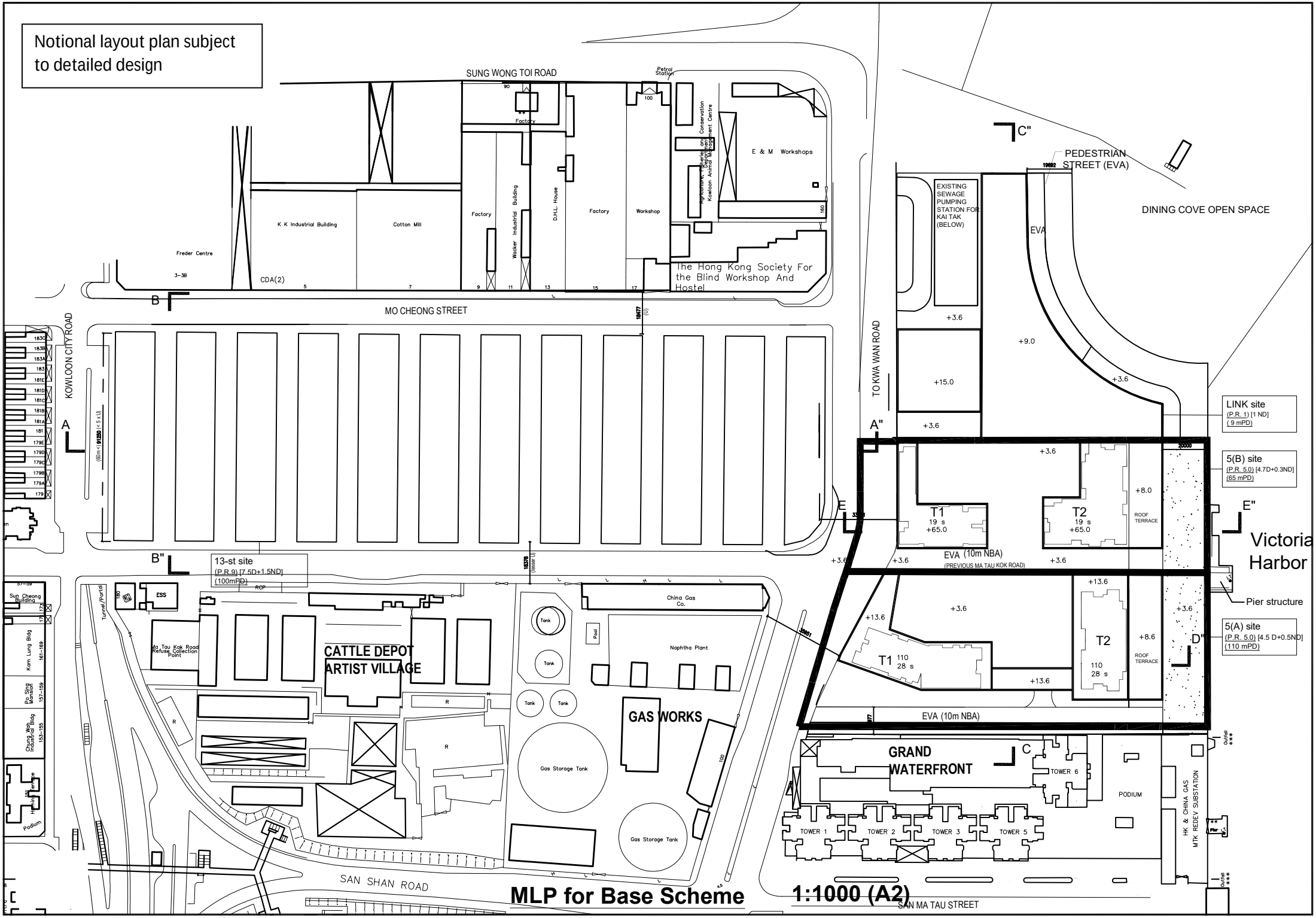



| | |
|---|---|
| **Figure:** 6 | RAMBOLL |
| **Title:** Illustration of Wind Flow from Summer Wind Directions for Proposed Scheme | Drawn by: CC<br>Checked by: CC |
| **Project:** Two Development Schemes - Ming Lun Street / Ma Tau Kok Road (KC-018) and To Kwa Wan Road / Ma Tau Kok Road (KC-019) | Rev.: 1.0<br>Date: Aug 2022 |

