

Hong Kong Housing Authority  
**Agreement No. CB20120293**  
**Public Housing Development at**  
**Wang Chau, Yuen Long**

Technical Report  
Transport and Traffic Impact  
Assessment

REP-031-02

Issue 1 | 23 September 2014

IMPORTANT – CONFIDENTIALITY

This project and study shall be kept confidential and any information contained in and/or related to the project/study shall not be disclosed to any person not involved in the project/study.

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 226464

**Ove Arup & Partners Hong Kong Ltd**  
Level 5 Festival Walk  
80 Tat Chee Avenue  
Kowloon Tong  
Kowloon  
Hong Kong  
[www.arup.com](http://www.arup.com)

**ARUP**

# Document Verification

# ARUP

<b>Job title</b>		Agreement No. CB20120293 Public Housing Development at Wang Chau, Yuen Long		<b>Job number</b>		226464	
<b>Document title</b>		Technical Report Transport and Traffic Impact Assessment		<b>File reference</b>		01	
<b>Document ref</b>		REP-031-02					
<b>Revision</b>	<b>Date</b>	<b>Filename</b>	REP-031-02 TR-TIA.docx				
Issue 1	23 Sep 2014	<b>Description</b>	Issue 1 (with TD's comment incorporated)				
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>		
		<b>Name</b>	[REDACTED]	[REDACTED]	[REDACTED]		
		<b>Signature</b>	[REDACTED]	[REDACTED]	[REDACTED]		
		<b>Filename</b>					
		<b>Description</b>					
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>		
		<b>Name</b>					
		<b>Signature</b>					
		<b>Filename</b>					
		<b>Description</b>					
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>		
		<b>Name</b>					
		<b>Signature</b>					

Issue Document Verification with Document



# Contents

---

	Page
<b>EXECUTIVE SUMMARY</b>	<b>i</b>
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Background	1
1.2 Objective of the Report	1
1.3 Structure of this Report	2
1.4 Nomenclature and Abbreviations	2
<b>2 PROJECT DESCRIPTION</b>	<b>4</b>
2.1 Site Location	4
2.2 Existing Conditions	4
2.3 Proposed Public Housing Site	4
<b>3 TECHNICAL APPROACH OF TRANSPORT AND TRAFFIC ASSESSMENT</b>	<b>6</b>
3.1 Proposed Area of Influence (AOI)	6
3.2 Planning Assumptions	6
3.3 Other Developments	7
3.4 2-Tier Transport Modelling	7
3.5 Planning Assumptions for Project Site	8
<b>4 PROPOSED TRAFFIC ARRANGEMENT</b>	<b>11</b>
4.1 Vehicular Access Arrangement	11
4.2 Proposed Access Road for Public Housing Site	11
4.3 Proposed Staggered Crossing Arrangement	13
<b>5 PROVISION OF TRANSPORT FACILITIES</b>	<b>14</b>
5.1 Existing Public Transport Services	14
5.2 Proposed Public Transport Facilities	15
5.3 Parking and Servicing Facilities Provisions of the Proposed Developments	18
<b>6 TRAFFIC IMPACT ASSESSMENT</b>	<b>21</b>
6.1 Existing Road Network	21
6.2 Base Year Traffic Condition	23
6.3 Future Year Assessment	24
<b>7 PEDESTRIAN IMPACT ASSESSMENT</b>	<b>27</b>
7.1 Existing Pedestrian Condition	27

7.2	Proposed Pedestrian Access Arrangement – A Proposed Public Footbridge across Long Ping Road	29
7.3	Future Pedestrian Condition	30
<b>8</b>	<b>CONCLUSIONS</b>	<b>34</b>

## Figures

Figure 1.1.1	Location of Project Site
Figure 2.3.1	Proposed Public Housing Development
Figure 3.1.1	Area of Influence
Figure 3.4.1	Proposed Transport Modelling Approach
Figure 4.1.1	Proposed Access Road for Public Housing Site
Figure 4.2.1	Cross Section for the Access Road For Public Housing Site
Figure 5.1.1	Existing Public Transport Facility
Figure 6.1.1	Existing Highway and Rail Network
Figure 6.2.1	Base Year 2012 Peak Hour Traffic Flow
Figure 6.3.1	Design Year 2025 Under Without Development Scenario Peak Hour Traffic Flow
Figure 6.3.2	Design Year 2025 Under With Development Scenario Peak Hour Traffic Flow
Figure 6.3.3	Design Year 2031 Under Without Development Scenario Peak Hour Traffic Flow
Figure 6.3.4	Design Year 2031 Under With Development Scenario Peak Hour Traffic Flow
Figure 6.4.1	Junction Improvement at Junction 5 – Wang Lok Street / Wang Tat Road / Long Yip Street / Yuen Long On Lok Road / Ma Wang Road (By Others)
Figure 6.4.2	Proposed Junction Improvement at Junction 6 – Po Yip Street / Long Yip Street / Yuen Long On Lok Road (By Others)
Figure 7.1.1	Pedestrian Facilities Inventory in the Vicinity of the Project Site
Figure 7.3.1	Major Pedestrian Routing



## EXECUTIVE SUMMARY

---

A transport and traffic impact assessment (TTIA) has been conducted for the proposed public housing development (PH) site at Wang Chau, Yuen Long. The proposed development site will consist of residential buildings for Home Ownership Scheme (HOS) and Public Rental Housing (PRH), car parks, retails, social welfare block, one 24-classroom primary school, and complementary recreational facilities. In addition, a kindergarten and an Estate Management Office (EMO) will also be planned within the PH site.

The TTIA is to ascertain the effects of the proposed development on the traffic infrastructure and transport provision in the vicinity of Project site and recommend necessary enhancement to the local traffic system. The assessment has already taken into account a number of major developments in the vicinity of the Project site including North East New Territories New Development Area, Lok Ma Chau Loop Development Area, Hung Shui Kiu New Development Area, Kam Tin South development, Yuen Long South Development, Long Bin housing Development, as well as some residential developments such as Long Ping Station North and South Development, and ex-Yuen Long Estate development.

To appreciate the existing traffic conditions, assessment for the base year 2012 at the major road links and junctions were undertaken. It is revealed that all assessed road links and junctions are currently operating at satisfactory level.

A new access road will be provided to serve the PH site. The proposed access road will be in single-2 lane configuration, which will be adequate to cater the traffic demand from the future development. A staggered pedestrian crossing at the access road leading to PH site will be provided. Under this proposed scheme, it is anticipated that the overall junction performance will be operating at satisfactory level.

Assessments for the design years 2025 and 2031 at the major road links and junctions under with and without development scenarios were undertaken. For the major road links, results indicate that all assessed road links will still be performing at satisfactory level, except for the eastbound of L2 (Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange) where the V/C ratio will start to exceed the capacity in 2025 and increase to 1.16 in 2031 for both the with and without development scenarios. By comparing the V/C ratio of L2 for the without development scenario in 2025 and 2031, the contribution of traffic from the proposed developments on L2 is only minimal. Therefore, the exceedance is contributed from the growth of regional traffic and the impact of the subject development is negligible. No road improvement works due to the proposed development is required. For the major junctions, results indicate that all assessed junctions will be operating at satisfactory level.

The existing road-based and rail-based public transport services in vicinity of the Project site have been reviewed. To encourage the use of public transport, a GMB lay-by and a Taxi stand at the access road of the development site and bus lay-bys along the two sides of Long Ping Road are proposed. One bus route and one to two GMB routes are initially recommended. It is anticipated that the service capacity of the proposed public transport facilities will adequately cater for the future demand after the completion of the development. It shall be noted that the final operation plan of the public transport would still be subject to future demand, and would need to be revisited by the respective operators. Re-routing of existing

public transport services along Long Ping Road to the development site could also supplement these proposed public transport services.

Future pedestrian conditions in design year 2025 and 2031 were also assessed. Based on the LOS assessment, the major pedestrian facilities in design year 2025 and 2031 are predicted to operate at LOS C or above. No pedestrian circulation problems are anticipated. In addition to the existing pedestrian network, a public footbridge across Long Ping Road connecting the public housing site to the Long Ping Estate will be required on the perspective of pedestrian flow. With the consideration of future pedestrian flows, the proposed public footbridge should be 3m wide in order to attain a LOS C.

Based on the traffic and pedestrian analysis, the proposed PH development in Wang Chau will have no adverse traffic impact on the nearby road links, junctions and pedestrian facilities. The conclusion therefore is that the proposed development is acceptable from the traffic point of view.

# 1 INTRODUCTION

---

## 1.1 Background

- 1.1.1 Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Hong Kong Housing Authority (HKHA) to conduct a transport and traffic impact assessment (TTIA) for a proposed public housing (PH) development at a potential site at Wang Chau, Yuen Long. The location of the project site and its environs in the vicinity are shown in **Figure 1.1.1**.
- 1.1.2 This TTIA is to ascertain the effects of the proposed development on the traffic infrastructure and transport provision in the vicinity of Project site, including the proposed future road connection to/from surrounding road network for the proposed PH development, and associated facilities particularly with respect to the performances of the affected junctions in the vicinity. Any necessary enhancement and improvements to the local traffic system will be recommended.
- 1.1.3 The site currently falls within an area zoned "Green Belt" (GB) according to the Approved Ping Shan Outline Zoning Plan (OZP) No. S/YL-PS/14. Rezoning is required for the proposed PH site.

## 1.2 Objective of the Report

- 1.2.1 The principal objective of the report is to support the proposed development by addressing the traffic-related issues and ensuring that the proposed development would be feasible in traffic terms without causing adverse impact on the surrounding road network.
- 1.2.2 Major tasks to achieve the objective are summarized as follows:
- Review the available traffic data/information for forecasting future traffic and pedestrian flow and pattern;
  - Conduct traffic counts and surveys and collect any other data for validating the transport models for the base year;
  - Forecast traffic and pedestrian flow and pattern generated and attracted by the proposed PH development in the vicinity of the Project site. The detailed methodology for traffic and pedestrian flow and pattern forecasts shall be agreed by Transport Department (TD);
  - Examine the adequacy of the capacity of the existing and planned road and pedestrian networks and major interchanges/junctions in the vicinity of the Project site; and recommend additional transport infrastructure, if any, to cater for the additional traffic generated from the PH development;

- Assess the likely traffic impact due to the PH development and associated facilities on the road network capacity, traffic and pedestrian circulation, car parking, loading and unloading facilities and lay-bys, and develop traffic improvement schemes, where appropriate, to mitigate any traffic impact;
- Review the public transport demand arising from the PH developments and associated facilities; and recommend the necessary public transport services and the associated public transport facilities. These tasks shall be conducted in close liaison with transport operations divisions of TD.

## 1.3 Structure of this Report

1.3.1 The structure of this Technical Report is as follows:

Section 1	Introduces the project background, objectives and as well as the main tasks of the study.
Section 2	Presents the planning parameters of the proposed development for technical assessment.
Section 3	Presents the technical approach of TTIA.
Section 4	Presents the proposed traffic management measures to the external road network.
Section 5	Presents the provision of transport facilities.
Section 6	Presents the findings of TTIA.
Section 7	Presents the findings of pedestrian impact assessment.
Section 8	Conclusion.

## 1.4 Nomenclature and Abbreviations

1.4.1 The following **Table 1.1.1** lists out the meaning of abbreviation for expressions adopted in this report:

**Table 1.1.1 Abbreviations**

Abbreviations	Term
AOI	Area of Influence
BDTM	Base District Traffic Model
DBPS	District-Based Parking Standards
GB	Green Belt
GFA	Gross Floor Area
GIC	Government/ Institution/ Community
HKPSG	Hong Kong Planning Standards and Guidelines
HOS	Home Ownership Scheme
HyD	Highways Department
HKHA	Hong Kong Housing Authority
LATM	Local Area Traffic Model
LOS	Level of Service
LRT	Light Rail Transit
NOFA	Net Operating Floor Area

<b>Abbreviations</b>	<b>Term</b>
OS	Open Storage
OZP	Outline Zoning Plan
PCU	Passenger Car Unit
PDZ	Planning Data Zone
PH	Public Housing
PlanD	Planning Department
PRH	Public Rental Housing
TD	Transport Department
TPDM	Transport Planning and Design Manual
TPEDM	Territorial Population and Employment Data Matrix
TTIA	Transport and Traffic Impact Assessment
TM	Transport Model
WC	Wang Chau
WR	West Rail
YLIE	Yuen Long Industrial Estate



## 2 PROJECT DESCRIPTION

---

### 2.1 Site Location

2.1.1 The Project site is bounded by Long Ping Road and Long Ping Estate to the east, Chun Hing San Tsuen, Shui Tin Tsuen and Fung Chi Tsuen to the south, Wing Ning Tsuen and Long Tin Road to the west, as well as Kai Shan to the north as indicated in **Figure 1.1.1**. The gross site area is about 5.6ha.

### 2.2 Existing Conditions

2.2.1 According to the Approved Ping Shan Outline Zoning Plan (OZP) No. S/YL-PS/14, the PH site is zoned as “Green Belt” (GB). It is currently occupied by farmland, fallow land, rural residential dwellings, temporary structures and few open storages.

2.2.2 The surrounding areas of the Project site are characterized by a mixture of various land uses. These include high-rise residential development, villages and low-rise residential developments, natural landscapes, burial grounds and graves, open storage uses, major roads and railway tracks.

### 2.3 Proposed Public Housing Site

#### *Development Proposal*

2.3.1 The PH site consists of residential buildings for Home Ownership Scheme (HOS) and Public Rental Housing (PRH), car parks, retails, social welfare block, one 24-classroom primary school, and complementary recreational facilities. In addition, a kindergarten and an Estate Management Office (EMO) have also been planned within the PH site. **Figure 2.3.1** shows the locations of the proposed PH development.

2.3.2 Retail facilities are planned strategically along Long Ping Road to allow street-front shops to serve the future residents. The social welfare block at the south-western tip would accommodate various welfare facilities.

#### *Development Parameters*

2.3.3 The planning parameters are yet to be confirmed at the stage of the study. As for a conservative approach, it is assumed that the total number of flats is capped at 5,000 units with PRH / HOS ratio of 50:50 for technical assessment purpose. Development parameters of the proposed development for this TTIA are summarized in **Table 2.3.1**.

2.3.4 Based on the tentative implementation programme, the PH site would be developed in a single phase, and the planned population intake would be in year 2025.

**Table 2.3.1 Summary of Development Parameters Adopted for the TTIA**

<b>Development</b>	<b>Parameter</b>
HOS	2,500 flats
PRH	2,500 flats
Retail	3,209 GFA (m <sup>2</sup> )
Primary School	24 Classrooms
Social Welfare Facilities	4,450 NOFA (m <sup>2</sup> )

Note:

1. GFA denotes Gross Floor Area
2. NOFA denotes Net Operating Floor Area

## 3 TECHNICAL APPROACH OF TRANSPORT AND TRAFFIC ASSESSMENT

### 3.1 Proposed Area of Influence (AOI)

3.1.1 For the purpose of this TTIA, an Area of Influence (AOI) is proposed and presented in **Figure 3.1.1**. It covers the critical road junctions and road networks, which may be affected by the proposed development in Wang Chau. Necessary data and information within the AOI have been collected and assembled for assessments.

### 3.2 Planning Assumptions

3.2.1 The 2009-based Territorial Population and Employment Data Matrix (TPEDM) has been released by Planning Department (PlanD) in August 2011. It serves as the major input assumptions in the transport model which translates the demographic data into traffic and transport demand. The TPEDM covers base year 2009 and design years 2011, 2016, 2021, 2026 and 2031.

3.2.2 The TPEDM presents the population and employment assumptions by 405 Planning Data Zones (PDZs). The population and employment data for the corresponding PDZs within the AOI are presented in **Tables 3.2.1** below.

**Table 3.2.1 Population and Employment Data for the Corresponding PDZs within the AOI**

PDZ	Year					
	2009	2011	2016	2021	2026	2031
Design Population						
232	8,333	9,299	10,262	11,137	12,041	11,519
177	46,067	45,253	44,636	45,602	46,500	55,322
314	9,484	9,585	9,416	9,786	10,482	10,060
179	8,130	10,526	14,990	15,264	16,007	15,304
178	10,140	10,320	11,336	14,229	21,966	21,526
315	28,532	28,485	27,761	28,773	30,694	29,775
180	14,100	14,173	21,108	21,655	22,763	21,775
Employment						
232	4,800	4,720	4,398	4,571	4,179	3,871
177	8,408	8,344	8,463	8,696	8,812	8,744
314	4,600	4,005	4,018	3,945	3,918	3,890
179	1,786	2,149	3,183	3,189	3,172	3,122
178	13,660	13,552	15,840	16,374	17,256	16,911
315	16,066	15,829	15,679	15,069	14,831	14,628
180	3,365	2,505	4,254	4,230	4,184	4,100



### 3.3 Other Developments

- 3.3.1 There are some other major developments in the vicinity of the Project site, such as North East New Territories New Development Area, Lok Ma Chau Loop Development Area, Hung Shui Kiu New Development Area, Kam Tin South development, Yuen Long South Development, Long Bin housing Development. They may not be fully updated in 2009-based TPEDM. With reference to other concurrent studies, the population and employment assumptions of these major developments have been incorporated to update the TPEDM for the relevant PDZ zones as appropriate.
- 3.3.2 In addition, there are some residential developments in the vicinity of the Project site, such as Long Ping Station North and South Development, and ex-Yuen Long Estate development. The planning and employment assumptions of these residential developments have also been reviewed and incorporated into the development of traffic forecast, as appropriate.

