Urban Renewal Authority
To Kwa Wan Road / Wing Kwong Street Development Scheme
(KC-016)

Air Ventilation Review
(v1.0)

June 2021

Approved By _____
(Project Manager: KS Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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1 INTRODUCTION

1.1 Project Background

1.1.1 The Urban Renewal Authority ("URA'') commenced the To Kwa Wan Road / Wing Kwong Street Development Scheme (the Scheme) and submitted the draft To Kwa Wan Road / Wing Kwong Street Development Scheme Plan (DSP) No. S/K3/URA4/A for consideration of the Town Planning Board ("TPB") in accordance with section 25 of the Urban Renewal Authority Ordinance ("URAO"). The area of the draft DSP is currently zoned as "Residential (Group A)" ("R(A)") with building height restriction of 100 mPD, and the road sections and pavement within the Scheme are shown as "Road" in the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26. The Scheme is proposed to rezone the area of the draft DSP into "R(A)", with a maximum building height of 140mPD, to facilitate a high-density residential development with commercial/retail and Government, Institution and Community (GIC) facilities. An all-weathered communal space is proposed in the Scheme. The major development parameters of Baseline Scheme and Proposed Scheme are listed below:

	Baseline Scheme (OZP-compliant Scheme)	**Proposed Scheme (Notional Design)**
Zoning	"R(A)" and "Road"	"R(A)"
Height Restriction	100 mPD	140 mPD
Gross Site Area	Approx. 6,592 m^2	
Proposed GFA	33,480 sq.m. (domestic) 6,696 sq.m. (non-domestic) Total: 40,176sq.m.	41,610 sq.m. (domestic) 8,322 sq.m (non-domestic) Total: 49,932sq.m. (excluded GIC)
Development Features	Four residential towers on top of commercial podia at four land parcels/sites	Two residential towers (Tower T1 & T2) on top of commercial podia: • T1 (on northern part of the site): Not more than 140 mPD • T2 (on southern part of the site): about 110 mPD One low block (Low Block) for commercial/ retail uses with an all-weathered communal space: • Low Block (on eastern part of the site): 4 storeys
Proposed Total PR	7.5 (Domestic) 1.5 (Non-domestic)	7.5 (Domestic) 1.5 (Non-domestic, excluding GIC) 1.0 (Non-domestic G/IC - exempted from PR calculation under planning regime)

1.1.2 This air ventilation review assesses the potential impact to air ventilation by the proposed development scheme by making reference to the OZP-compliance notional scheme as the Baseline Scheme.

1.1.3 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. The ground elevation of the Scheme is around 7.0 mPD. The Scheme is in a developed urban area, with a mix of old tenement buildings, newer high-rise residential buildings, and industrial buildings, whereas most of the existing buildings within and/or close to the Scheme are the relatively low 6-8 storeys tenement buildings. There are seven

redevelopment projects commenced in the vicinity of the Scheme to redevelop the existing tenement buildings into high-density residential development with commercial podium. All the seven redevelopment projects have been approved for implementation. The maximum building height for the seven adjoining redevelopment projects are 100mPD. To the West of the Scheme is the elevated East Kowloon Corridor.

2 SITE WIND AVAILABLE DATA

2.1.1 According to Planning Department's website, a meso-scale Regional Atmospheric Modeling System (RAMS) has been used to propose a simulated 10-year wind climate at horizontal resolution of 0.5km x 0.5km, covering the whole Hong Kong. Three levels of nested domains with realistic boundary conditions were adopted in RAMS to provide reasonable approaching wind condition to the finest level of nesting. The wind data from various wind stations have been used in RAMS to refine the model results. Considering that the grid from RAMS can cover the Site and the advantages of the RAMS over wind tunnel experiments, the data of grid [83,41] at 200mPD from RAMS is best suited for this air ventilation review, while the wind roses at 500mPD is best suited for quantitative analysis. The vertical wind profiles are adopted as the inlet conditions of the numerical analysis.

2.1.2 The simulated wind roses at 200mPD show that the local area is dominated by Easterly wind (winds from E, ENE, ESE) annually, while the summer winds are mainly coming from South-Western wind (SW, SSW, and E).

2.1.3 Wind penetration in the area around the site would mainly rely on To Kwa Wan Road, Ma Tau Wai Road, Bailey Street, Sung On Street, Chi Kiang Street, Kai Ming Street, and Hung Fook Street as wind corridors. Yuk Shing Street is not served as an air path in the area given that it is blocked by existing buildings to the north and south of the street.

3 STUDY SCHEMES

3.1.1 Two schemes (i.e. Baseline Scheme and Proposed Scheme) are studied in this air ventilation review report.

3.2 The Baseline Scheme (100mPD Scheme)

3.2.1 A Baseline Scheme fulfilling the maximum building height restriction (100mPD) of Approved Hung Hom OZP No. S/K9/26, has been used to represent the intended air ventilation performance as permitted in the current OZP. Four residential towers on top of commercial podia are set in the four individual land parcels/sites within the scheme

area to reflect the possible redevelopment by market practice, which is shown in **Figure 3-1**. No development is built on area shown as "Road" in the OZP.