**Appendix 1**

**Master Layout Plan of the OZP Conforming Baseline Scheme**

Notional layout plan subject to detailed design




**MLP for Base Scheme** **1:1000 (A2)**

**Appendix 2 Master Layout Plan of the Proposed Scheme**

# LEGEND

THE SCHEME AREA

PLANNED ROAD WIDENING WORKS IN AREA SHOWN AS "ROAD"

MOK CHEONG STREET 木廠街

TO KWA WAN ROAD 土瓜灣道

MA TAU KOK ROAD 馬頭角道

10m-WIDE RETAIL BELT NOT EXCEEDING 2 STOREYS)
10米闊零售地帶

PODIUM
平台

RESIDENTIAL TOWER
住宅大樓

KC-019

about 25m

NON-BUILDING AREA 非建築用地

WATERFRONT PLAZA
海濱廣場

KC-018

20m-WIDE WATERFRONT PROMENADE
20米闊海濱長廊

(Notional layout subject to detailed design and liaison with relevant government departments upon DSP approval)

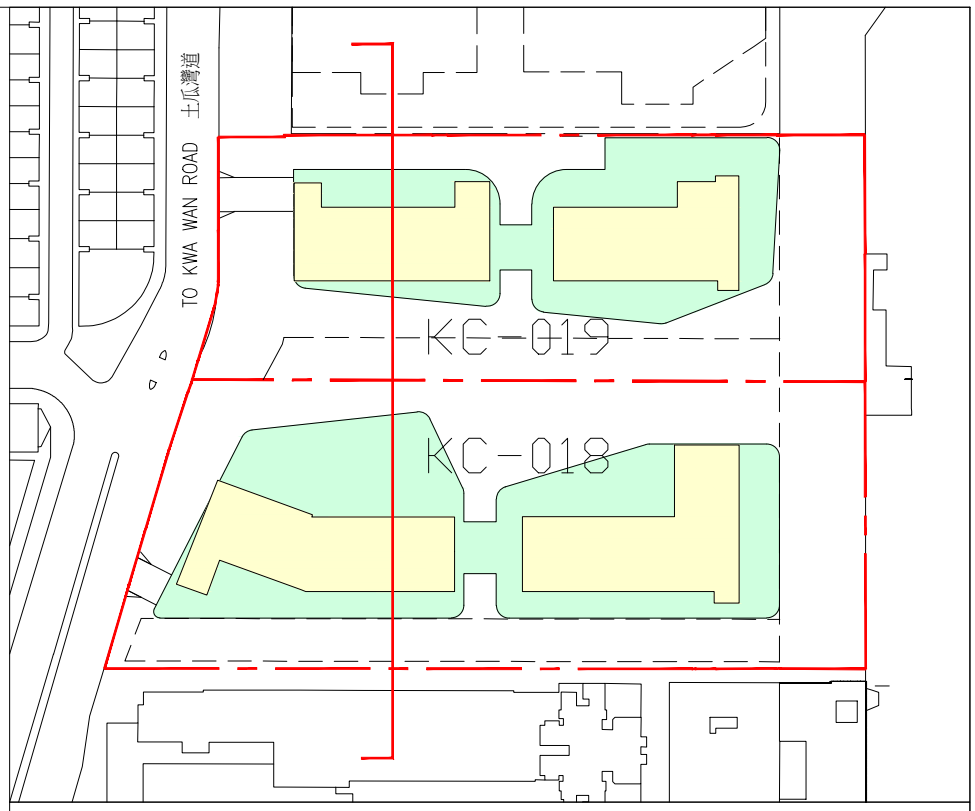
N

市區重建局
URBAN RENEWAL AUTHORITY

URA Ming Lun Street/ Ma Tau Kok Road (KC-018)
&
To Kwa Wan Road/ Ma Tau Kok Road (KC-019)
Development Scheme