### 3.4 2-Tier Transport Modelling

- 3.4.1 A two-tier modelling approach was adopted. The upper tier involved the use of Arup's in-house CTS-compatible TM which produced traffic forecasts on a strategic basis. The cordoned matrices from the TM would then be input into the lower tier LATM which would be used to predict the future year traffic flow on a more local perspective. The modelling approach is illustrated in **Figure 3.4.1** and also elaborated in the following sections.

#### *Upper Tier Model*

- 3.4.2 Arup's in-house CTS-compatible TM was applied as the upper tier model. The planning assumption as discussed in **Sections 3.2 & 3.3** had been incorporated into the TM. Adopting this TM would ensure compatibility with current government studies and would allow factors affecting global travel behaviour such as economic growth to be taken into account. The TM was capable of producing trip matrices for the base and future years based on demographic and socio-economic data such as population, employment and income etc., through which this traditional four-stage TM reflected trip generation/attraction, modal split, trip distribution, and trip assignment throughout the territory. The TM also offered the advantage of being capable of reflecting the traffic impacts especially the mode choice caused by changes of fundamental assumptions such as the demographic, socio-economic and infrastructures. It was hence recommended to adopt this model as the basis, and updated using the latest available planning data, land use data, planned and committed new infrastructures and local developments in the AOI for this study.
- 3.4.3 In order to ensure the traffic patterns predicted by the model could reasonably replicate the current traffic condition and hence provided confidence in forecasting the future year traffic, the output from the base year TM was compared against observed traffic flows as

published in the Annual Traffic Census for both the AM and PM peak hours. Year 2009 was selected as the Base Year of the TM.

### *Lower Tier Model*

- 3.4.4 Matrices cordoned from the TM were input into the LATM. Despite the LATM only performs traffic assignment, it offered the benefit of giving more detailed accounting of queuing, junction control and delays, making it more suitable for the evaluation of localized traffic impacts.
- 3.4.5 The development of the LATM would follow the same approach as TD's latest 2008-based BDTM. The compatibility between the 2 tiers was ensured by the control of the external trip ends, which were essentially the link flows of San Tin Highway, Kam Tin Road, Kam Sheung Road, Tai Lam Tunnel, Yuen Long Highway – Lam Tei and Castle Peak Road – Lam Tei, obtained from the TM. In other words, the LATM would consistent with the TM in terms of the socio-economic, transport infrastructure, road network, planning data and all relevant transport policy assumptions. The link flows and junction turning counts on a more local level would be produced by the LATM assignments for subsequent impact assessments.
- 3.4.6 Validation was also carried out for the LATM and additional focus was given to the comparison of observed and modelled flows at both strategic and local road links. Supplementary traffic survey had been conducted to provide traffic flows and turning counts which were not available in the Annual Traffic Census.
- 3.4.7 As survey counts represented the Year 2012 observed traffic flows, it was proposed to adopt Year 2012 as the LATM base year, and the LATM was validated to Year 2012 conditions. Trip matrices cordoned from the validated TM for the LATM model validation was projected from Year 2009 to 2012 by making reference to the published growth factors of various road links in AOI according to the Annual Traffic Census 2009 and 2012.
- 3.4.8 The LATM has been developed for the area of North West New Territories, where the area of Wang Chau, Yuen Long has been included.

## **3.5 Planning Assumptions for Project Site**

### *Design Years and Development Parameters Adopted*

- 3.5.1 Considering the implementation programme, traffic impact due to the PH developments in design years 2025 and 2031 would be assessed. The development parameters adopted in the corresponding assessment years should be referred to **Table 2.3.1**.

### *Adopted Trip Rates for PH Development*

- 3.5.2 To estimate the traffic generation of the proposed development, reference has been made to traffic generation survey conducted at the

existing similar developments in Yuen Long and Sha Tin areas where experience similar environment as the proposed PH site.

- 3.5.3 The surveys were undertaken during the periods 07:30 – 09:30 and 17:30 – 19:30 hours on a normal weekday. Surveyors were deployed to conduct classified traffic count surveys on the vehicular trips entering to and leaving from the selected developments. The observed peak traffic generation rates are tabulated in **Table 3.5.1**. The trip rates obtained from survey were compared against the trip rates stated in Transport Planning and Design Manual (TPDM) as shown in **Table 3.5.2**.

**Table 3.5.1 Summary on Surveyed Trip Rates at Similar Development**

Survey Location	Development Type	Unit	AM Peak		PM Peak	
			Generation Rate	Attraction Rate	Generation Rate	Attraction Rate
Yiu On Estate (Sha Tin)	PRH	pcu/hr/flat	0.0259	0.0157	0.0146	0.0179
Long Ping Estate (Yuen Long)	PRH	pcu/hr/flat	0.0246	0.0219	0.0120	0.0181
Kam Ying Court (Sha Tin)	HOS	pcu/hr/flat	0.0354	0.0186	0.0164	0.0245

**Table 3.5.2 Summary on Trips Rates Stated in TPDM**

Development Type	Upper / Mean / Lower	Unit	AM Peak		PM Peak	
			Generation Rate	Attraction Rate	Generation Rate	Attraction Rate
PRH (Average Flat Size 40 sqm)	Upper	pcu/hr/flat	0.0539	0.0439	0.0278	0.0339
	Mean		0.0432	0.0326	0.0237	0.0301
	Lower		<u>0.0325</u>	<u>0.0213</u>	<u>0.0196</u>	<u>0.0263</u>
HOS (Average Flat Size 50 sqm)	Upper	pcu/hr/flat	0.0761	0.0573	0.035	0.0451
	Mean		0.0622	0.0426	0.0297	0.0401
	Lower		<u>0.0483</u>	<u>0.0279</u>	<u>0.0244</u>	<u>0.0351</u>
Retail	Upper	pcu/hr/10 0 sqm GFA	0.3307	0.3342	0.3839	0.4504
	Mean		<u>0.2296</u>	<u>0.2434</u>	<u>0.3100</u>	<u>0.3563</u>
	Lower		0.1285	0.1525	0.2360	0.2622

Note:

- The values underlined indicate the trip rate adopted for assessment.

- 3.5.4 It is generally observed that the surveyed trips rates were lower for both generation and attraction for both AM and PM peaks. It is therefore recommended to adopt the lower values of TPDM as underlined in **Table 3.5.2** for assessment. For retail, the mean trip rates as stated in TPDM has been assumed.
- 3.5.5 For primary school, trip rates have been assumed by making reference to Transport Department's Technical Circular No. 05/2006 – Traffic Generation Survey 2006, as shown in **Table 3.5.3**.

**Table 3.5.3 Summary on Trips Rates Stated in Transport Department's Technical Circular No. 05/2006 – Traffic Generation Survey 2006**

Development Type	Unit	AM Peak		PM Peak	
		Generation Rate	Attraction Rate	Generation Rate	Attraction Rate
Primary School	pcu/hr/30classrooms	7	30	1	1

***Design Year Traffic Generation for the Proposed Development***

- 3.5.6 Based on the development parameters and the proposed trip rates as discussed in the sub-sections above, the total AM / PM peak hour vehicular traffic trips generated / attracted by the proposed development site are computed and shown in **Table 3.5.4**.

**Table 3.5.4 Traffic Generation by the Proposed Development (in units of pcu/hr)**

Development Type	Unit	AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Design Years 2025 and 2031					
PRH	pcu/hr	82	54	49	66
HOS	pcu/hr	121	70	61	88
Retail	pcu/hr	8	8	10	12
Primary School	pcu/hr	6	24	1	1
Total		217	156	121	167

- 3.5.7 It is noted that the trips generated / attracted by social welfare facilities fall outside the commuter peak hours, these trips are therefore excluded from the estimation of vehicular trip generation.

## 4 PROPOSED TRAFFIC ARRANGEMENT

### 4.1 Vehicular Access Arrangement

- 4.1.1 By studying the existing road network in the vicinity of the AOI, and the need to maintain the accessibility of the proposed development, the main road access for the PH site has been proposed.
- 4.1.2 The key objective of the vehicular access arrangement is established with due consideration to cater for the new demands from the developments, as well as improvements to the adjoining areas. The proposed new access road is shown in **Figure 4.1.1**.
- 4.1.3 Vehicular traffic to and from the PH site would take the routes through either Long Ping Road or Fung Chi Road. The vehicular access routings connecting to and from the PH site are illustrated in **Figure 4.1.1**. Details of the road access are discussed in the following section.

### 4.2 Proposed Access Road for Public Housing Site

- 4.2.1 The proposed access road would extend northwards from the junction and continue towards the west near the proposed GIC site. The proposed access road is in single-2-lane configuration. The cross section of the proposed access road is shown in **Figure 4.2.1**.
- 4.2.2 Based on traffic forecast results, the critical peak hour 2-way traffic flow in year 2031 is about 370 pcu/hr. Considering the design capacity of 1,800 pcu/hr for a single-2 lane access road, the V/C is about 0.21. Therefore, it is anticipated that the proposed access road in its single-2 lane configuration would be adequate to cater the traffic demand from the future development.
- 4.2.3 Due to the physical constraints of the site, the proposed access road would rise from the existing level at around +5.9mPD on Long Ping Road, then levels at +16.0mPD at upper platform of HOS site with a combination of gradient ranging between 4% to 8%.
- 4.2.4 In terms of the accessibility to eastern portion of the site, a primary access to the car parking and loading/unloading area has been proposed. A right turn pocket has also been proposed to minimise the interruption on prevailing traffic. A secondary access has been proposed on Long Ping Road opposite Kam Ping House of Long Ping Estate, which is intended for emergency uses only (as shown in **Figure 4.1.1**).
- 4.2.5 Run in/outs have been considered for western portion of the site and the GIC facility. However, the arrangement of the run-in/outs is yet to be determined at this stage of the study and is subject to the detailed design of the developments.



- 4.2.6 For the school site, a pick-up/drop-off area and a run in/out (as shown in **Figure 4.1.1**) have been proposed. A minimum sight distance of 50m has been allowed.
- 4.2.7 A GMB lay-by and a Taxi stand have been planned at the access road (as shown in **Figure 4.1.1**). The proposed GMB lay-by could serve as feeder services to bring residents to West Rail Long Ping MTR Station, and its details are discussed in **Section 5**.
- 4.2.8 The requirement for greening on roads has been reviewed with reference to Development Bureau's Technical Circular No. 2/2012 "Allocation of Space for Quality Greening on Roads". As stipulated in the Technical Circular, localised discontinuities of greening zones for standard provision of traffic and transport facilities, such as vehicular run-in/out, pedestrian crossings, bus stops, taxi stands, etc. would be allowed and sufficient clearance between proposed trees and roadside facilities should also be allowed for consideration of road safety. Other than these, sound justifications with alternative greening measures for the exemption should be provided such as (i) difficulty in maintenance of the planting at traffic-sensitive locations such as high speed roads/expressways; (ii) significant constraints on existing site areas (e.g. road widening projects restricted by buildings, or locations with unfavourable conditions for healthy planting); (iii) not cost-effective, e.g., requiring resumption of a substantial amount of private land, incurring considerable maintenance costs, requiring a substantial amount of site formation works in return of a greening effect that is disproportionate to the costs or resources involved, etc.
- 4.2.9 In consideration of the proposed access road, it would accommodate a large number of traffic and transport facilities. Along the western bound of the road, a pick-up/drop-off area (about 60m) for the school site, a GMB lay-by (about 40m), a Taxi Stand (about 30m) and a run-in/out for the GIC site would need to be allowed. Besides, sufficient sightline distances should be allowed for the entire curvature of the road around the school and a section of road to west of the school pick-up/drop-off area so as to maintain a clear visibility for road safety purpose. As such there is limited space for roadside greenings on the western bound of the road. On the eastern bound, greening zone is constrained by a run-in/out for refuse collection point, two car parking run-ins, two EVA run-in/outs and pedestrian crossings (location to be determined in detailed design stage). Sufficient sightline distance is also required at the curvature of the road junction. Besides for the section of road to the west of the school pick-up/drop-off area, substantial amount of site formation work (i.e. bored pile wall) is proposed and if greening zone is considered, additional resumption of land and graves to its north is required which is considered not cost-effective and not acceptable from social perspectives. Therefore the remaining space that could be allocated for possible quality greenings is also limited.

- 4.2.10 Taking into consideration of the above constraints including the road safety, the proposed traffic and transport facilities, additional resumption of land and grave required, as well as the target of maximising the net site area for PH development, greening zone on the proposed access road will be proposed as far as possible and where considered not practicable, alternative greening measures within the housing site will be provided.

### 4.3 Proposed Staggered Crossing Arrangement

- 4.3.1 As shown in **Figure 4.1.1**, a staggered pedestrian crossing with a central island will be provided at the access road leading to PH site. The crossing would be arranged such that pedestrians stepping onto the refuge island always turn towards the approaching traffic to give them a better view of it for safety reasons. Under this proposed scheme, it is anticipated that the overall junction performance would be operating at satisfactory level and the details of future year assessment are presented in **Section 6.3**.

## 5 PROVISION OF TRANSPORT FACILITIES

### 5.1 Existing Public Transport Services

#### *Road-based Public Transport Services*

- 5.1.1 Two bus termini can be found in the vicinity of the Project site. They are located at Wang Lee Street and Long Ping Estate respectively. At present Long Ping bus terminus provides service for 8 franchised bus routes, and 3 of which terminate at the terminus. A summary of public transport services operating in the vicinity of the Project site are shown in **Figure 5.1.1** and **Table 5.1.1**.

**Table 5.1.1 Public Transport Services Operating in the Vicinity of the Project site**

Route No	Origin / Destination	
Franchised Bus (FB)		
68A	Long Ping Estate Bus Terminus	Tsing Yi Railway Station Bus Terminus
76K	Long Ping Estate Bus Terminus	Wah Ming Bus Terminus
263M	Fu Tai Estate Bus Terminus	Tsing Yi Railway Station Bus Terminus
264M	Tin Yan Estate Bus Terminus	Tsing Yi Railway Station Bus Terminus
268B	Long Ping Railway Station	Hung Hom Ferry Concourse Bus Terminus
268C	Long Ping Railway Station	Kwun Tong Ferry Bus Terminus
269D	Tin Fu	Lek Yuen Bus Terminus
276	Tin Tsz Bus Terminus	Sheung Shui Bus Terminus
276P	Tin Tsz Bus Terminus	Sheung Shui Bus Terminus
B1	Tin Shui Wai Railway Station	Lok Ma Chau Spur Line
E34	Tin Shui Wai Town Centre Bus Terminus	Airport (Ground Transportation Centre) Terminus
K66	Long Ping Estate Bus Terminus	Tai Tong Bus Terminus
K68	Yuen Long Industrial Estate Bus Terminus	Yuen Long Park
K73	Tin Heng Estate Public Transport Interchange	Yuen Long Plaza
K74	Tin Shui Bus Terminus	Yuen Long (East) Public Transport Interchange
N269	Tin Tsz Bus Terminus	Mei Foo Bus Terminus
N30	Yuen Long (East) Bus Terminus	Tung Chung Railway
Green Minibus (GMB)		
74	Yuen Long (Fook Hong Street) Minibus Terminus	Shing Uk Tsuen
74A	Yuen Long (Fook Hong Street) Minibus Terminus	Tung Tau Wai
77	Tin Shui Wai Town Centre Public Transport Interchange	Lok Ma Chau (San Tin) Public Transport Interchange
77A	Grandeur Terrace Terminus	Pok Oi Hospital Terminus
79S	Tin Chung Court Bus Terminus	Lok Ma Chau Control Point



### ***Rail-based Public Transport Services***

- 5.1.2 The West Rail (WR) line forms part of the strategic rail network in Hong Kong, which links Northwest New Territories with main urban area. The first phase of West Rail (WR) has been in operation since 20 December 2003 providing a railway connection between Tuen Mun to Sham Shui Po via Yuen Long. The second phase of WR was completed in 2009 and the operation began on 16 August 2009. This phase has extended the service from Nam Cheong Station in Sham Shui Po to Hung Hom Station via Austin Station in Jordan and Tsim Sha Tsui East Station.
- 5.1.3 Long Ping Station is located at the southeast of the proposed PH site. The proposed PH site is largely covered by the 500m rail catchment of the Long Ping Station (the commonly agreed acceptable walking distance for railway services in Hong Kong). There are seven exits / entrances provided in Long Ping Station. Exit A is the nearest entrance to the proposed PH site.
- 5.1.4 Comprehensive rail passenger surveys have been conducted at the entries / exits of the Long Ping Station. It is observed that the existing AM peak hour total entry and exit rail passenger flow of Long Ping Station are about 4,400 and 2,600 passengers per hour.