3.3 The Proposed Scheme (140mPD Scheme)

3.3.1 The Proposed Scheme is showed in Figure 3-2 & 3-3. Comparison of the two schemes is illustrated in Figures 3-4a & 3-4b. The differences between Proposed Scheme and Baseline Scheme are shown as follows:

- Reduction of number of towers (from 4 to 2 and a Low Block);
- Creation of staggered height design with taller building on the north, cascading down to lower building of the south, and a low-rise commercial building (the Low Block) in the east of the Scheme;
- Restructuring of 3 existing road sections at Yuk Shing Street, Hung Fook Street and Kai Ming Street for integration into redevelopment and provision of pedestrian walkways;
- Provision of all-weathered communal space (open/semi-opened area without side walls) in the Low Block.
- A deck structure over the closed Hung Fook Street Section;
- A linked bridge over the closed Kai Ming Street Section;
- Ground floor setback around Low Block and linked bridge between Low Block and the podia on the west.

3.3.2 The following wind enhancement features are adopted in the Proposed Scheme:

- a minimum full height setback of not less than 45m of the residential portion above podium of the proposed development from the north-eastern boundary of the Area at Ngan Hon Street is proposed to maintain the east-west breezeway along Ngan Hon Street;
- two intervening spaces/urban windows design with a minimum dimension of not less than 15m in height and 15m in width, excluding architectural features, open-side deck and circulation, will be designed at grade of the podia along Hung Fook Street and Kai Ming Street, which will create a continuation of east-west breezeway along Hung Fook Street and Kai Ming Street respectively;
  - the urban windows at Kai Ming Street section will not be decked, instead, there is a linked bridge connecting the podium structures of T1 & T2, at height of ~20m above ground (26.9 mPD), which is not expected to significantly affect the ventilation;
  - the urban windows of the closed Hung Fook Street Section will be widened;
- a Low Block design with an open area (i.e. all-weathered communal space) on the ground floor at the eastern portion of the site to enhance pedestrian level air ventilation;
  - ground floor setback around the Low Block to enhance air flow at pedestrian level;

- only linked bridge between the Low Block and the podia to the west to enhance air ventilation.

4 DIRECTIONAL ANALYSIS

4.1 Introduction

4.1.1 The directional analysis will discuss the air ventilation performance of the Proposed Scheme and its air ventilation impacts on the surroundings under both annual and summer prevailing wind directions. Two major range of wind conditions are used for representing the annual condition and summer condition as shown below: -

- from 67.5deg to 112.5deg (most occurrence at ~90deg, i.e. Easterly wind) for annual condition, and;
- from 202.5-225deg and 90deg (most occurrence at 225deg, i.e. South-Western wind) for summer condition.

4.2 Annual Condition – Easterly Wind (E, ENE, ESE)

4.2.1 Under the major prevailing wind direction in annual condition, i.e. Easterly wind, as the road sections works as east-west breezeways and important for the both the local and downstream's air ventilation performance, the main focus is on the Hung Fook Street and Kai Ming Street sections within the site.

4.2.2 In the Baseline Scheme, unobstructed open areas (open road surfaces) with ~15m wide will be provided to both of the road sections as breezeways.

4.2.3 In the Proposed Scheme, urban windows with not less than 15m wide will be provided to both road sections. Specifically, the Hung Fook Street section will be decked above 15.4mAG and a linked bridge will be provided across the Kai Ming Street section. To eliminate the potential negative effect of the decked at the Hung Fook Street section, a wider urban windows will be provided to enhance the local ventilation. On the other hand, the link bridge across the Kai Ming Street section is not expected to induce any significant impact to the local ventilation.

4.2.4 Besides the aforementioned wind pathways / urban windows, a large portion of pedestrian wind across the Kai Ming Street section comes from Hung Fook Street as there are buildings at the eastern end of Kai Ming Street blocking the wind from directly enter the Kai Ming Street. To improve the condition at Kai Ming Street section, the Proposed Scheme provides a setback Low Block with an open all-weathered communal space at pedestrian level, which helps reduce the resistance for the pedestrian wind from Hung Fook Street flowing to Kai Ming Street under Easterly wind.

4.2.5 Last but not least, the 45m setback from Ngan Hon Street has been provided for residential tower (T1). Although the setback over the podium should have little effect to the nearby pedestrian's ventilation, it helps the overall wind condition in the far downstream area by reducing the blockage area thus reducing resistant under Easterly wind.

4.2.6 Therefore, the overall ventilation performance of the Proposed Scheme should be similar, if not better than the Baseline Scheme under the Easterly wind, which is the major prevailing wind direction in annual condition.

4.3 Summer Condition - South-Western Wind (SW, SSW)

4.3.1 Under the major prevailing wind direction in summer condition, i.e. South-Western wind. It is not expected that the ventilation performance of the Baseline Scheme and Proposed Scheme will be significantly different as the major wind pathways are not crossing the Scheme area.