Notional Design - Block Plan

FIGURE 1.1
NOT TO SCALE




KEY PLAN 索引圖

GRAND WATERFRONT
翔龍灣
+176mPD

## KC-018

NOT MORE THAN
不高於
+120 mPD R/F

RESIDENTIAL 33
住宅

30

25

20

15

10

5

TRANSFER PLATE
結構轉換層

2/F RETAIL / GIC/ CLUBHOUSE/ E&M
零售/政府社區設施/會所/機電房

1/F COMMERCIAL/ RETAIL/ E&M
商業/ 零售/ 機電房

G/F COMMERCIAL/ RETAIL/ E&M
商業/ 零售/ 機電房

+3.6 mPD

B1 BASEMENT CARPARK/ L&UL/ E&M
地下停車場/上落貨設施/機電房

B2 BASEMENT CARPARK/ E&M 地下停車場/機電房

B3 BASEMENT CARPARK/ E&M 地下停車場/機電房

B.L.

NON-BUILDING AREA 非建築用地

B.L.

## KC-019

NOT MORE THAN
不高於
+120 mPD R/F

RESIDENTIAL 33
住宅

30

25

20

15

10

5

TRANSFER PLATE
結構轉換層

2/F RETAIL / GIC/ CLUBHOUSE/ E&M
零售/政府社區設施/會所/機電房

1/F COMMERCIAL/ RETAIL/ E&M
商業/ 零售/ 機電房

G/F COMMERCIAL/ RETAIL/ E&M
商業/ 零售/ 機電房

B1 BASEMENT CARPARK/ L&UL/ E&M
地下停車場/上落貨設施/機電房

B2 BASEMENT CARPARK/ E&M 地下停車場/機電房

B3 BASEMENT CARPARK/ E&M 地下停車場/機電房

B.L.

NON-BUILDING AREA 非建築用地

B.L.

DEDICATED
REHOUSING ESTATE
專用安置屋邨項目

+100 mPD

+18.6 mPD

2/F

1/F

G/F

B1

B2

B3

(Notional layout subject to detailed design and liaison with relevant government departments upon DSP approval)