## **5.2 Proposed Public Transport Facilities**

- 5.2.1 In support of the transport strategy to promote the use of public transport facilities, a GMB lay-by at the access road of development site and bus lay-bys along the two sides of Long Ping Road are proposed. The following sub-sections present a preliminary estimate on the public transport demand and the recommended public transport requirements to cater the future demand generated by the PH site.

### ***Public Transport Demand***

- 5.2.2 Based on Arup's in-house CTS-compatible TM, it is estimated that the modal share of rail-based and road-based public transport in Wang Chau were about 58% and 24% respectively as shown in **Table 5.2.1**. The higher modal share of rail-based public transport in Wang Chau as compared to the modal share of entire Yuen Long District can be attributed by its proximity to the West Rail Long Ping MTR station.
- 5.2.3 The reliance of short-shuttle trips for rail passenger from the development site to West Rail Long Ping MTR Station has also been reviewed. Considering a large portion of the PH site are within the rail catchment area, it is therefore assumed that all the rail-based public transport trips generated by PRH site would be walk trips, while half of the rail-based public transport trips generated by HOS site would be walk trips and the remaining half would use GMB as the feeder services. The assumptions for the public transport demand generated by the primary school follows the same as HOS site.

**Table 5.2.1 Modal Share of Yuen Long and Wang Chau**

Area	Private Mode	Public Transport	
		Rail	Road-based
Yuen Long	21%	48%	31%
Wang Chau	18%	58%	24%

5.2.4 The demand on public transport, both short-shuttle trips to West Rail Long Ping MTR Station and external bus services, by person trips generated and attracted by the development site was estimated by making reference to the Arup's in-house pedestrian trip surveys conducted for similar developments. For PRH and HOS, the surveyed pedestrian trip generation rates were applied to the proposed number of flats to derive the trips, while for primary school site, the surveyed pedestrian trip generation rates were applied to the proposed number of classrooms. The trip rates and the estimated pedestrian trips are tabulated in **Table 5.2.2** and **Table 5.2.3**.

**Table 5.2.2 Pedestrian Generation Rates**

Development Type	Unit	AM Peak		PM Peak	
		Generation Rate	Attraction Rate	Generation Rate	Attraction Rate
PRH	persons/hr/flat	0.464	0.201	0.194	0.440
HOS	persons/hr/flat	0.494	0.081	0.158	0.298
Primary School	Persons/hr/classroom	4.733	17.533	1.467	0.333

5.2.5 For the retail and social welfare facilities, since they are expected to serve mainly the site residents, and it will only induce minimal pedestrian trips on the external walkway network during commuter peak hours. These development types are therefore excluded from the estimation of pedestrian trip generation.

**Table 5.2.3 Estimated Demand on Public Transport (in units of persons/hr)**

Development Type	Unit	AM Peak			PM Peak		
		Generation	Attraction	2-way	Generation	Attraction	2-way
Estimated Trips for 2,500 PRH Flats	persons/hr	1,160	503	1,663	485	1,100	1,585
Estimated Trips for 2,500 HOS Flats	persons/hr	1,235	203	1,438	395	745	1,140
Estimated Trips for 24 classroom primary school	persons/hr	114	421	535	35	8	43
Total		2,509	1,127	3,636	915	1,853	2,768

**Table 5.2.4 Estimated Demand on Road-based Public Transport and Short-shuttle Trips using GMB Feeder Services (in units of persons/hr)**

Development Type	Road-based Public Transport	Rail-based Public transport - GMB feeder services
PRH	334	0
HOS	356	430
Primary School	33	40
<b>Total</b>	<b>723</b>	<b>470</b>

Note:

1. To account for the peak within the peak hour, a surge factor of 1.2 was applied to estimate the demand.

- 5.2.6 Based on the critical peak hour one-way total demand (about 2,509 persons/hr) i.e. AM peak generation as indicated in **Table 5.2.3**, it is estimated that there are some 730 and 470 persons per hour demand on road-based public transport and short-shuttle trips using GMB feeder services (as shown in **Table 5.2.4**).

#### *Preliminary Layout and Service Capacity of the Proposed Public Transport Facilities*

- 5.2.7 The preliminary layouts of the proposed lay-by at the access road of development site and bus lay-bys along the two sides of Long Ping Road are shown in **Figure 4.1.1**. The proposed lay-by at the access road would accommodate 1 GMB bay and 1 taxi bay; while the proposed bus lay-by would accommodate 1 bus bay for each direction of Long Ping Road. **Table 5.2.5** summarizes the provision of the proposed public transport facilities.

**Table 5.2.5 Summary on Provision of the Proposed Public Transport Facilities**

Location	Facility Type	Provision
Long Ping Road (for each direction)	Bus Bay	52m
Access road of development site	Green Minibus (GMB)	40m
	Taxi	30m

Note:

1. With reference to TPDM, the width of the single width bus bay is 3.5m and the length is 40.0m which allows 1 boarding/alighting space and 2 spaces for stacking. If only one route is assigned to this bay, there will be 2 stacking spaces for the bus route. However, these spaces are not used by buses of other routes even if the spaces are not occupied;
2. With reference to TPDM, public light bus bays should be 3.0m wide between kerbs with a minimum length of 30 metres for 4 PLBs. At least one double-width bay should be provided to facilitate bypassing. A passenger platform with shelter and queue railing should have a minimum width of 2.5m and minimum 2.0m wide without shelter; and
3. With reference to TPDM, taxi stands should be 3.0m in width from the kerb with a minimum length for 3 taxis. The length of taxi stand should accommodate some stacking requirements of off-peak hours when turn over is low.

- 5.2.8 A preliminary estimate of the road-based public transport requirements to meet the demand as described above is shown in **Table 5.2.6**. 1 bus route and 1 - 2 GMB routes are initially recommended. The service capacity of the proposed public transport facilities (1,000 and 500 persons per hour for franchised bus and GMB, respectively) would adequately cater for the road-based public transport demand (730 persons per hour) and feeder to rail-based public transport demand using GMB services (470 persons per hour) from the developments.

- 5.2.9 It shall be noted that the final operation plan of the public transport would be subject to future demand, and would need to be revisited by the respective operators. Re-routing of existing public transport services along Long Ping Road to the development site could also supplement these proposed public transport services.

**Table 5.2.6 Estimates on Service Capacity**

	Franchised Bus	GMB
Number of routes provided	1	1 - 2
Proposed AM peak headway (minutes)	7	2
Capacity (persons)	135	16
Occupancy rate in AM peak	0.9	1.0
Estimated service capacity in AM peak (persons per hour)	1,000	500

## 5.3 Parking and Servicing Facilities Provisions of the Proposed Developments

- 5.3.1 Private car, motorcycle, and light goods vans parking spaces and loading/unloading bays would be provided inside the proposed developments.
- 5.3.2 The proposed parking and servicing requirements are estimated in accordance with the District-Based Parking Standards (DBPS), TD's Departmental Circular No. 2/2012, and the Hong Kong Planning Standards and Guidelines (HKPSG). **Tables 5.3.1** summarises the requirements for the PH site.

**Table 5.3.1 Summary on the Parking and Servicing Requirements for the PH Site**

Facilities	Standard
<b>PRH - Domestic</b>	
Private Car	Lower – 1 per 41 flats Higher – 1 per 37 flats
Motorcycle	1 per 210 flats
Light Goods Vans	Lower – 1 per 400 flats Higher – 1 per 300 flats
Loading/Unloading Bay	1 per block
Accessible Car Parking	Subject to the total no. of car parking space in lot: 1-50 = 1 51-150 = 2 151-250 = 3 251-350 = 4 351-450 = 5 Above 450 = 6
<b>PRH – Non-Domestic (Retail/Commercial)</b>	
Private Car	Lower – 1 per 300 sqm GFA Higher – 1 per 200 sqm GFA
Loading/Unloading Bay	Lower – 1 per 1200 sqm GFA Higher – 1 per 800 sqm GFA

Facilities	Standard
Accessible Car Parking	Subject to the total no. of car parking space in lot:
	1-50 = 1
	51-150 = 2
	151-250 = 3
	251-350 = 4
	351-450 = 5
	Above 450 = 6
<b>HOS - Domestic</b>	
Private Car	Lower – 1 per 19 flats Higher – 1 per 13 flats
Motorcycle	1 per 110 flats
Bicycle	1 per 7.5 flats
Loading/Unloading Bay	1 per block
Visitor Car Parking	Lower – 2 per block Higher – 3 per block
Accessible Car Parking	Subject to the total no. of car parking space in lot:
	1-50 = 1
	51-150 = 2
	151-250 = 3
	251-350 = 4
	351-450 = 5
	Above 450 = 6

## 5.3.3

With reference to the development parameters and assumptions presented in **Section 3.5** and the parking and loading/unloading facilities requirements as shown in **Tables 5.3.1**, the recommended car parking and loading/unloading facilities for the proposed PH site are summarised in **Tables 5.3.2**. In view of the transport strategy and the close proximity to West Rail Long Ping MTR Station as discussed in **Sections 5.1** and **5.2**, it is proposed to adopt the low-end provision.

**Table 5.3.2 Recommended Provision of Car Parking and Loading/Unloading Facilities**

Facilities	Standard	Recommended Provision
<b>PRH – Domestic</b>		
Private Car	Lower – 1 per 41 flats	61
Motorcycle	1 per 210 flats	12
Light Goods Vans	Lower – 1 per 400 flats	7
Loading/Unloading Bay	1 per block	5
Accessible Car Parking	Subject to the total no. of car parking space in lot:	2
	51-150 = 2	
<b>PRH – Non-Domestic</b>		
Private Car	Lower – 1 per 300 sqm GFA	11
Loading/Unloading Bay	Lower – 1 per 1200 sqm GFA	3
Accessible Car Parking	Subject to the total no. of car parking space in lot:	1
	1-50 = 1	
<b>HOS – Domestic</b>		
Private Car	Lower – 1 per 19 flats	132
Motorcycle	1 per 110 flats	23
Bicycle	1 per 7.5 flats	334
Loading/Unloading Bay	1 per block	5

Facilities	Standard	Recommended Provision
Visitor Car Parking	Lower – 2 per block	10
Accessible Car Parking	Subject to the total no. of car parking space in lot: 51-150 = 2	2

## Note:

1. Estimates based on the 50%:50% split of PRH and HOS. of the total no. of 5,000 flats.
2. Estimates based on the 50%:50% split of PRH and HOS. of the total no. of 10 blocks.
3. Estimates based on the total no. of retail 3,209 sqm GFA.



## 6 TRAFFIC IMPACT ASSESSMENT

### 6.1 Existing Road Network

- 6.1.1 The existing major transportation linkages are shown in **Figure 6.1.1**. The main road network in the vicinity includes Yuen Long Highway, Long Tin Road and Castle Peak Road – Yuen Long Section. These roads would serve as the main external road access for the Project site. In addition, Fung Chi Road, Fuk Hi Street, Long Ping Road and Wang Lok Street would serve as the connections between the proposed PH site and Yuen Long Town.

#### **Yuen Long Highway**

- 6.1.2 Yuen Long Highway is an expressway in a dual-3 configuration, running in the east-west direction at the south of Yuen Long Town. It connects Tsing Long Highway in the east and Tuen Mun Road in the west. It caters mainly for traffic between New Territories West and Kowloon. Pok Oi Interchange is located at the junction amongst Yuen Long Highway and Castle Peak Road – Yuen Long Section, whereby majority of the traffic to Yuen Long Town from Kowloon will utilise this interchange. Pok Oi Interchange is currently operating over its capacity. Traffic queues are generally observed on the slip roads between Yuen Long Highway and Pok Oi Interchange. Tong Yan San Tsuen Interchange is located at the junction amongst Yuen Long Highway and Long Tin Road, whereby majority of the traffic to Yuen Long Town from Tuen Mun will utilise this interchange. Tong Yan San Tsuen Interchange is currently operating well within its capacity during normal peaks hours.

#### **Long Tin Road**

- 6.1.3 Long Tin Road is a primary distributor in dual carriageway configuration with 2 traffic lanes running in northbound and 3 traffic lanes running in southbound. It spans from Tin Tze Road in the north near Tin Tsz Estate and Yuen Long Highway in the south near The Eldorado. It currently serves as a major connector road between Yuen Long Highway, Castle Peak Road – Ping Shan, Wang Tat Road, Ma Wang Road, Long Ping Road as well as Tin Tsz Road in Tin Shui Wai.

#### **Castle Peak Road – Yuen Long Section**

- 6.1.4 Castle Peak Road – Yuen Long (Yuen Long Main Road) is a district distributor in dual carriageway configuration with one traffic lane running in each direction. It is the traditional main road in Yuen Long running in the middle of the town. Over the decades, Yuen Long expanded and Castle Peak Road was evolved as a main traffic street characterised with heavy people movements and immense kerb side activities. Most of the traffic was diverted to use Long Yip Street/Ma Wang Road/Wang Tat Road and Yuen Long Highway instead leaving most of the public transport services behind. Providing the Light Rail Transit (LRT) in the middle of the carriageway further pushed the

motorized traffic away from the Castle Peak Road and thus public transport services dominate traffic on it.

### **Fuk Hi Street**

- 6.1.5 Fuk Hi Street is a local distributor in single-2 configuration with one traffic lane running in each direction. It is the key western access to Yuen Long Industrial Estate. It connects Long Ping Road to the south, which links to Long Tin Road and eventually to Yuen Long Highway. Numerous frontal vehicular accesses can be found along Fuk Hi Street with frequent on-street loading / unloading activities.

### **Long Ping Road**

- 6.1.6 Long Ping Road is a district distributor in dual-2 configuration. It connects Fuk Hi Street in the north at the northern end of Long Ping Estate and Long Tin Road in the south near Chun Hing San Tsuen. It currently serves as a major connecting road between Yuen Long Industrial Estate (YLIE), Long Ping Estate, Tin Shui Wai and Yuen Long Highway.

### **Wang Lok Street**

- 6.1.7 Wang Lok Street is a local distributor in dual-2 configuration. It is the key vehicular access to YLIE in the east. It connects Wang Tat Road / Long Yip Street in the south near Long Ping Station of West Rail. Wang Lok Street also provides access to Tung Tau Industrial Area via Fu Yip Street. Numerous frontal vehicular accesses can be found along Wang Lok Street with frequent on-street loading / unloading activities.

### **Wang Tat Road / Long Yip Street**

- 6.1.8 Wang Tat Road / Long Yip Street is a primary distributor in a single-3 configuration running in the eastbound direction only. It connects Shui Pin Wai Interchange in the west and Castle Peak Road – Yuen Long in the east. It serves as a key traffic corridor in Yuen Long complement to Castle Peak Road.

### **Yuen Long On Lok Road / Ma Wang Road**

- 6.1.9 Yuen Long On Lok Road / Ma Wang Road is a primary distributor in a single-3 configuration running in the westbound direction only. It connects Shui Pin Wai Interchange in the west and Castle Peak Road – Yuen Long in the east. It also serves as a key traffic corridor connecting Yuen Long Highway and the northern part of Yuen Long. Three intersections can be found between Wang Tat Road / Long Yip Street and Yuen Long On Lok Road / Ma Wang Road which enables the access between YLIE, Tung Tau Industrial Area, Yuen Long Town as well as Yuen Long Highway.



## 6.2 Base Year Traffic Condition

6.2.1 The traffic condition of the base year 2012 at major roads are presented in Link flow (in units of pcu/hr), and Volume/Capacity (V/C) ratio in **Table 6.2.1**. The location of the road links is shown in **Figure 6.1.1**. Volume to Capacity (VC) Ratio indicates the proportion of peak hour traffic flow to the capacity of a road link. A higher VC ratio of a road indicates a heavy usage of the road link in concern, inter alia. Reviewing the VC ratio of major road link in the area helps identifying the spare capacity in the existing road network. Making a better use of the road network helps minimising the additional capital investment for further development in Yuen Long.

**Table 6.2.1 Traffic flow (in pcu/hr) and V/C ratio of Existing Major Road Links**

Key Corridors	Road Type	Configuration	Design Capacity	2012 Peak Hour Flow (pcu/hr)		2012 Peak Hour V/C Ratio		
				AM	PM	AM	PM	
				L1 – Yuen Long Highway – Tin Shui Wai West Interchange & Tong Yan San Tsuen Interchange	EB WB	EX	D3	6,100
L2 – Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange	EB WB	EX	D3	6,100	4,300 4,030	3,950 4,180	0.70 0.66	0.65 0.68
L3 – Long Tin Road – Castle Peak Road – Yuen Long & Yuen Long Highway	SB NB	PD	D3	6,100	4,100 2,660	2,260 2,900	0.67 0.44	0.37 0.48
L4 – Long Ping Road – Shui Pin Wai Interchange & Fung Chi Road	EB WB	DD	D2	2,850	600 750	660 800	0.21 0.26	0.23 0.28

Note:

1. A V/C ratio below 1.0 is considered acceptable. A V/C ratio above 1.0 indicates the onset of mild congestion and a V/C ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A V/C ratio above 1.2 indicates the onset of more serious congestion.
2. Calculated traffic flow with reference to Annual Traffic Census 2012.