4.3.2 In the Baseline Scheme, the major existing wind pathways around the Scheme under South-Western wind are the Ma Tau Wai Road and To Kwa Wan Road adjoining the Scheme boundary on the west. On the adjoining east, the Wan On Street, open areas of other URA's projects and Lung Tak Street are connected and form a new wind pathway in north-south direction in the middle part of the residential clusters. Although the new north-south wind pathway is within the redevelopment clusters and is not as efficient as the main roads in the west, it creates a wind pathway to penetrate into this inner area. It should be noted that Yuk Shing Street is not served as an air pathway in the Baseline Scheme given that it is blocked by existing buildings to the north and south of the street. Therefore, the focus of summer wind is on the ventilation performance of those wind pathways, i.e. Ma Tau Wai Road, To Kwa Wan Road, and the new wind pathway created by the planned URA redevelopment projects in the area.

4.3.3 As the Ma Tau Wai Road and To Kwa Wan Road are wide enough, the South-westerly wind can reach the downstream area, no additional setback from Ma Tau Wai Road and To Kwa Wan Road is provided in the Proposed Scheme. Therefore, the performance of the wind pathways on the west are similar.

4.3.4 For the north-south wind pathway on the east, the Proposed Scheme provides a Low Block which offset from the east boundary and together with the open all-weathered communal space provided at ground level, to create a wider north-south wind pathway with the open area of the planned URA redevelopment project (KC-011&DL-8:KC)).

4.3.5 Therefore, the Proposed Scheme should provide similar ventilation performance in the west boundary of the Scheme while offering slightly better ventilation in the east boundary of the Scheme under South-westerly wind.

4.4 Summer Condition - South-Westerly Wind (E)

4.4.1 For the third major prevailing wind direction in summer condition, i.e. Easterly wind, please refer to **Section 4.2**.