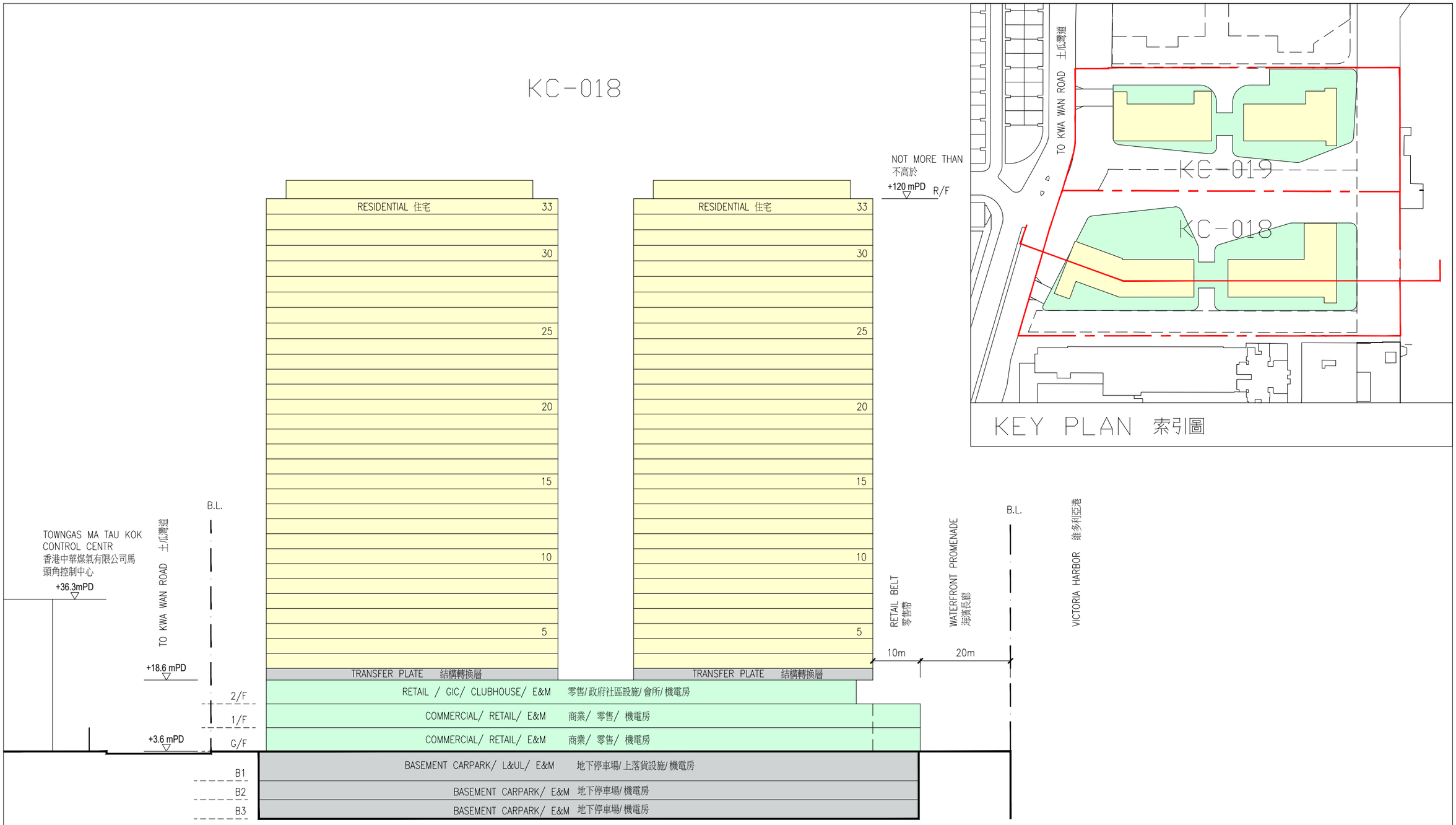
市區重建局
URBAN RENEWAL AUTHORITY

URA Ming Lun Street/ Ma Tau Kok Road (KC-018)
&
To Kwa Wan Road/ Ma Tau Kok Road (KC-019)
Development Scheme

Notional Design -
Schematic Section

FIGURE
1.2
NOT TO
SCALE

KC-018







(Notional layout subject to detailed design and liaison with relevant government departments upon DSP approval)