6.2.2 The results indicate that all assessed road links are currently operating at satisfactory level.

6.2.3 The major junctions in the vicinity of the Project site have been identified, and their locations are shown in **Figure 6.1.1**. The traffic condition for the base year 2012 at these major junctions are presented in Reserved Capacity (RC) for signal-controlled junction and Design Flow to Capacity (DFC) ratio for priority junction in **Table 6.2.2**. The base year 2012 peak hour traffic flow are presented in **Figure 6.2.1**.

**Table 6.2.2 Assessment on Existing Major Junctions**

Junction	Junction Type	2012	
		AM	PM
J1 – Fuk Hi Street / Long Ping Road	Signal	48.6%	>50%
J2 – Fuk Hi Street / Wang Lok Street	Signal	45.0%	47.2%
J3 – Long Ping Road / Fung Chi Road	Signal	>50%	>50%

Junction	Junction Type	2012	
		AM	PM
J4 – Fung Chi Road / Wang Tat Road / Ma Wang Road / Ping Wui Street	Signal	38.1%	>50%
J5 – Wang Lok Street / Wang Tat Road / Long Yip Street / Yuen Long On Lok Road / Ma Wang Road	Signal	34.8%	>50%
J6 – Po Yip Street / Long Yip Street / Yuen Long On Lok Road	Signal	41.1%	>50%
J7 – Shui Bin Wai Interchange	Signal	>50%	>50%
J8 – Long Ping Road / Long Ping Estate Ingress	Priority	0.39	0.47
J9 – Long Ping Road / Long Ping Estate Egress	Priority	0.78	0.63

Note:

1. A signal-controlled junction with a Reserved Capacity (RC) of 0% implies that it is operating at capacity while a negative RC suggests that it is over capacity.
2. For priority junctions and roundabouts, the performance indicator is the Design Flow to Capacity (DFC) ratio. A DFC ratio less than 1.0 (or in positive percentage) indicates that the junction is operating within design capacity. A DFC ratio greater than 1.0 (or in negative percentage) indicates that the junction is overloaded, resulting in traffic queues and longer delay time to the minor arm traffic.

6.2.4 The results indicate that all the assessed junctions are currently operating at satisfactory.

## 6.3 Future Year Assessment

6.3.1 The traffic forecast for the design year 2025 and 2031 at major roads under with and without development scenarios are presented in Link flow (in units of pcu/hr) and Volume/Capacity (V/C) ratio in **Table 6.3.1**. The location of the road links is shown in **Figure 6.1.1**.

**Table 6.3.1 Traffic Forecast Result of Major Road Links for Design Years 2025 and 2031 (Traffic flow in pcu/hr and V/C ratio)**

Road Link		Road Type	Design Capacity	2025 Without Development		2025 With Development		2031 Without Development		2031 With Development	
				AM	PM	AM	PM	AM	PM	AM	PM
L1 - Yuen Long Highway – Tin Shui Wai West Interchange & Tong Yan San Tsuen Interchange	EB	EX	6,100	5,060 (0.83)	4,700 (0.77)	5,075 (0.83)	4,722 (0.77)	5,816 (0.95)	5,897 (0.97)	5,829 (0.96)	5,912 (0.97)
	WB			5,332 (0.87)	4,340 (0.71)	5,364 (0.88)	4,364 (0.72)	6,078 (1.00)	5,353 (0.88)	6,098 (1.00)	5,371 (0.88)
L2 - Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange	EB	EX	6,100	6,318 (1.04)	5,840 (0.96)	6,326 (1.04)	5,866 (0.96)	7,095 (1.16)	7,009 (1.15)	7,106 (1.16)	7,037 (1.15)
	WB			4,520 (0.74)	4,585 (0.75)	4,539 (0.74)	4,607 (0.76)	4,943 (0.81)	5,405 (0.89)	4,958 (0.81)	5,429 (0.89)
L3 - Long Tin Road – Castle Peak Road – Yuen Long & Yuen Long Highway	SB	PD	6,100	4,420 (0.72)	3,397 (0.56)	4,456 (0.73)	3,422 (0.56)	4,990 (0.82)	4,110 (0.67)	5,013 (0.82)	4,128 (0.68)
	NB			2,430 (0.40)	3,053 (0.50)	2,455 (0.40)	3,083 (0.51)	2,440 (0.40)	3,171 (0.52)	2,459 (0.40)	3,195 (0.52)
L4 - Long Ping Road – Shui Pin Wai Interchange & Fung Chi Road	EB	PD	2,850	594 (0.21)	578 (0.20)	629 (0.22)	641 (0.23)	606 (0.21)	583 (0.20)	636 (0.22)	644 (0.23)
	WB			575 (0.20)	795 (0.28)	681 (0.24)	870 (0.31)	649 (0.23)	846 (0.30)	749 (0.26)	914 (0.32)

Note:

1. A V/C ratio below 1.0 is considered acceptable. A V/C ratio above 1.0 indicates the onset of mild congestion and a V/C ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A V/C ratio above 1.2 indicates the onset of more serious congestion.

6.3.2 The results indicate that all assessed road links would be operating at satisfactory level except for the eastbound of L2 (Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange) where the V/C ratio would start to exceed the capacity in 2025 and increase to 1.16 in 2031 for both the with and without development scenarios. By comparing the V/C ratio of L2 for the without development scenario in 2025 and 2031, the contribution of traffic from the proposed developments in Wang Chau on L2 is minimal. Therefore, the exceedance is contributed from the growth of regional traffic and the impact of the subject development is negligible. No road improvement works due to the proposed development is required.

6.3.3 The traffic forecast for the design years 2025 and 2031 at major junctions under with and without development scenarios are presented in Reserved Capacity (RC) for signal-controlled junction and Design Flow to Capacity (DFC) ratio for priority junction in **Table 6.3.2**. The design years 2025 and 2031 peak hour traffic flow under with and without development scenarios are presented in **Figure 6.3.1** to **Figure 6.3.4**.

**Table 6.3.2 Traffic Forecast Result of Major Junctions for Design Years 2025 and 2031**

Junction	Junction Type	2025 Without development		2025 With development		2031 Without development		2031 With development	
		AM	PM	AM	PM	AM	PM	AM	PM
J1 Fuk Hi Street / Long Ping Road	Signal	>50%	>50%	>50%	>50%	>50%	>50%	>50%	>50%
J2 Fuk Hi Street / Wang Lok Street	Signal	41%	29%	32%	25%	32%	27%	25%	25%
J3 Long Ping Road / Fung Chi Road (Note 3)	Signal	>50%	>50%	38%	33%	>50%	>50%	38%	27%
J4 Fung Chi Road / Wang Tat Road / Ma Wang Road	Signal	41%	>50%	40%	>50%	24%	>50%	19%	>50%
J5 Wang Lok Street / Wang Tat Road / Ma Wang Road / Long Yip Street / Yuen Long On Lok Road (Note 4)	Signal	40%	>50%	33%	>50%	12%	>50%	10%	>50%
J6 Po Yip Street / Long Yip Street / Yuen Long On Lok Road (Note 5)	Signal	>50%	>50%	>50%	>50%	46%	>50%	38%	>50%
J7 Shui Bin Wai Interchange	Signal	>50%	>50%	>50%	>50%	>50%	>50%	49%	>50%
J8 Long Ping Road / Long Ping Estate Ingress	Priority	0.41	0.50	0.41	0.50	0.46	0.50	0.46	0.50
J9 Long Ping Road / Long Ping Estate Egress	Priority	0.88	0.70	0.89	0.70	0.89	0.70	0.89	0.70

Note:

1. A signal-controlled junction with a Reserved Capacity (RC) of 0% implies that it is operating at capacity while a negative RC suggests that it is over capacity.
2. For priority junctions and roundabouts, the performance indicator is the Design Flow to Capacity (DFC) ratio. A DFC ratio less than 1.0 (or in positive percentage) indicates that the junction is operating within design capacity. A DFC ratio greater than 1.0 (or in negative percentage) indicates that the junction is overloaded, resulting in traffic queues and longer delay time to the minor arm traffic.
3. For the without development scenario, J3 would remain the same as existing. For the with development scenario, a staggered pedestrian crossing will be provided at the access road leading to the PH site;
4. It is assumed that the proposed junction improvement works proposed by West Rail Long Ping South Development would be in place as shown in **Figure 6.4.1**.
5. It is assumed that the proposed junction improvement works proposed by Highways Department (HyD) would be in place as shown in **Figure 6.4.2**.

- 6.3.4 The results indicate that all assessed junctions would be operating at satisfactory level in design years 2025 and 2031. As mentioned in **Section 4.3**, a staggered pedestrian crossing at the access road leading to PH site will be provided. No other improvement work due to the development is required.

## 7 PEDESTRIAN IMPACT ASSESSMENT

### 7.1 Existing Pedestrian Condition

#### *Existing Pedestrian Network*

- 7.1.1 **Figure 7.1.1** shows the inventory of existing pedestrian network in close vicinity of the Project site. The existing footpaths (particularly along Long Ping Road Northern Footpath, Pedestrian Crossing across Long Ping Road, Fung Chi Road Eastern Footpath, and Wang Tat Road Northern Footpath) provide the major pedestrian connection between the proposed PH site and West Rail Long Ping MTR Station.
- 7.1.2 In addition, pedestrian can use the elevated walkway system through Long Ping Estate as an alternative to gain access to West Rail Long Ping MTR Station.

#### *Existing Pedestrian Condition*

- 7.1.3 Pedestrian count surveys were conducted on a normal weekday in close vicinity of the Project site. It is anticipated that the peak pedestrian flows would be critical during the commuting period. The counts were undertaken during the periods 0730-0930 and 1730-1930 hours. The morning and evening peak hours were found to be 0730-0830 and 1830-1930 hours respectively. Based on the pedestrian count surveys, the existing pedestrian condition has been assessed under the “Level of Service” approach.

#### *Level of Service (LOS)*

- 7.1.4 According to the definition in TPDM (Volume 6, Chapter 10, Section 10.4.2), “Level of Service” is primarily based on the density of people in a given space and has six levels. **Table 7.1.1** shows the details of these six LOS levels which are ‘quantified’ in terms of pedestrian flow rates.
- 7.1.5 For the purposes of this pedestrian impact assessment, a LOS of C or above would be considered acceptable.

**Table 7.1.1 Level of Service (LOS) for Walkway**

LOS	Flow rate (ped/min/m)	Description
A	<= 16	Pedestrians basically move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.
B	16 - 23	Sufficient space is provided for pedestrians to freely select their walking speeds, to bypass other pedestrians and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians and to respond to their presence in the selection of walking paths.

LOS	Flow rate (ped/min/m)	Description
C	23 - 33	Sufficient space is available to select normal walking speeds and to bypass other pedestrians primarily in unidirectional stream. Where reverse direction or crossing movement exist, minor conflicts will occur, and speed and volume will be somewhat lower.
D	33 - 49	Freedom to select individual walking speeds and bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflicts is high and its avoidance requires changes of speeds and position. The LOS provides reasonable fluid flow; however considerable friction and interactions between pedestrians are likely to occur.
E	49 - 75	Virtually, all pedestrians would have their normal walking speeds restricted. At the lower range of this LOS, forward movement is possible only by shuffling. Space is insufficient to pass over slower pedestrians. Cross- and reverse-movement are possible only with extreme difficulties. Design volumes approach the limit of walking capacity with resulting stoppages and interruptions to flow.
F	> 75	Walking speeds are severely restricted. Forward progress is made only by shuffling. There are frequent and unavoidable conflicts with other pedestrians. Cross- and reverse-movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristics of queued pedestrians than of moving pedestrian streams.

7.1.6 **Table 7.1.2** presents the results of the assessment on LOS of the major existing footpaths. To account for the peak within the peak hour, a surge factor of 1.2 was applied to the pedestrian flow rates to represent the peak 5-minute situation for the pedestrian serviceability assessments. **Figure 7.1.1** shows the location of the assessed pedestrian facilities.

**Table 7.1.2 Assessment on LOS of Existing Footpaths**

	Location	Type	Clear Width (m)	Ped Flow 2-way (ped/hr)		Ped Flow Rate (ped/m/min)		LOS	
				AM	PM	AM	PM	AM	PM
F1	Long Ping Road (Northern Footpath)	Footpath	3.6	147	248	1.1	1.9	A	A
F2	Fung Chi Road (Eastern Footpath)	Footpath	3	181	315	1.8	3.2	A	A
F3	Wang Tat Road (Northern Footpath)	Footpath	3	176	262	1.8	2.6	A	A

Notes:

1. Clear width in metres based on on-site measurement.
2. Pedestrian flow rates are computed based on effective width, by assuming 0.5m lateral clearance on both sides.

7.1.7 The results indicate all assessed existing footpaths are operating with LOS A. This indicates that there are currently no pedestrian circulation problems.



## 7.2 Proposed Pedestrian Access Arrangement – A Proposed Public Footbridge across Long Ping Road

- 7.2.1 In addition to the existing pedestrian network as mentioned in **Section 7.1**, a public footbridge across Long Ping Road connecting the PH site to the Long Ping Estate would be required on the perspective of pedestrian flow. **Figure 4.1.1** shows the location of the proposed public footbridge. The justifications and requirements of the proposed public footbridge are discussed in details in the following sections.

### *Justifications for the proposed public footbridge*

- 7.2.2 Justification for the proposed public footbridge as a part of the pedestrian network after the completion of the PH development has been established and reviewed with reference to the factors listed in TPDM (Volume 2, Chapter 3, Section 3.7.7.2). The review indicates that the criteria are largely fulfilled.

**Road safety and capacity considerations** - The junction Long Ping Road / Fung Chi Road primarily operates to maximize vehicular green times. It is generally unwelcome for pedestrians to wait for a junction signal cycle to walk across Long Ping Road. On one hand, some impatient pedestrians may try to cross Long Ping Road even under pedestrian red signal. On the other hand, if higher priority is put on the pedestrian crossing, the performance of vehicular traffic would unavoidably deteriorate. Considering both road safety and junction capacity issues, there is a necessity to provide a grade separated footbridge as a better alternative to the pedestrians in order to segregate pedestrians from vehicular traffic.

**The desired pedestrian path** - The proposed public footbridge would form a central part of the desired pedestrian path, connecting the PH development to the West Rail system and the Yuen Long Town area. As compared to the at grade pedestrian crossing, it is anticipated that the proposed public footbridge would effectively divert the pedestrians from using the pedestrian crossing across Long Ping Road and would provide a more convenient and direct access to West Rail Long Ping MTR Station and to area of Yuen Long Town.

**The connectivity of the facility with nearby developments and walkway systems** - The proposed public footbridge would be strategically located at front door of the PH site. It would serve as a convenient walking access for promoting residents using the West Rail system. The connectivity between the PH site and the Yuen Long town area would also be enhanced.

**Public opinions** - It is expected that the public would generally welcome a better pedestrian connection between the proposed development at Wang Chau and the West Rail Long Ping MTR Station with enhanced road safety and convenience.

### *Requirement of the proposed public footbridge*

7.2.3 Several requirements should be considered in the design and implementation process of the proposed public footbridge, including:

- Barrier-free access and lift elevator should be provided at both ends.
- For the end connecting the proposed PH development, direct linkage to the retail facilities of the PRH site should be provided.
- For the end connecting the Long Ping Commercial Complex, direct linkage to the complex would be subject to liaison with LINK during detailed design stage.
- 3m width of the proposed public footbridge (The width requirement is assessed in **Section 7.3** below).
- The completion of the proposed public footbridge should tie in with the completion of the proposed PH development.

## 7.3 Future Pedestrian Condition

### *Pedestrian Trip Generation*

7.3.1 As discussed in **Section 5.2**, it is anticipated that the proposed development would generate / attract some 3,700 and 2,800 two-way pedestrian flows during the AM and PM peak hours (in units of persons per hour), as recapped in **Table 7.3.1**.

**Table 7.3.1 Summary on Pedestrian Trip Generations in AM/PM Peak Hour (persons/hr)**

Development Type	Unit	AM Peak			PM Peak		
		Generation	Attraction	2-way	Generation	Attraction	2-way
Estimated Trips for 2,500 PRH Flats	persons/hr	1,160	503	1,663	485	1,100	1,585
Estimated Trips for 2,500 HOS Flats	persons/hr	1,235	203	1,438	395	745	1,140
Estimated Trips for 24 classroom primary school	persons/hr	114	421	535	35	8	43
Total		2,509	1,127	3,636	915	1,853	2,768

7.3.2 For the retail and social welfare facilities, since they are expected to serve mainly the site residents, and it will only induce minimal pedestrian trips on the external walkway network during commuter peak hours. These development types are therefore excluded from the estimation of pedestrian trip generation.