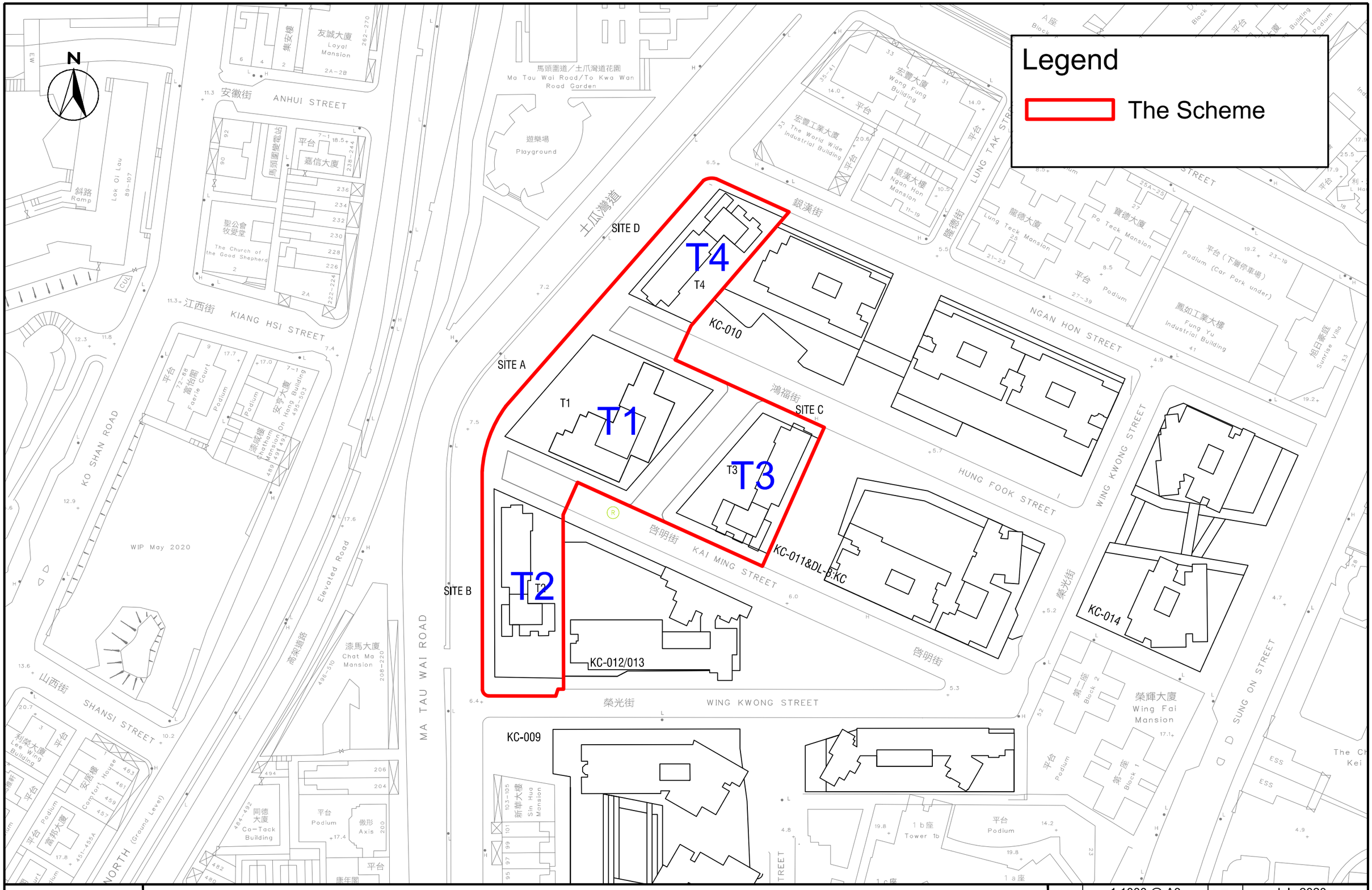
5 CONCLUSION

5.1.1 With reference to the above air ventilation review, it is considered that the proposed wind enhancement features as explained in **Section 3.3.2** would mitigate potential air ventilation impacts from the proposed development, including the provision of building separations, building setback and open area provided at the low zone. For the Proposed Scheme, as the existing Hung Fook Street and Kai Ming Street which aligns with the existing prevailing annual wind directions would mostly remain permeable for air ventilation with the intervening spaces, it is expected that there would not have adverse air ventilation impact on the surrounding pedestrian environment as compared with the Baseline Scheme.

5.1.2 Although Yuk Shing Street is proposed to be closed and some structures are proposed, it is considered that no significant impact would be made to the surrounding areas as compared to the Baseline Scheme as it is not an air path.

5.1.3 Given the proposed wind enhancement measures incorporated in the Proposed Scheme, it is anticipated that the proposed relaxation of building height of 140mPD would not create adverse air ventilation impact on the surrounding pedestrian wind environment when compared with the Baseline Scheme.

FIGURES



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Block Plan of the Baseline Scheme

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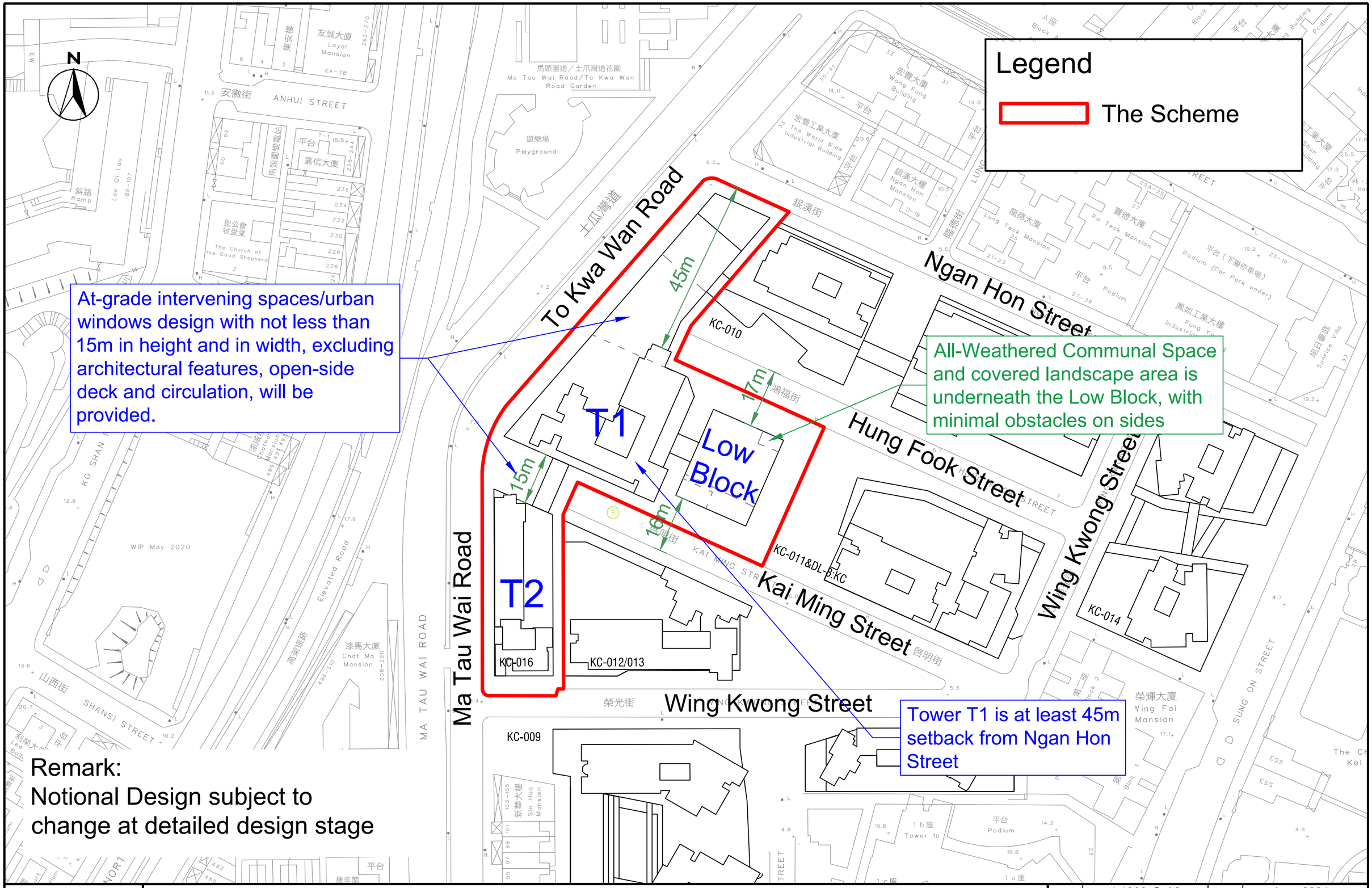
		REV	-