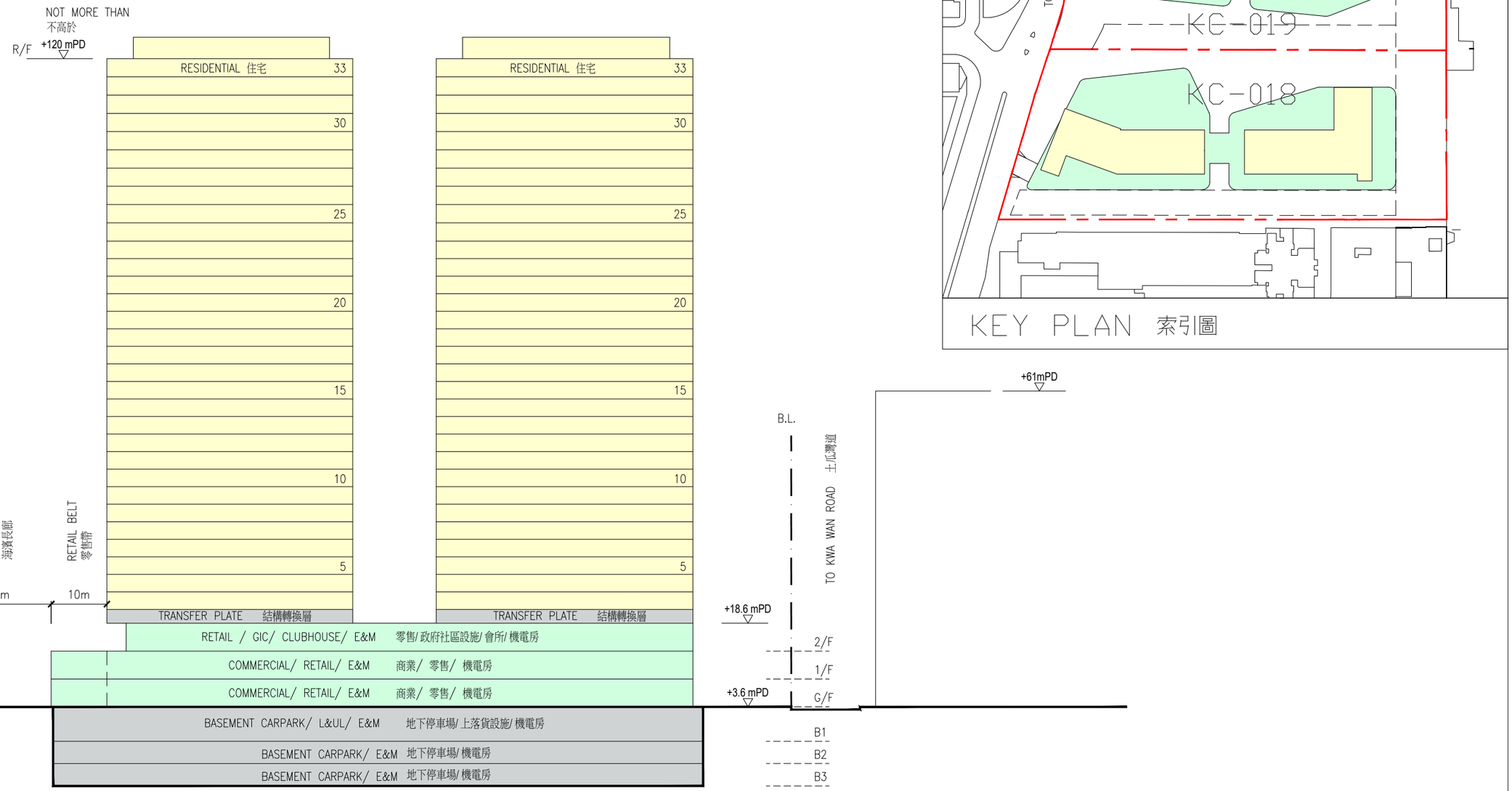
URBAN RENEWAL AUTHORITY 市區重建局

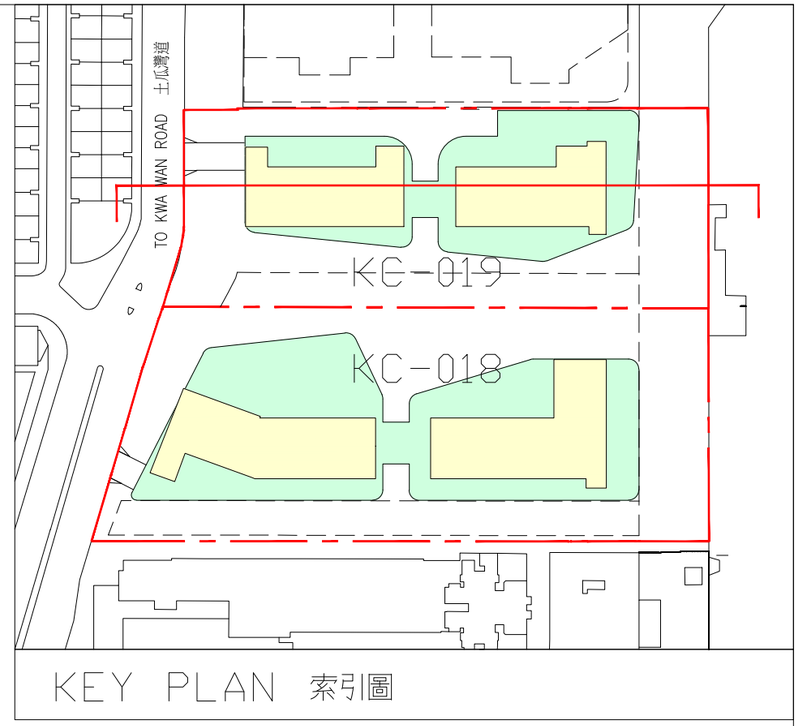
URA Ming Lun Street/ Ma Tau Kok Road (KC-018)
&
To Kwa Wan Road/ Ma Tau Kok Road (KC-019)
Development Scheme

Notional Design - Schematic Section

FIGURE 1.3
NOT TO SCALE

# KC-019




(Notional layout subject to detailed design and liaison with relevant government departments upon DSP approval)