### *Pedestrian Desire Lines*

- 7.3.3 Pedestrian desire lines represent linkages of key trip generation and attraction areas that may be the source and destination of pedestrians.
- 7.3.4 The main pedestrian desire line during the peak hours would be from the Project site towards the public transport facilities in the area (i.e. West Rail Long Ping MTR Station). It is anticipated that majority of pedestrians would travel from the PH site along Long Ping Road Northern Footpath, the proposed public footbridge across Long Ping Road, Fung Chi Road Eastern Footpath, and Wang Tat Road Northern Footpath. **Figure 7.3.1** shows the major pedestrian routing.
- 7.3.5 For the purpose of assessment, it is assumed that amongst 58% rail-based public transport trips, all rail-based public transport trips generated/attracted by PRH site would be walk trips using the pedestrian facilities from/to West Rail Long Ping MTR Station, while half of rail-based public transport trips generated/attracted by HOS site would be walk trips using the pedestrian facilities from/to West Rail Long Ping MTR Station. In addition, 24% of road-based public transport trips generated/attracted by both PRH and HOS sites would also use the pedestrian facilities. The assumptions for pedestrian trips generated / attracted by the primary school follows the same as HOS site.
- 7.3.6 **Table 7.3.2** presents the assumed two-way pedestrian trips using pedestrian facilities.

**Table 7.3.2 Assumed 2-way Pedestrian Trips Using Pedestrian Facilities (persons/hr)**

Component	AM Peak	PM Peak
Road-based Public Transport Walk trips from/to bus stops	1047	796
Rail-based Public Transport Walk trips from/to West Rail Long Ping MTR Station	1,843	1,515
Total	2,890	2,311

Notes:

- To account for the peak within the peak hour, a surge factor of 1.2, was applied.

### *Background Pedestrian Flow Forecast*

- 7.3.7 Pedestrian flows adopted in the study were primarily based on the existing pedestrian counts undertaken. A suitable growth factor was then applied to forecast the background pedestrian flow in future years. The growth factor was derived based on TM for which the methodology has been discussed in **Section 3**.

### *Future Pedestrian Condition*

- 7.3.8 Taking into account the background pedestrian flows and pedestrian trips due to the proposed development, a forecast LOS assessment for the design years 2025 and 2031 are shown in **Table 7.3.3** and **Table 7.3.4**.

**Table 7.3.3 Assessments on LOS of Existing Footpaths in Design Year 2025**

Location	Clear Width (m)	Ped Flow without Development (persons/hr)		Ped Flow with Development (persons/hr)		Ped Flow Rate without Development (persons/m/min)		Ped Flow Rate with Development (persons/m/min)		LOS without Development		LOS with Development	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
F1	3.6	151	254	3,042	2,566	1.2	2.0	23.4	19.7	A	A	C	B
F2	3	185	323	2,030	1,838	1.9	3.2	20.3	18.4	A	A	B	B
F3	3	180	268	2,024	1,783	1.8	2.7	20.2	17.8	A	A	B	B

Notes:

1. Please refer to **Figure 7.3.1** for the location of the assessed pedestrian facilities.
2. Clear width in metres based on on-site measurement.
3. Computed based on effective width, by assuming 0.5m lateral clearance on both sides.

**Table 7.3.4 Assessments on LOS of Existing Footpaths in Design Year 2031**

Location	Clear Width (m)	Ped Flow without Development (persons/hr)		Ped Flow with Development (persons/hr)		Ped Flow Rate without Development (persons/m/min)		Ped Flow Rate with Development (persons/m/min)		LOS without Development		LOS with Development	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
F1	3.6	152	257	3,194	2,823	1.2	2.0	24.6	21.7	A	A	C	B
F2	3	188	327	2,217	2,164	1.9	3.3	22.2	21.6	A	A	B	B
F3	3	182	272	2,207	2,055	1.8	2.7	22.1	20.5	A	A	B	B

Notes:

1. Please refer to **Figure 7.3.1** for the location of the assessed pedestrian facilities.
2. Clear width in metres based on on-site measurement.
3. Computed based on effective width, by assuming 0.5m lateral clearance on both sides.

7.3.9 The results indicate all assessed pedestrian footpaths in design years 2025 and 2031 are predicted to operate with LOS C or above. It is anticipated that the impact due to the proposed PH development on existing pedestrian network would be minimal.

#### ***Width Requirements for the Proposed Public Footbridge across Long Ping Road***

7.3.10 Based on the estimation of pedestrian trip generation, it is anticipated that the critical two-way pedestrian flows using the proposed public footbridge are some 2,900 pedestrians per hour, as shown in **Table 7.3.5**.

**Table 7.3.5 Anticipated Two-way Pedestrian Trips Using the Proposed Public Footbridge**

Component	Critical 2-way Pedestrian trips (persons/hr)
Road-based Public Transport Walk trips from/to bus stops	1,047
Rail-based Public Transport Walk trips from/to West Rail Long Ping MTR Station	1,843
Total	2,890

7.3.11 The required and recommended actual width of the proposed public footbridge under a Level of Service (LOS) of C is summarized in **Table 7.3.6**.

**Table 7.3.6 Required and Recommended Actual Width under LOS of C**

Location	Anticipated Critical 2-way Pedestrian Flow (ped/hr)	Required Effective Width under LOS C (m) (Note 1)	Required Actual Width under LOS C (m) (Note 2)	Recommended Actual Width (m)
Proposed Public Footbridge across Long Ping Road	2,900	1.7	2.7	3.0

Notes:

1. Middle level of LOS C, i.e. pedestrian flow rate of 28 ped/m/min was adopted.
2. Width accommodates 0.5m lateral clearance on both sides.

## 8 CONCLUSIONS

---

- 8.1.1 This Transport and Traffic Impact Assessment (TTIA) is to ascertain the effect of the proposed development in Wang Chau, Yuen Long on the traffic infrastructure and transport provision.
- 8.1.2 Assessment for the base year 2012 at the major road links and junctions has revealed that all assessed road links and junctions are currently operating at satisfactory level.
- 8.1.3 A new access road will be provided to serve the PH site. The proposed access road would be in single-2 lane configuration, which would be adequate to cater the traffic demand from the future development. A staggered pedestrian crossing at the access road leading to PH site would be provided. Under this proposed scheme, it is anticipated that the overall junction performance would be operating at satisfactory level.
- 8.1.4 For the major road links, results indicate that all assessed road links would still be performing at satisfactory level for the design years 2025 and 2031, except for the eastbound of L2 (Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange) where the V/C ratio would start to exceed the capacity in 2025 and increase to 1.16 in 2031 for both the with and without development scenarios. By comparing the V/C ratio of L2 for the without development scenario in 2025 and 2031, the contribution of traffic from the proposed developments on L2 is only minimal. Therefore, the exceedance is contributed from the growth of regional traffic and the impact of the subject development is negligible.
- 8.1.5 For the major junctions, results indicate that all assessed junctions will be operating at satisfactory level.
- 8.1.6 A GMB lay-by and a Taxi stand at the access road of the development site and bus lay-bys along the two sides of Long Ping Road have been proposed. One bus route and one to two GMB routes are initially recommended. It is anticipated that the service capacity of the proposed public transport facilities would adequately cater for the future demand after the completion of the development.
- 8.1.7 Based on the LOS assessment, the major pedestrian facilities in design year 2025 and 2031 are predicted to operate at LOS C or above. No pedestrian circulation problems are anticipated.
- 8.1.8 A public footbridge across Long Ping Road connecting the public housing site to the Long Ping Estate would be required on the perspective of pedestrian flow. With the consideration of future pedestrian flows, the proposed public footbridge should be 3m wide in order to attain a LOS C.
- 8.1.9 Based on the above analysis, the proposed development in Wang Chau would have no adverse traffic impact on the nearby road links, junctions and pedestrian facilities. The conclusion therefore is that the proposed development is acceptable from the traffic point of view.

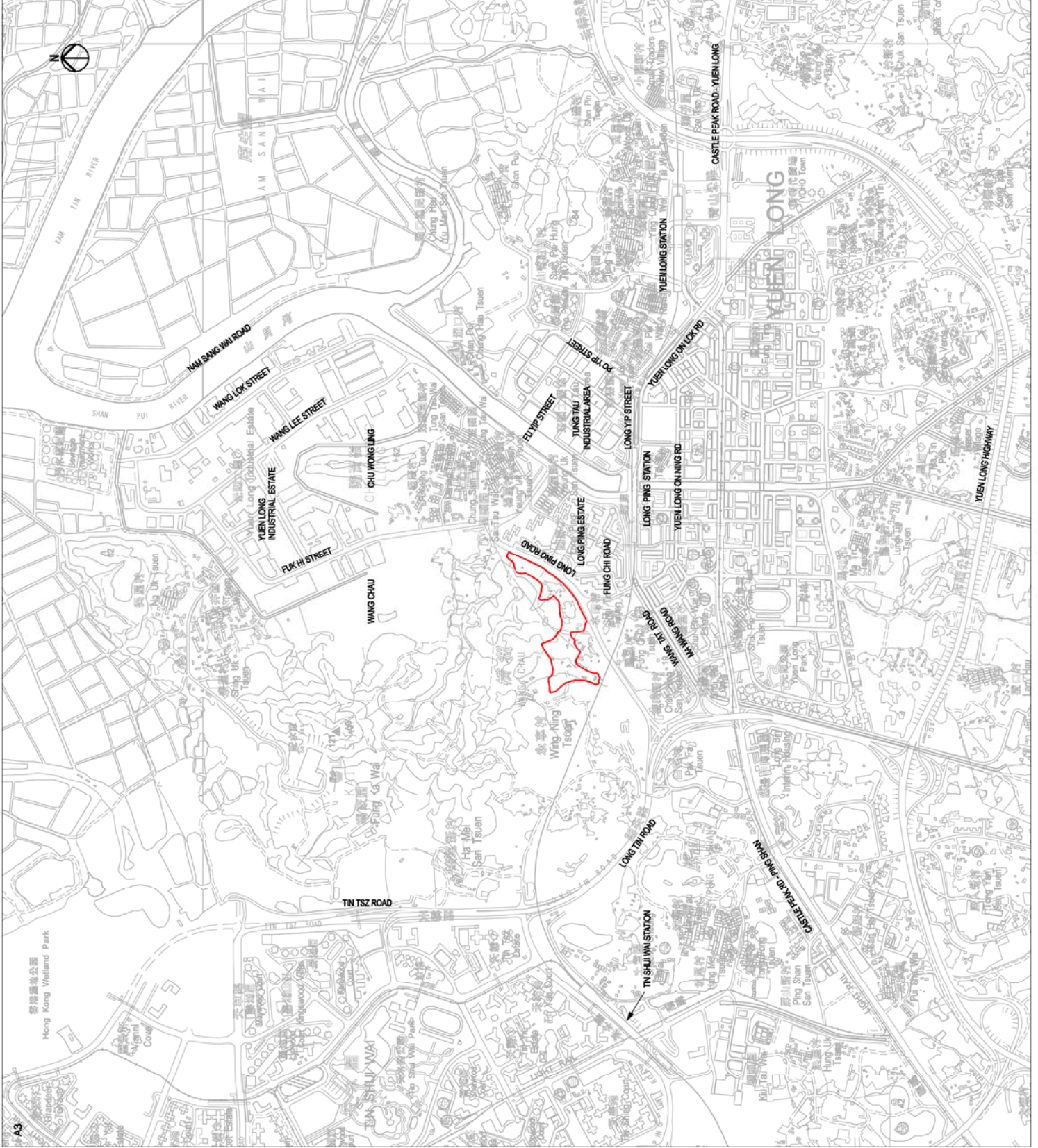
## Figures

---



LEGEND:

 PUBLIC HOUSING SITE



Rev	Description	KHC	Date
A	FIRST ISSUE		08/13
	By		

**ARUP**

Project title  
 Agreement No. CB20120293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
 LOCATION OF PROJECT SITE

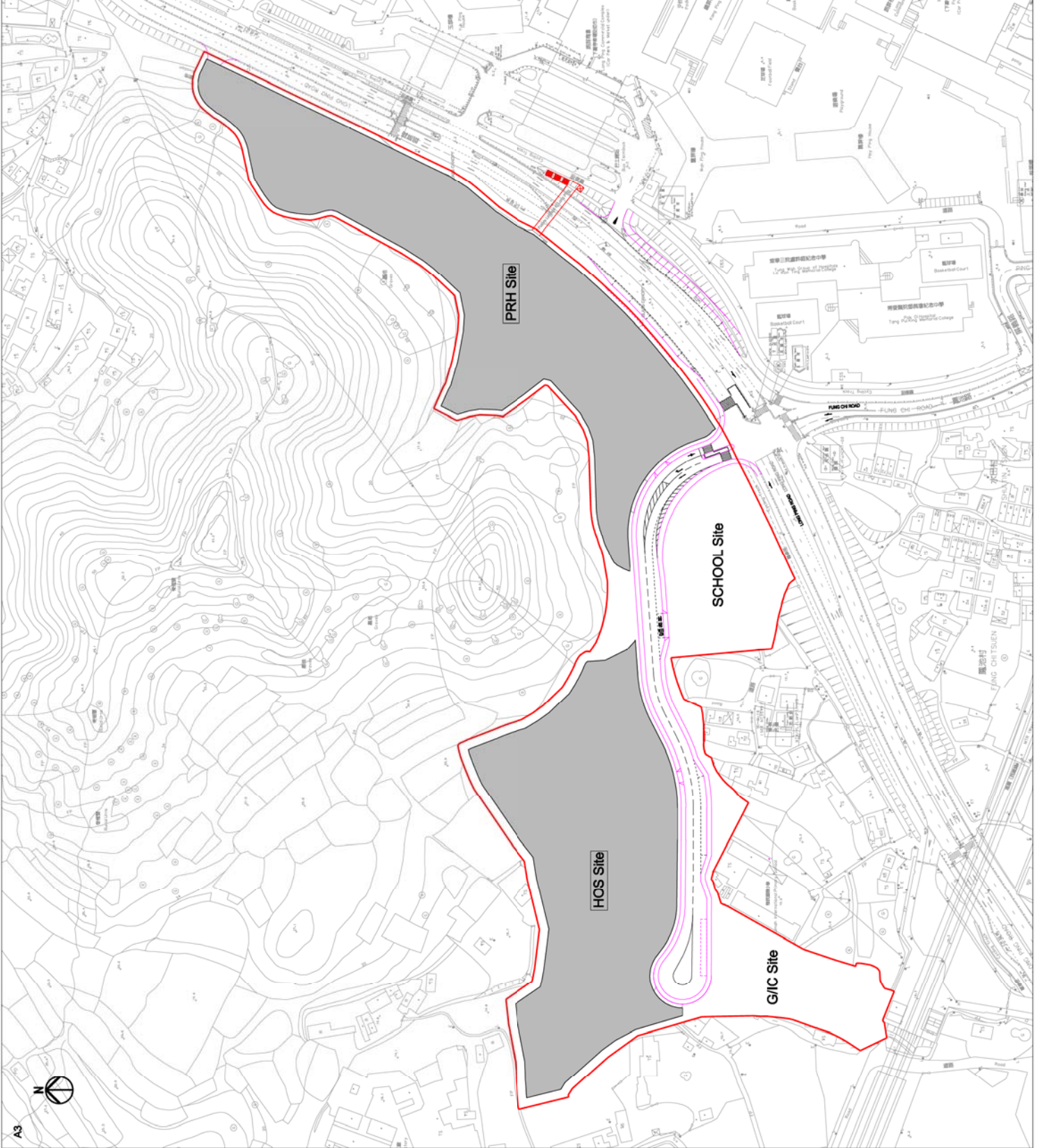
Drawing no.	Rev.	FIGURE 1.1.1	Rev.
Drawn	KHC	Date	09/13
Checked	DW	Approved	CC
Status	1:15000 (A3)	PRELIMINARY	
Scale	COPYRIGHT RESERVED		



HONG KONG HOUSING AUTHORITY



LEGEND:  
 PUBLIC HOUSING SUITE



Rev	Description	KHC	Date
A	FIRST ISSUE	KHC	09/14

**ARUP**

Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chan, Yuen Long

Drawing title  
 MASTER LAYOUT PLAN

Drawing no.	FIGURE 2.3.1	Rev.
Drawn	KHC	Date
Checked	HY	Approved
Date	09/14	CC
Scale	1:1000 (A3)	Status
		PRELIMINARY
		COPYRIGHT RESERVED