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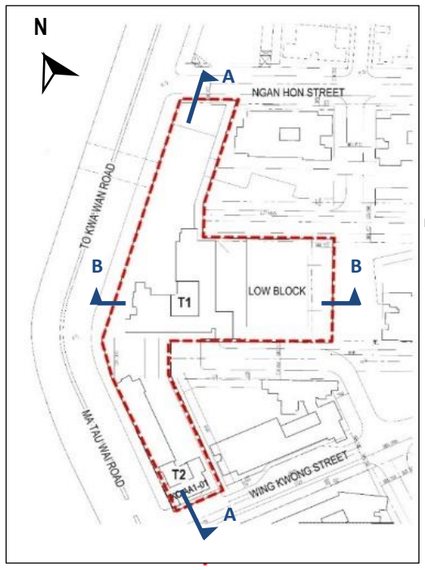
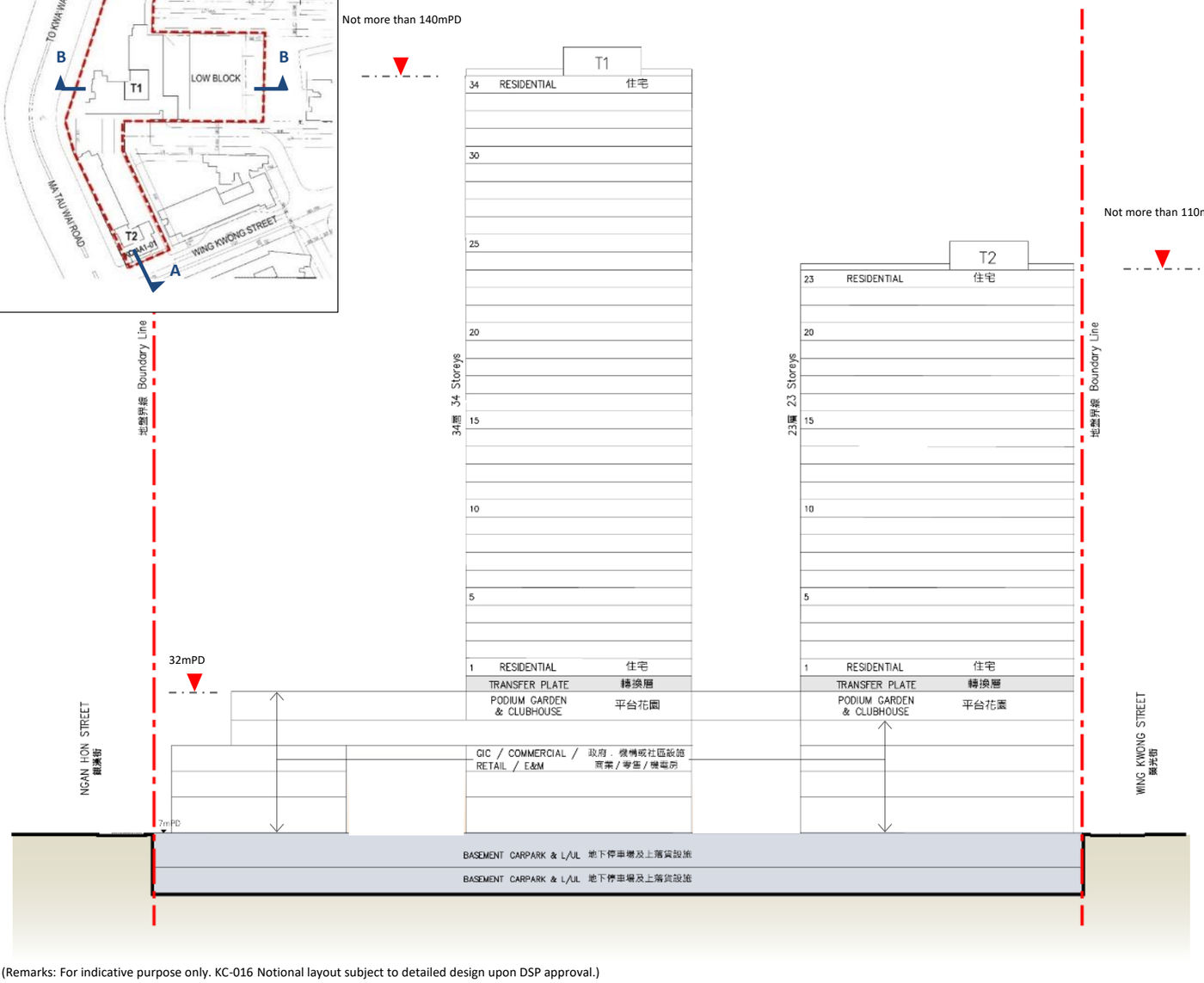
Notional Block Plan of the Proposed Scheme