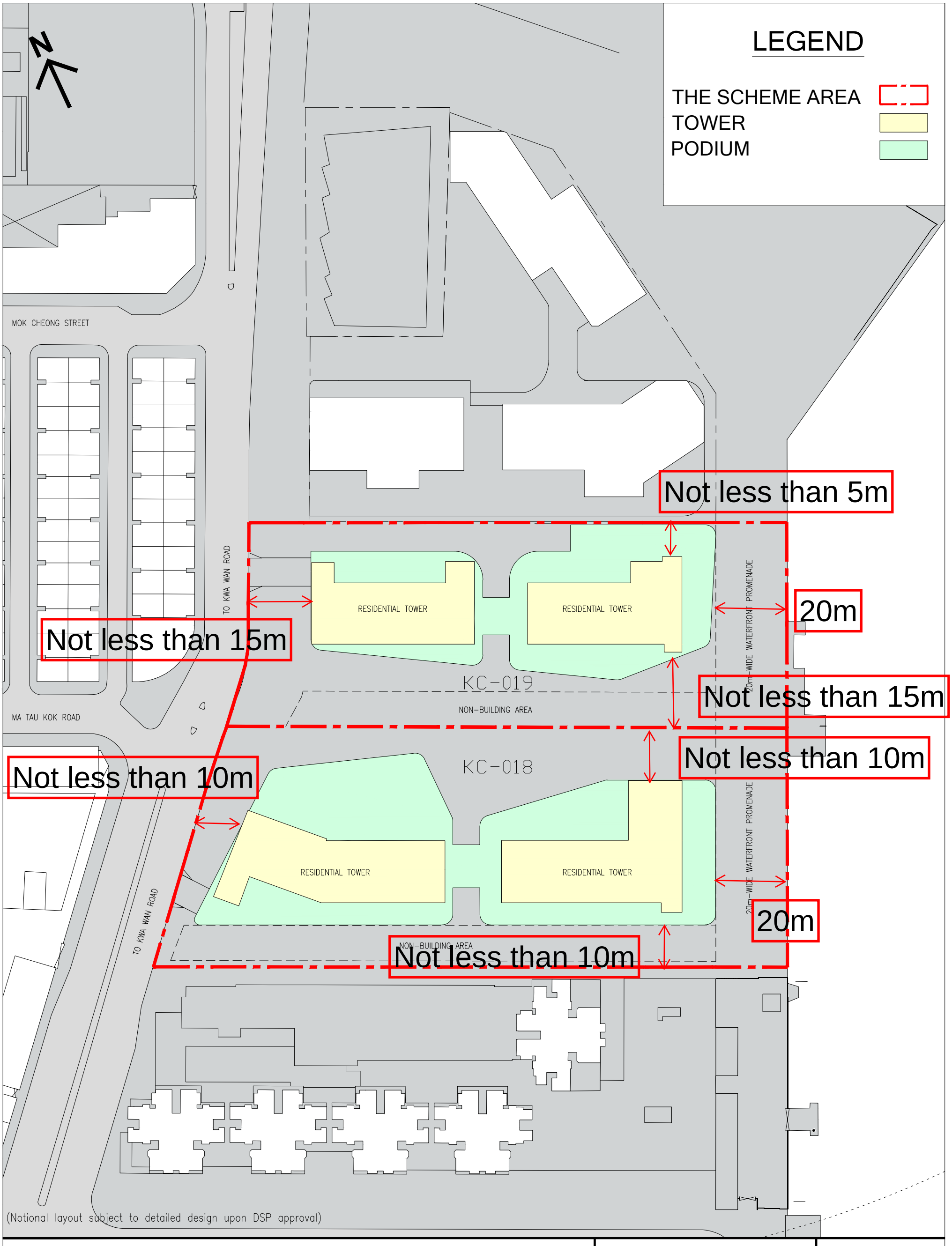
URBAN RENEWAL AUTHORITY 市區重建局

URA Ming Lun Street/ Ma Tau Kok Road (KC-018)
&
To Kwa Wan Road/ Ma Tau Kok Road (KC-019)
Development Scheme

Notional Design - Schematic Section

FIGURE 1.4
NOT TO SCALE

**Appendix 3 Proposed Air Ventilation Design Measures of the Proposed Scheme**




URBAN RENEWAL AUTHORITY 市區重建局

URA Ming Lun Street/ Ma Tau Kok Road (KC-018)
&
To Kwa Wan Road/ Ma Tau Kok Road (KC-019)
Development Scheme

Notional Design -
Block Plan

FIGURE
1.1
NOT TO
SCALE