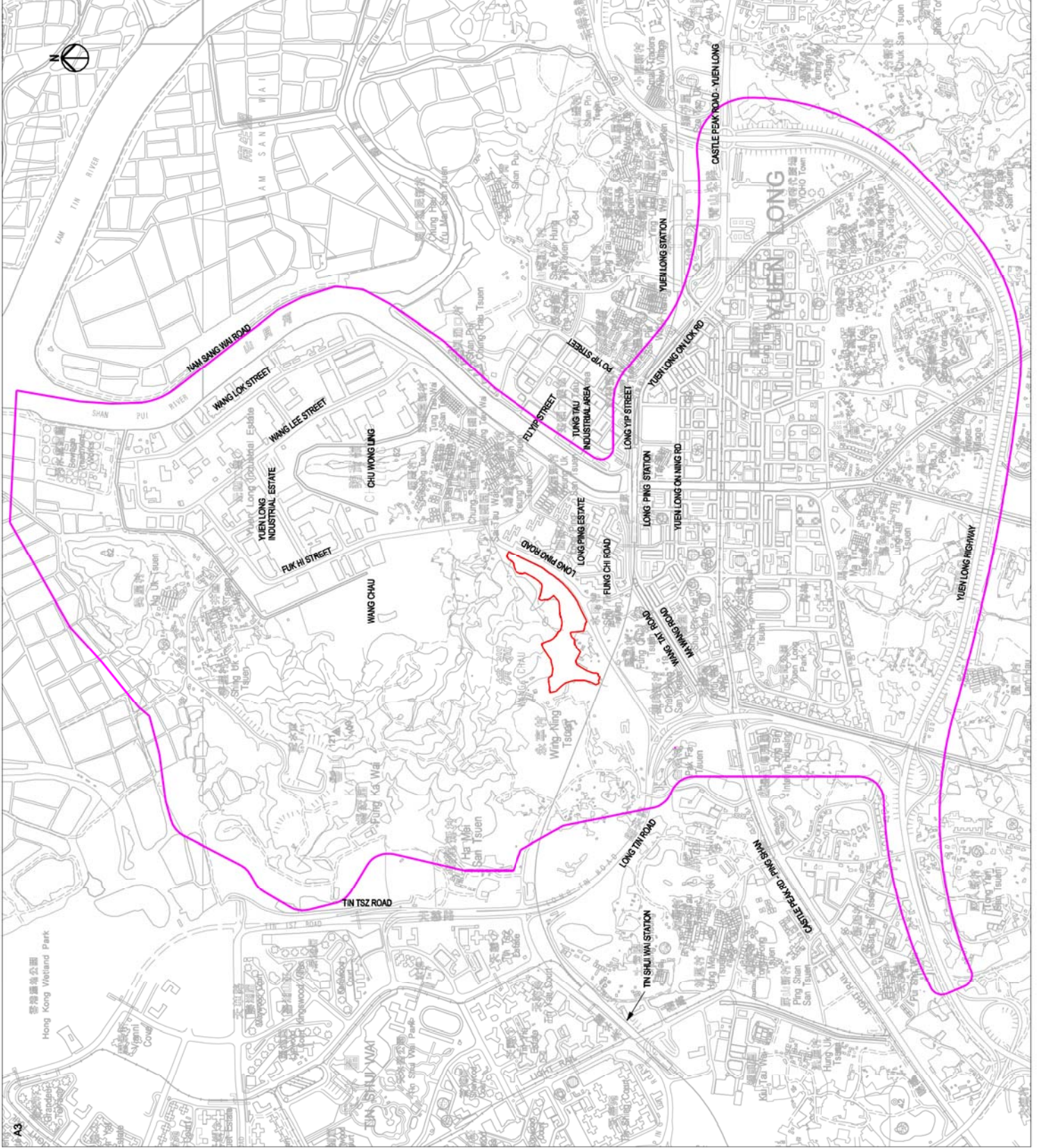


HONG KONG HOUSING AUTHORITY



LEGEND:

- AREA OF INFLUENCE
- PUBLIC HOUSING SITE



Rev	Description	Date
A	FIRST ISSUE	08/13
	By	KHC

**ARUP**

Project title  
 Agreement No. CB20120293  
 Public Housing Development at Wang Chau, Yuen Long

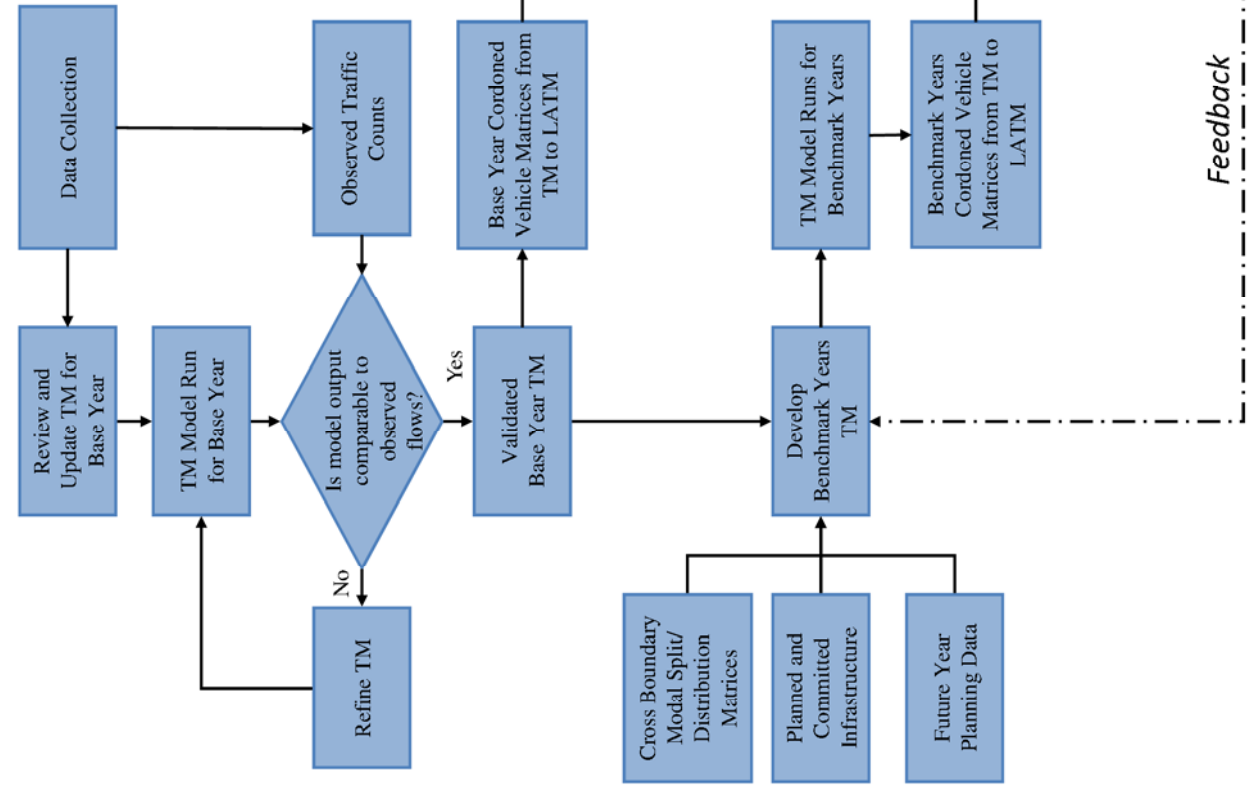
Drawing title	
AREA OF INFLUENCE	

Drawing no.	Rev.	A
FIGURE 3.1.1 <td>Checked <td>Approved </td></td>	Checked <td>Approved </td>	Approved
Date	09/13	DW
KHC	Status	CC
Scale	1:15000 (A3)	PRELIMINARY
COPYRIGHT RESERVED		

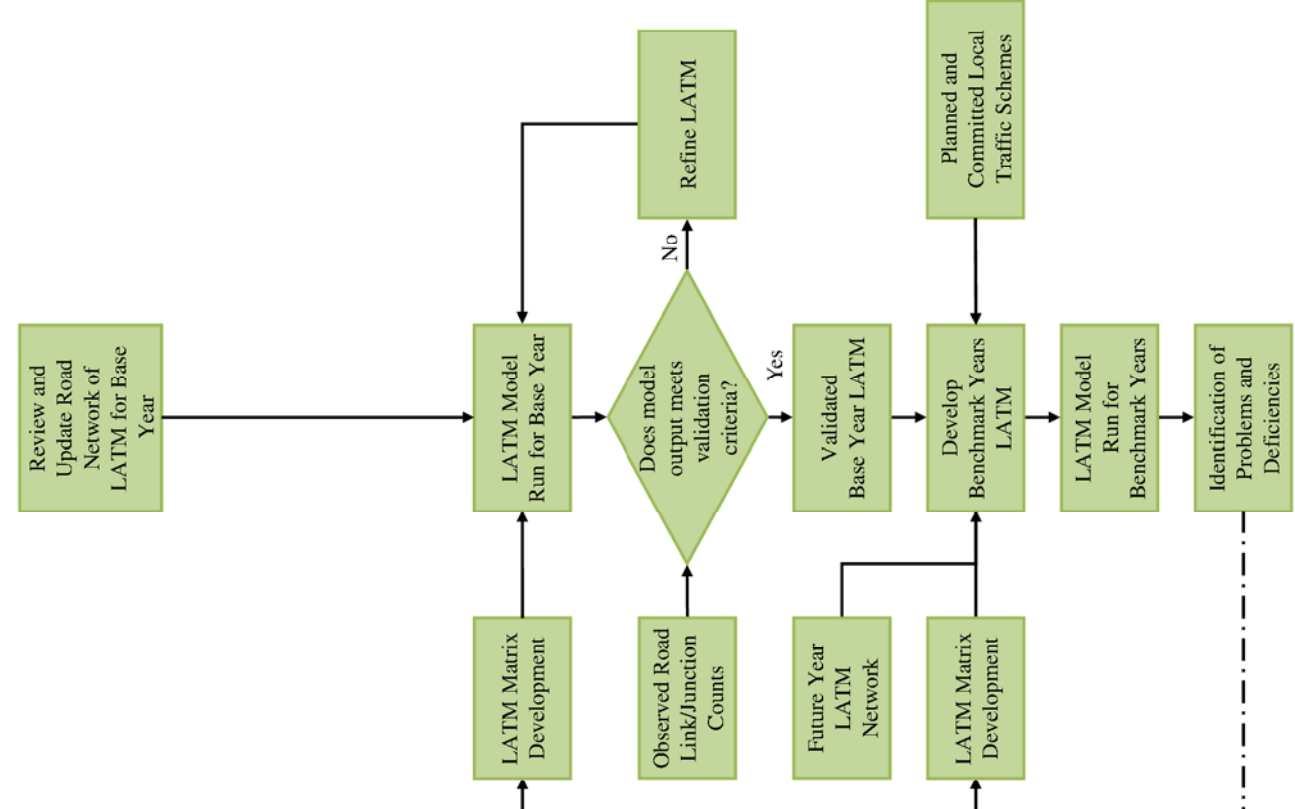


HONG KONG HOUSING AUTHORITY

Upper Tier - Transport Model (TM)



Lower Tier - Local Area Traffic Model (LATM)



Upper Tier - Transport Model (TM)

Lower Tier - Local Area Traffic Model (LATM)

Rev	By	Date
A	KHC	06/13
First Issue Description		
Consultant		

**ARUP**

Project title  
 Agreement No. CB20120293  
 Public Housing Development at Wang Chau, Yuen Long

Drawn	KHC	Date	06/13	Checked	IL	Approved	ST
Scale	N.T.S.			Status	PRELIMINARY		
Drawing no.	FIGURE 3.4.1			Rev.	-		

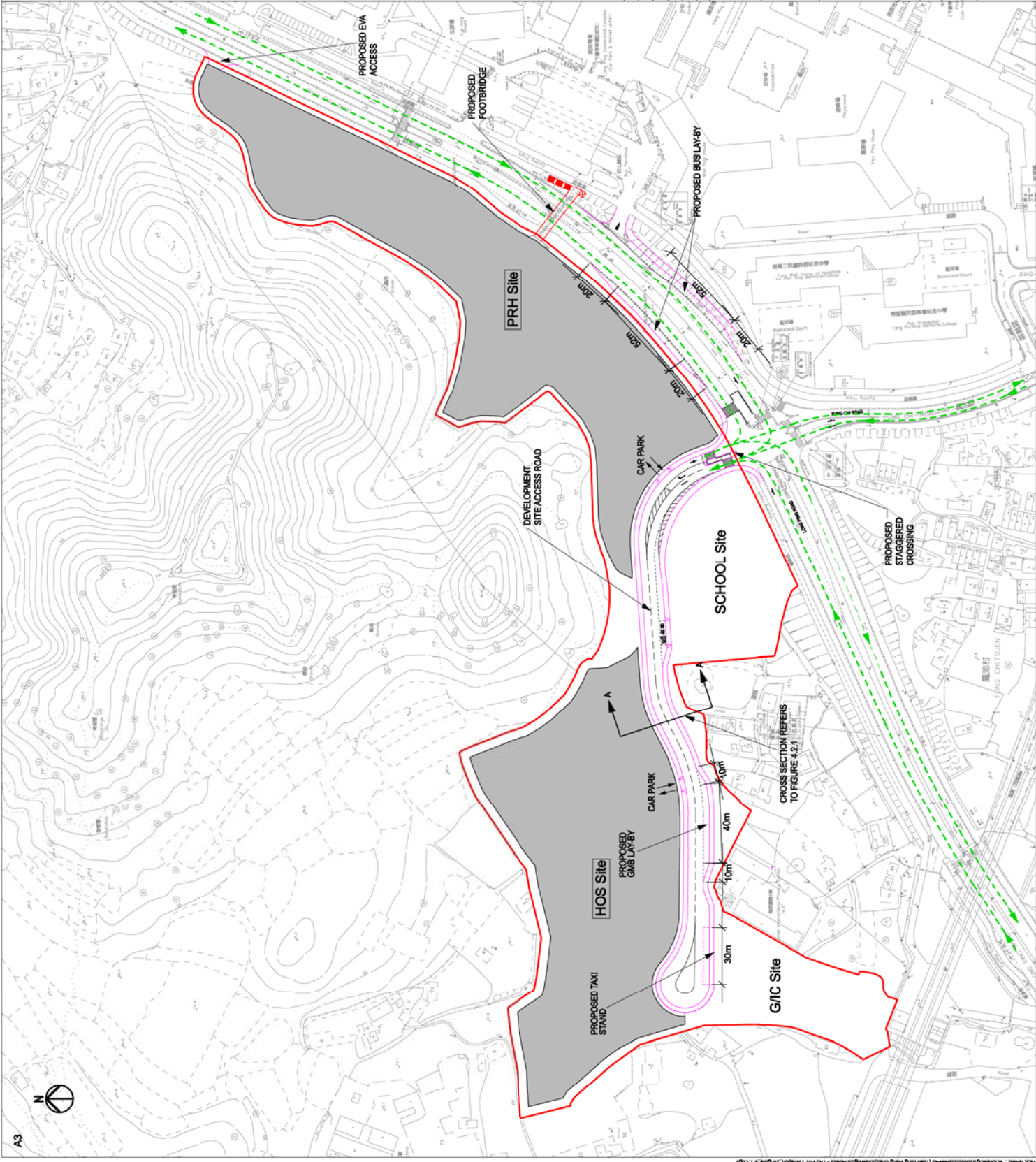
Copyright reserved



FIGURE 3.4.1  
 PROPOSED TRANSPORT MODELLING APPROACH



LEGEND:  
 PUBLIC HOUSING SUITE  
 VEHICULAR ACCESS ROUTINGS



Rev	Description	KHC	Date
A	FIRST ISSUE	KHC	09/14
	By		
	Consultant		

**ARUP**

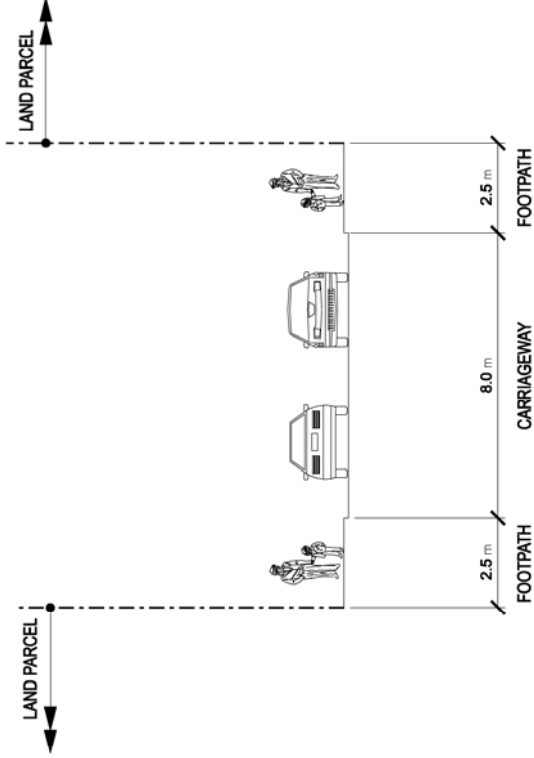
Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
**PROPOSED ACCESS ROAD FOR PUBLIC HOUSING SUITE**

Drawing no.	Rev.	A
FIGURE 4.1.1	Checked	Approved
Date	09/14	CC
Scale	1:1000 (A3)	PRELIMINARY
	COPYRIGHT RESERVED	



HONG KONG HOUSING AUTHORITY



SECTION A - A

Rev	Description	KHC	09/13
A	FIRST ISSUE	By	Date
<b>ARUP</b>			

Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
 CROSS SECTION FOR THE  
 PROPOSED ACCESS ROAD FOR  
 PUBLIC HOUSING SITE








Drawing no.	FIGURE 4.2.1	Rev.	A
Drawn	KHC	Date	11/13
Checked	DW	Approved	CC
Scale	1:150 (A3)	Status	PRELIMINARY
COPYRIGHT RESERVED			