SCALE	1:1000 @ A3	DATE	June 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-2
		REV	-

Key Plan



Section A



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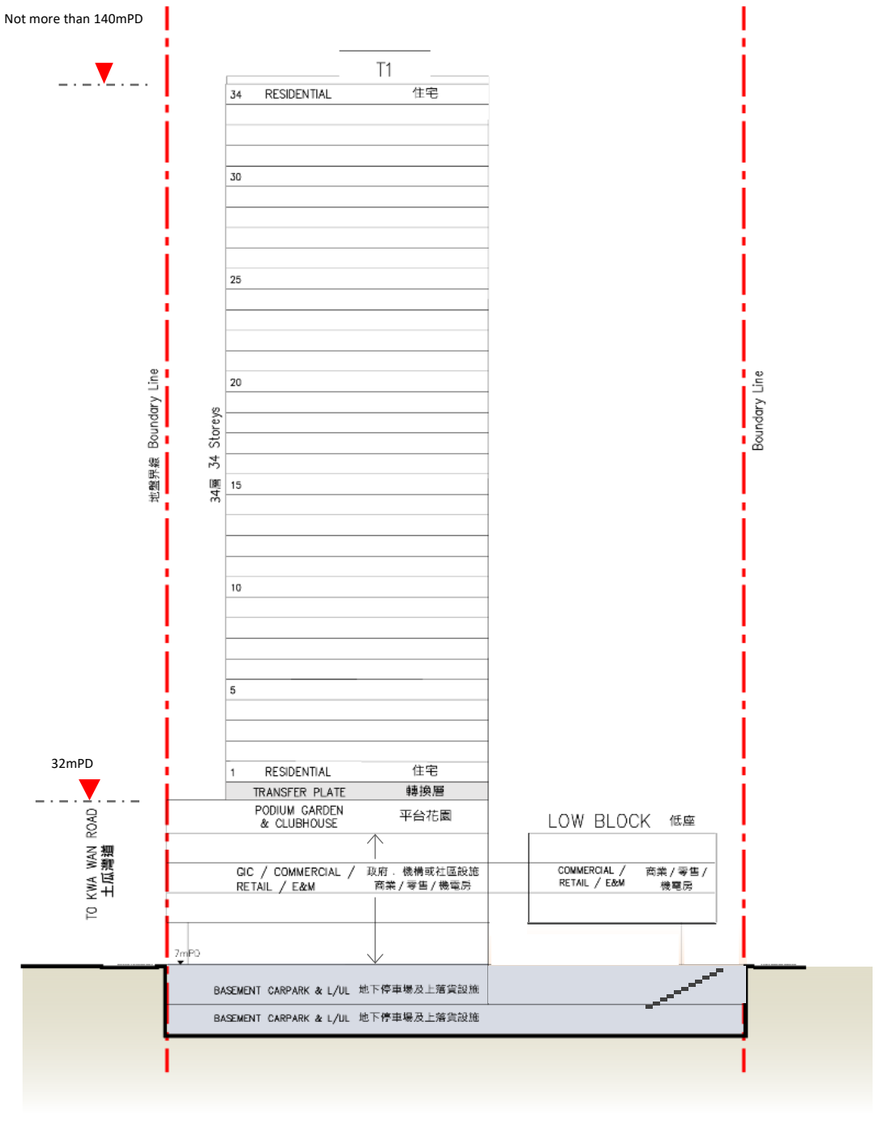

(Remarks: For indicative purpose only. KC-016 Notional layout subject to detailed design upon DSP approval.)

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Notional Section Plan of the Proposed Scheme

SCALE	N.T.S.	DATE	Jun-21	
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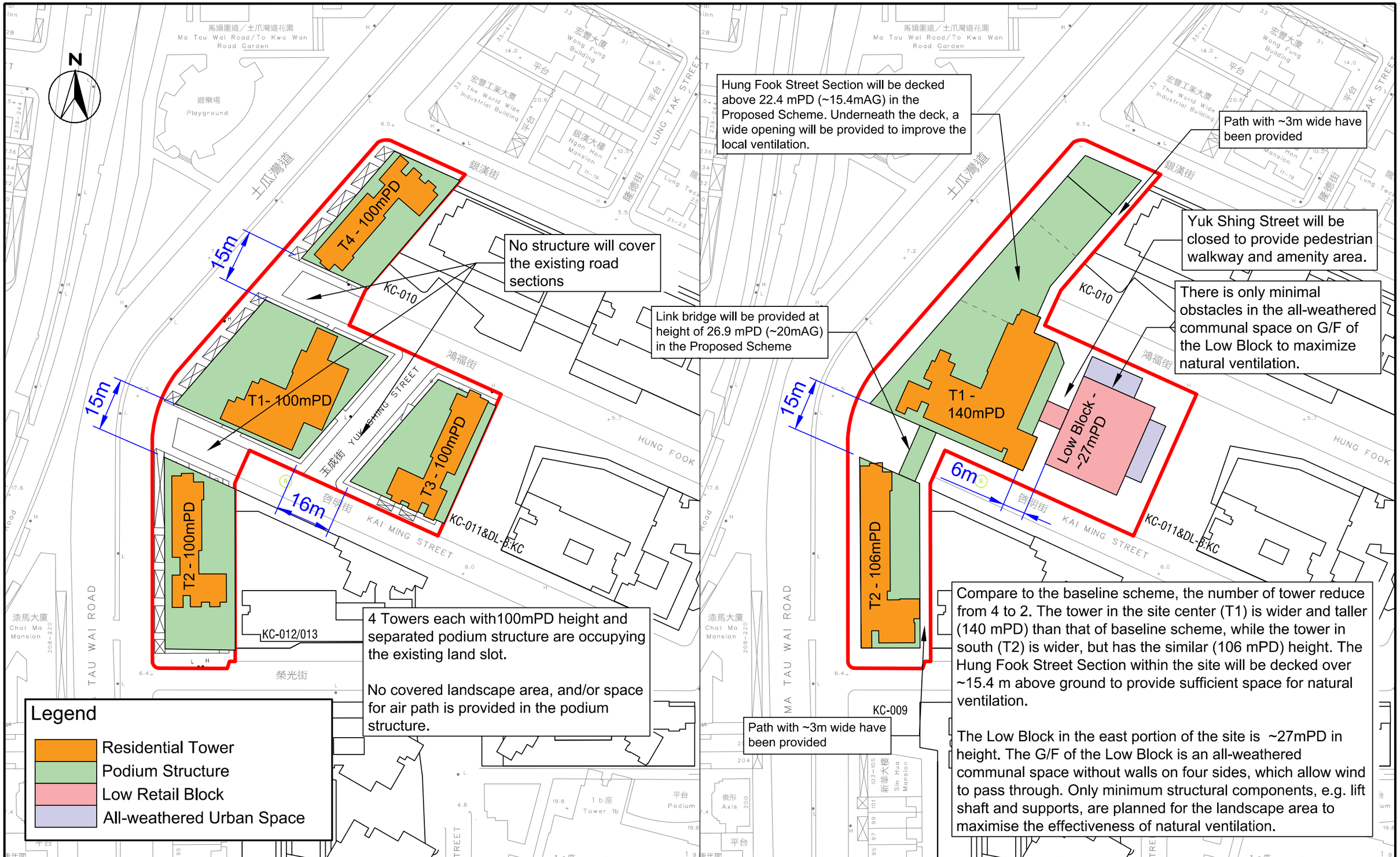
				-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