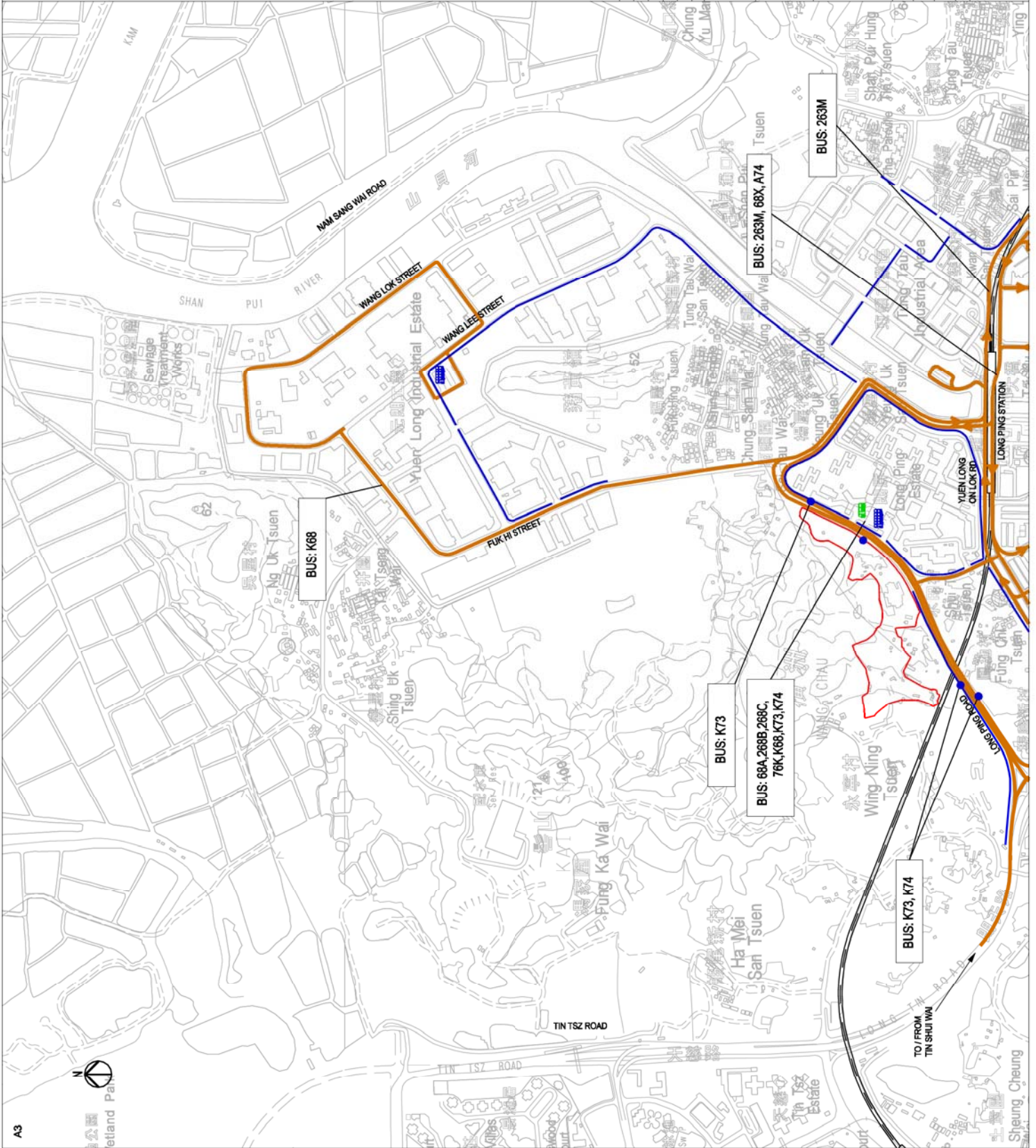


HONG KONG HOUSING AUTHORITY



**LEGEND:**

-  PUBLIC HOUSING SITE
-  WEST RAIL
-  BUS ROUTE
-  CYCLE TRACK
-  BUS TERMINUS
-  GMB TERMINUS
-  BUS LAY-BY (LONG PING ROAD)



Rev	Description	By	Date
A	FIRST ISSUE	KHC	09/13

**ARUP**

Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
 EXISTING PUBLIC TRANSPORT FACILITY

Drawing no.	Rev.	A
FIGURE 5.1.1	Checked	Approved
Drawn	KHC	09/13
Date	09/13	Status
Scale	1:10000 (A3)	PRELIMINARY
		COPYRIGHT RESERVED



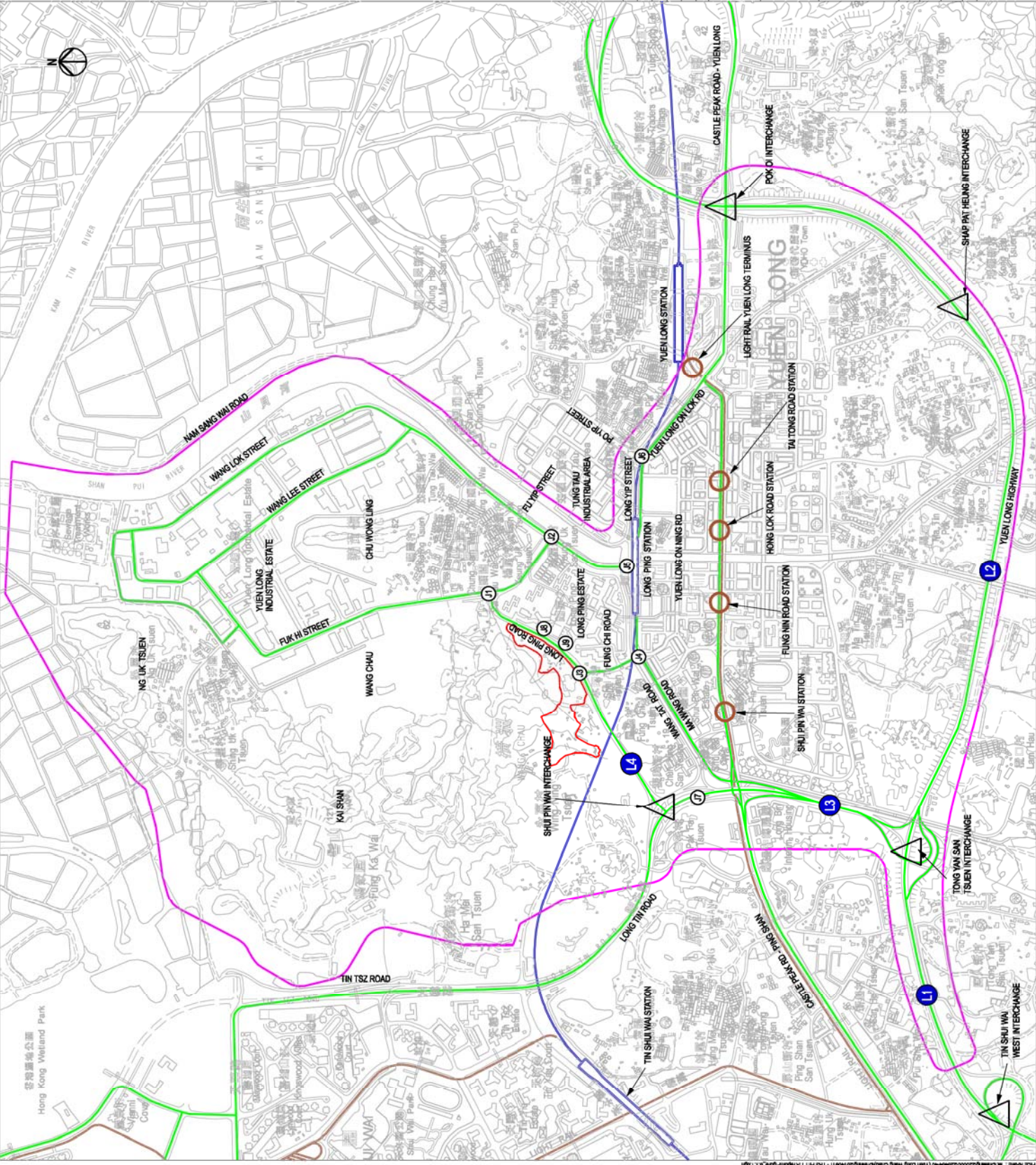
HONG KONG HOUSING AUTHORITY





**LEGEND:**

- AREA OF INFLUENCE
- PUBLIC HOUSING SITE
- EXISTING RAILWAY LINE (LRT)
- EXISTING RAILWAY LINE (WEST RAIL)
- EXISTING ROAD
- MAJOR INTERCHANGE
- SURVEYED JUNCTION
- ROAD LINK



Rev	Description	Date
A	FIRST ISSUE	09/13
	By	KHC
	Consultant	

**ARUP**

Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
 EXISTING HIGHWAY  
 AND RAIL NETWORK

Drawing no.	Rev.	A
FIGURE 5.1.1	Checked	Approved
KHC	Date	DW
09/13	Status	CC
Scale	1:15000 (A3)	PRELIMINARY
		COPYRIGHT RESERVED



HONG KONG HOUSING AUTHORITY



LEGEND:  
50 (50)  
AM (PM) PCU / HR

Rev	Description	By	Date
A	FIRST ISSUE	KHC	09/13

**ARUP**

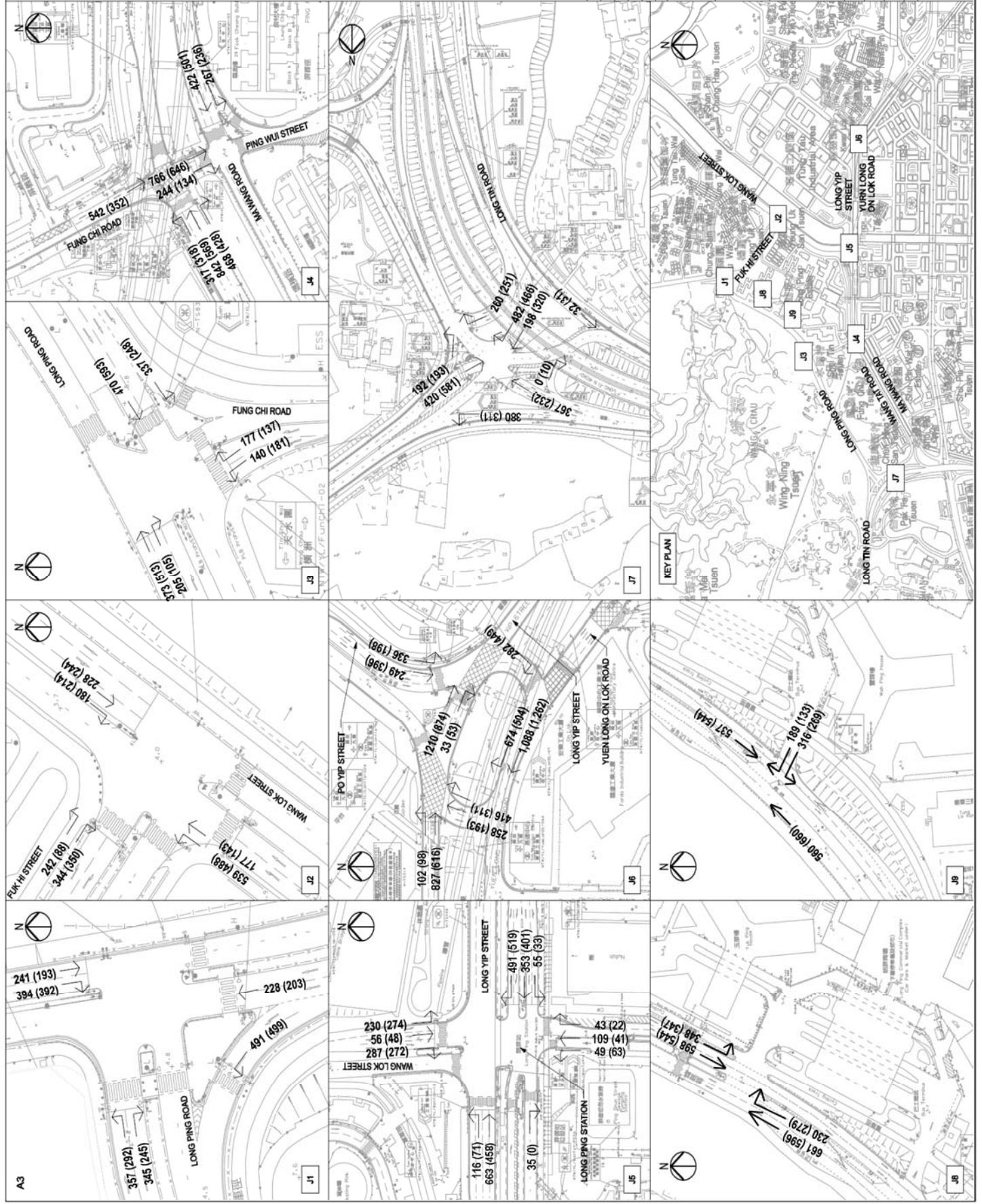
Project title  
Agreement No. CB20120293  
Public Housing Development at Wang Chau, Yuen Long

Drawing title  
**BASE YEAR 2012 PEAK HOUR TRAFFIC FLOW**

Drawing no.	FIGURE 6.2.1	Rev.	A
Drawn	KHC	Date	09/13
Scale	N.T.S.	Status	PRELIMINARY
		Checked	DW
		Approved	CC



HONG KONG HOUSING AUTHORITY

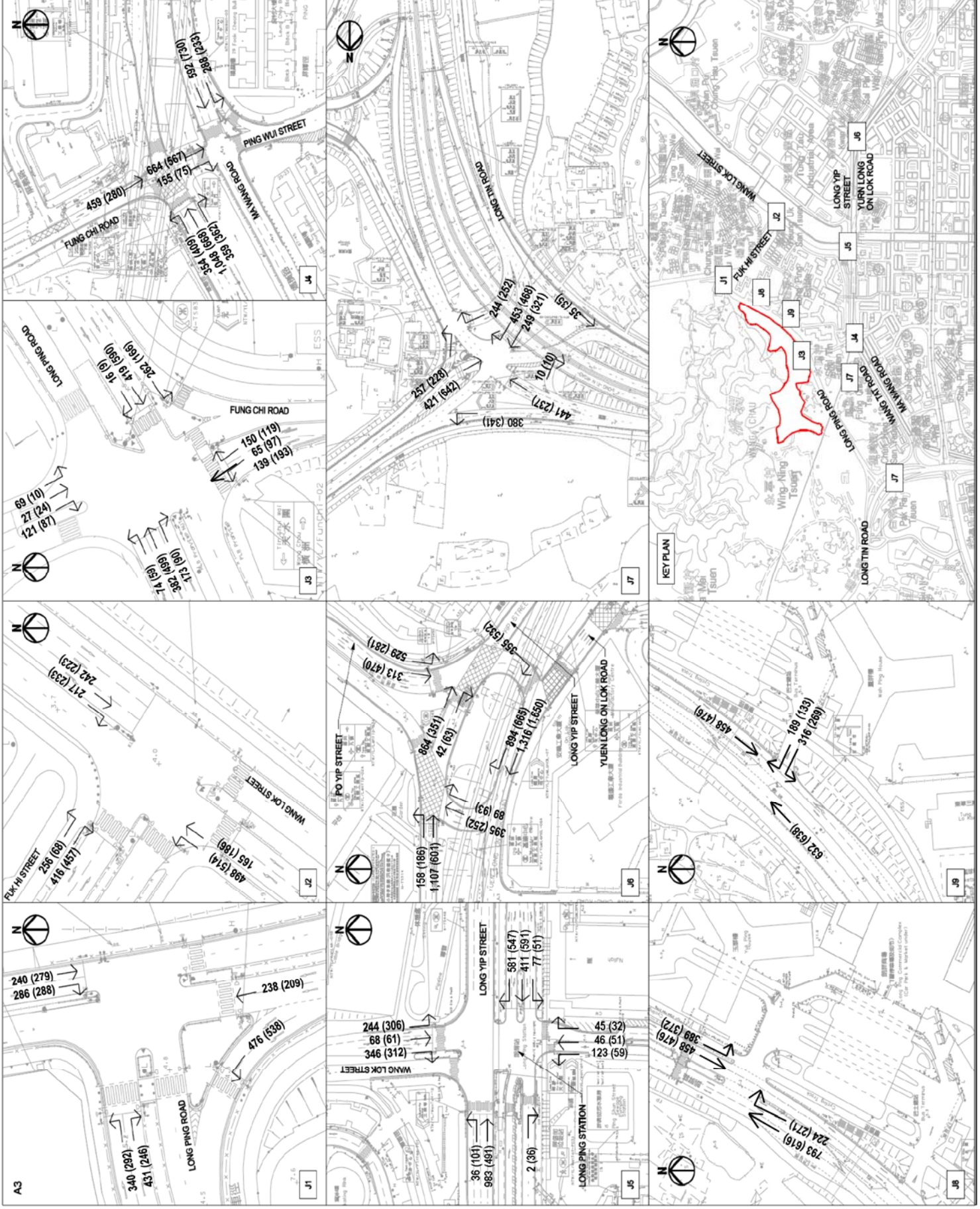




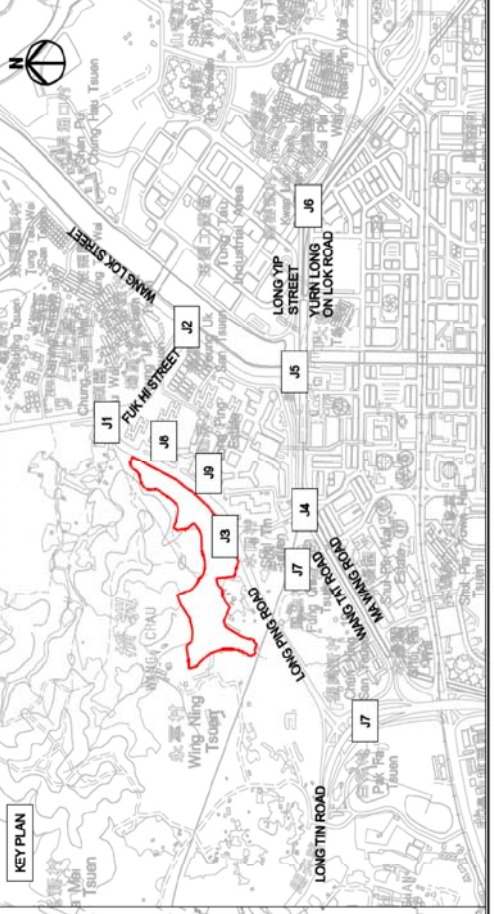
LEGEND:

50 (50)

AM (PM) PCU / HR



KEY PLAN



Rev	Issue	Description	By	Date
A	FIRST ISSUE		KHC	09/13

ARUP

Project title  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Drawing title  
 DESIGN YEAR 2025 UNDER  
 WITH DEVELOPMENT SCENARIO  
 PEAK HOUR TRAFFIC FLOW

Drawing no.	FIGURE 6.3.1	Rev.	A
Drawn	KHC	Date	09/13
Checked	DW	Approved	CC
Scale	N.T.S.	Status	PRELIMINARY
COPYRIGHT RESERVED			



HONG KONG HOUSING AUTHORITY



LEGEND:  
50 (50) AM (PM) PCU / HR



Rev	By	Date
A	KHC	09/13
FIRST ISSUE		
Description		
Consultant		
<b>ARUP</b>		
Project title		
Agreement No. CB20120293		
Public Housing Development at Wang Chau, Yuen Long		
Drawing title		
DESIGN YEAR 2025 UNDER WITHOUT DEVELOPMENT SCENARIO		
PEAK HOUR TRAFFIC FLOW		
Drawing no.	FIGURE 6.3.2	Rev. A
Drawn	KHC	09/13
Checked	DW	Approved
Scale	N.T.S.	Status
		PRELIMINARY
		COPYRIGHT RESERVED



HONG KONG HOUSING AUTHORITY







LEGEND:  
50 (50) AM (PM) PCU / HR



Rev	By	Date
A	KHC	09/13
FIRST ISSUE		
Description		
Consultant		

**ARUP**

Project title  
Agreement No. CB20120593  
Public Housing Development at Wang Chau, Yuen Long

Drawing title  
**DESIGN YEAR 2031 UNDER WITHOUT DEVELOPMENT SCENARIO PEAK HOUR TRAFFIC FLOW**

Drawing no.	FIGURE 6.3.4	Rev.	A
Drawn	KHC	Checked	DW
Date	09/13	Status	APPROVED
Scale	N.T.S.	Copyright	RESERVED

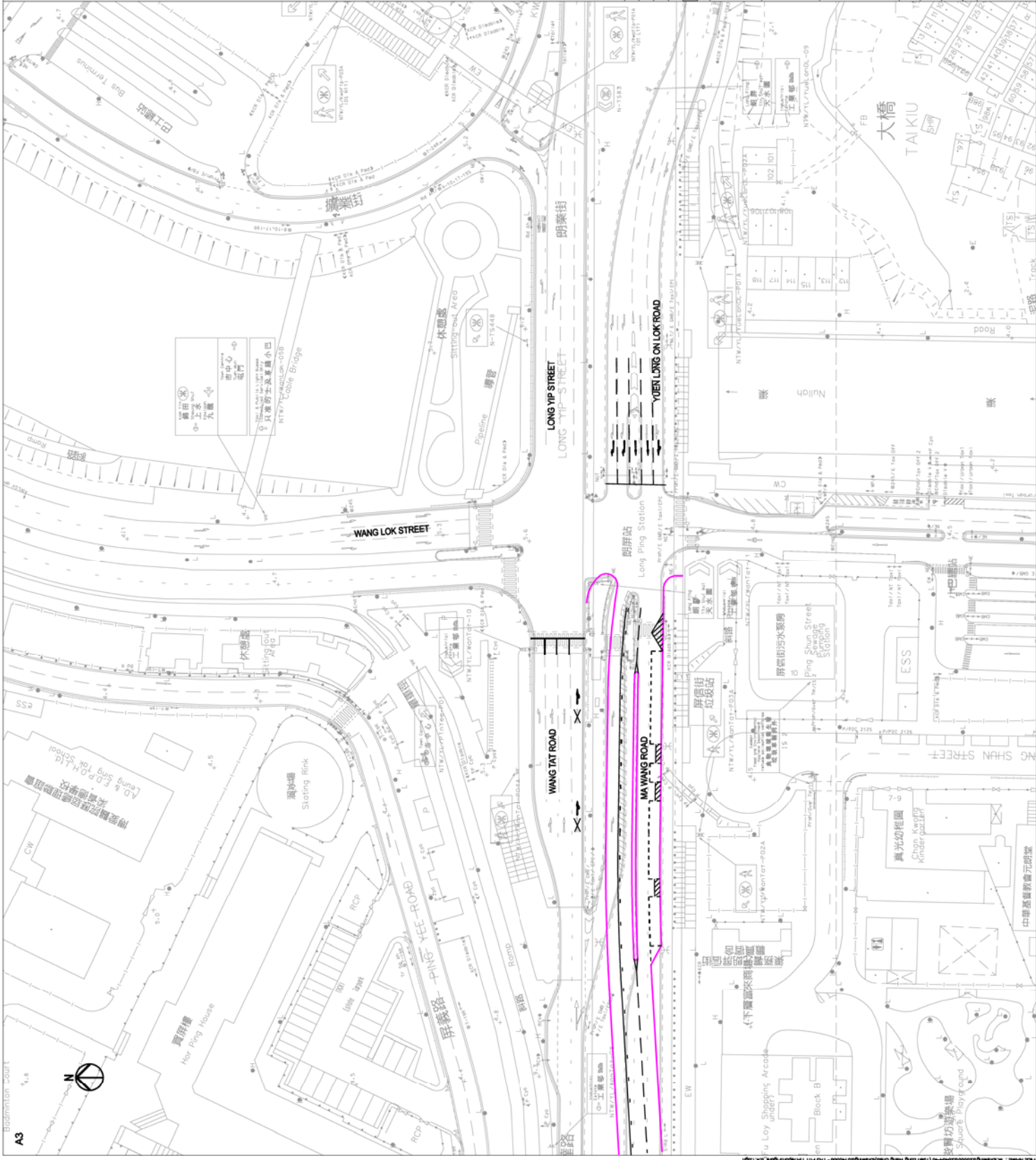
**HONG KONG HOUSING AUTHORITY**

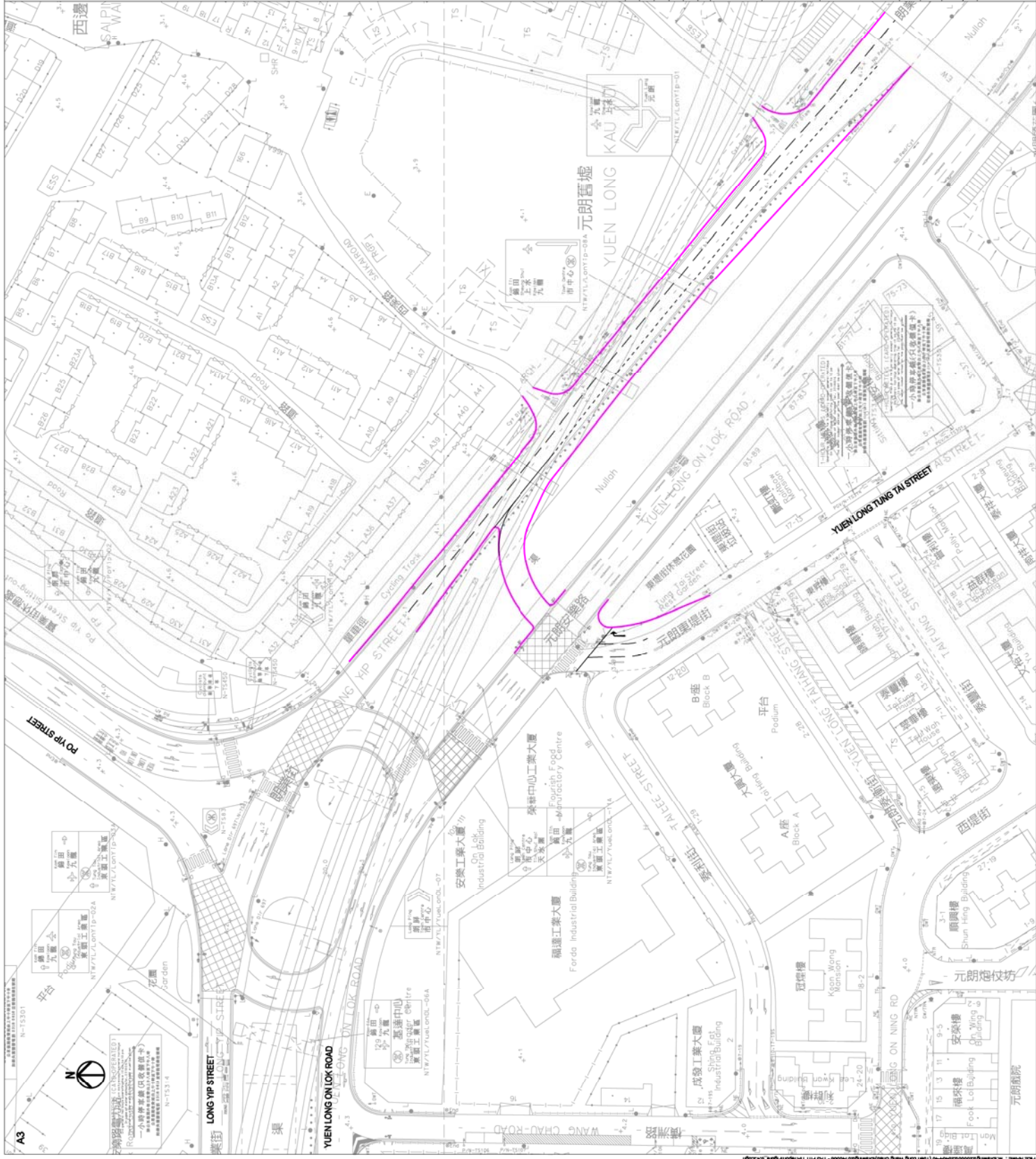


A		FIRST ISSUE	KHC	09/13
Rev	Description	By	Date	
		Consultant	ARUP	
Project title				
Agreement No. CB201/20293				
Public Housing Development at Wang Chan, Yuen Long				
Drawing title				
JUNCTION IMPROVEMENT AT				
JUNCTION 5 - WANG LOK STREET /				
WANG TAT ROAD / LONG YIP STREET /				
YUEN LONG ON LOK ROAD / MA WANG ROAD				
(BY OTHER)				
Drawing no.	FIGURE 6.4.1	Rev.	A	
Drawn	KHC	Date	09/13	Checked
Scale	1:1000 (A3)	Status	PRELIMINARY	
COPYRIGHT RESERVED				



HONG KONG HOUSING AUTHORITY





Rev	Description	By	Date
A	FIRST ISSUE	KHC	09/13

**ARUP**

**Project title**  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

Rev.	Checked	Approved	CC
A			

**Drawing title**  
 JUNCTION IMPROVEMENT AT  
 JUNCTION 6 - PO YIP STREET /  
 LONG YIP STREET /  
 YUEN LONG ON LOK ROAD (BY OTHERS)

**Drawing no.** FIGURE 6.4.2

**Scale** 1:1000 (A3)

**Status** PRELIMINARY

**Copyright** RESERVED

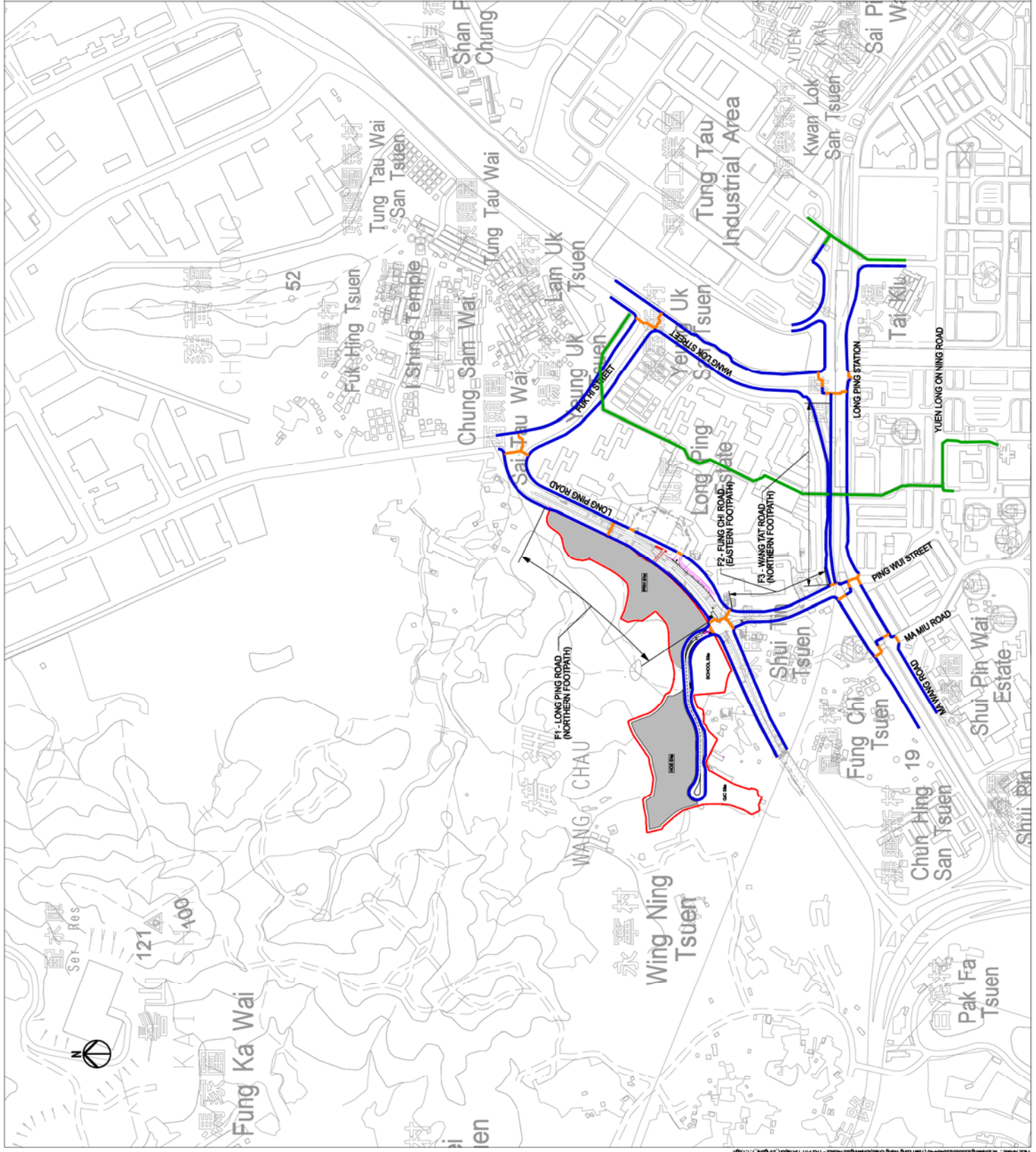


HONG KONG HOUSING AUTHORITY



**LEGEND:**

- ELEVATE WALKWAY
- AT-GRADE FOOTPATH
- PEDESTRIAN CROSSING
- FOOTPATH
- F1



Rev	DESCRIPTION	By	Date
A	FIRST ISSUE	KHC	09/13

**ARUP**

**Project title**  
 Agreement No. CB201/20293  
 Public Housing Development at Wang Chau, Yuen Long

**Drawing title**  
 PEDESTRIAN FACILITIES IN THE VICINITY OF THE PROJECT SITE

Rev.	A
Drawn	Checked
Date	09/13
Scale	1:6500 (A3)
Status	PRELIMINARY
COPYRIGHT RESERVED	



HONG KONG HOUSING AUTHORITY