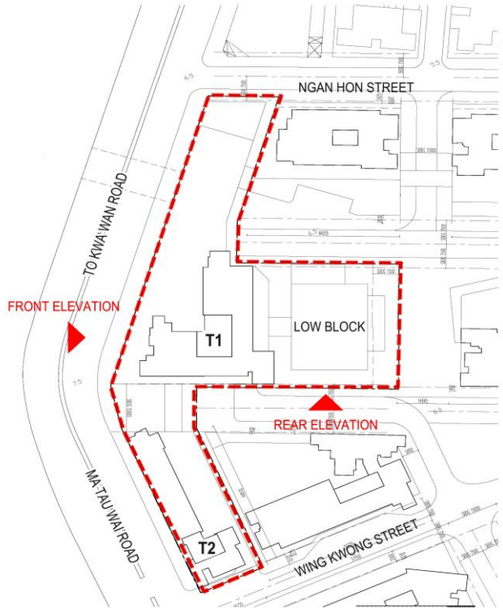
Comparison of the Schemes

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-4a
		REV	-

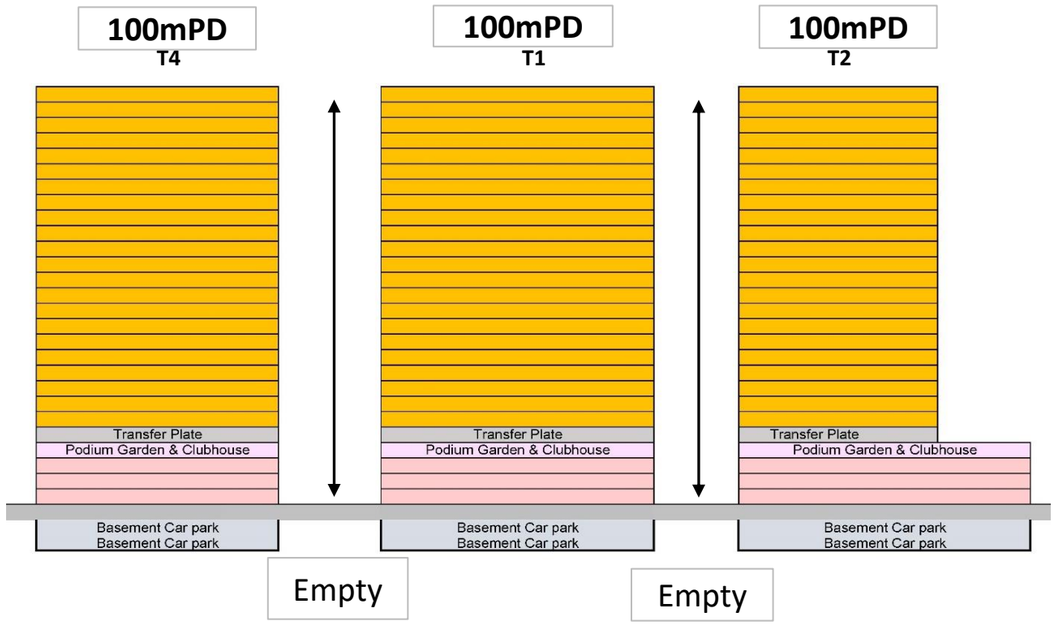
Baseline Scheme

4 towers each with 100mPD in height and separate podium

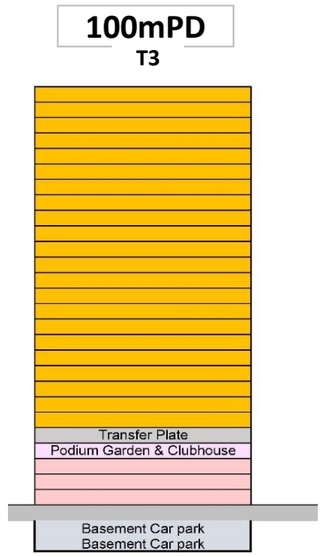
Residential Tower
GIC uses / E&M
Retail / Commercial / E&M
Basement Car park



Front Elevation



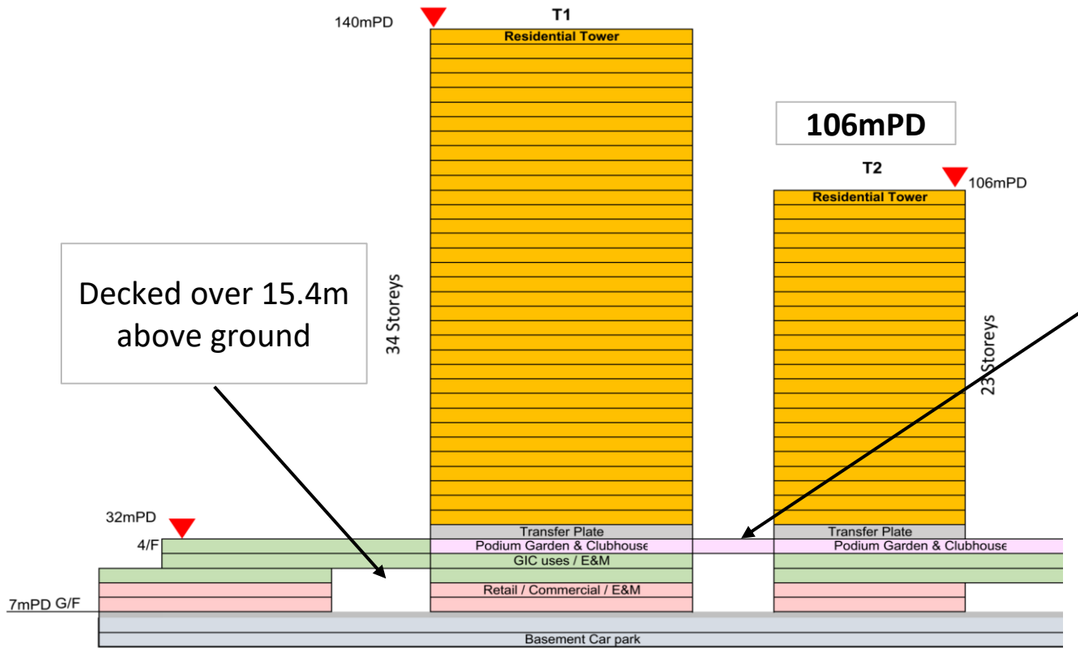
Rear Elevation



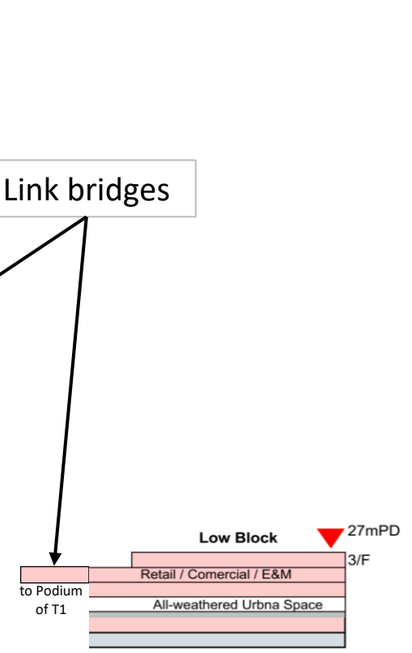
Proposed Scheme

2 towers with 140mPD & 106 mPD in height and a Low Block. The podia and the Low Block are connected by decking and/or link bridge.

Front Elevation



Rear Elevation



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Comparison of the Schemes (Section)

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				-