Appendix 5 Traffic Impact Assessment

Traffic Impact Assessment Final Report August 2024

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1.0 INTRODUCTION

Background

- 1.1 The Subject Site is located at Lot 94 in D.D. 388 and adjoining government land, at Castle Peak Road Tsing Lung Tau, in Tsing Lung Tau, Tsuen Wan. The location of the Subject Site is shown in **Figure 1.1**.
- 1.2 On 8th December 2022, the Town Planning Board ("TPB") approved the Section 16 Planning Application (TPB ref.: A/TWW/122) to develop the Subject Site to provide 2 residential blocks with 165 flats (the "Approved A/TWW/122").
- 1.3 The Owner now intends to develop the Subject Site into 1 residential block with 112 flats, a residential care home for the elderly ("RCHE") with no more than 320 beds, and a small training centre for RCHE (the "Proposed Development").
- 1.4 Against this background, CKM Asia Limited, a traffic and transportation planning consultancy firm, was commissioned to conduct a Traffic Impact Assessment ("TIA") in support of the Proposed Development. The report presents the findings and recommendations of the TIA for the Proposed Development.

Scope of the Assessment

- 1.5 The main objectives of this TIA are as follows:
 - To assess the existing traffic issues in the vicinity of the Subject Site;
 - To quantify the amount of traffic generated by the Proposed Development; and
 - To examine the traffic and pedestrian impact on the local road network in the vicinity of the Subject Site.

Contents of the Report

1.6 After this introduction, the remaining chapters contain the following:

Chapter Two -	-	describes the existing situation;
Chapter Three -	-	outlines the development proposal;
Chapter Four -	-	presents the traffic impact analysis ;
Chapter Five -	-	describes the pedestrian assessment; and
Chapter Six -	-	summarises the overall conclusion

2.0 THE EXISTING SITUATION

The Subject Site

2.1 The Subject Site is located to the immediate north of Castle Peak Road - Tsing Lung Tau and is bounded by Hong Kong Garden on the remaining 3 sides. At present, the Subject Site has no vehicular access.

Existing Road Network

2.2 Castle Peak Road – Tsing Lung Tau is a rural road, connecting Castle Peak Road – Sham Tseng to the east and Castle Peak Road – New Tai Lam to the west. It is a dual carriageway 2-lane road. To the east of the section of Castle Peak Road – Tsing Lung Tau fronting the Subject Site is the roundabout of Castle Peak Road – Tsing Lung Tau / Lung Yue Road and to the west is the roundabout of Castle Peak Road – Tsing Lung Tau / Access Road to Vista Cove.

Traffic Survey

- 2.3 To quantify the traffic flows at the junctions chosen for the capacity analysis, manual classified counts were conducted on Friday, 31st May 2024 during the AM and PM peak periods. The locations of the surveyed junctions are presented in **Figure 2.1** and their layouts are shown in **Figures 2.2 to 2.5**.
- 2.4 The surveyed junctions include the following:
 - J1: Castle Peak Road Tsing Lung Tau / Access Road to Hong Kong Garden;
 - J2: Castle Peak Road Tsing Lung Tau / Lung Yue Road
 - J3: Signalised Pedestrian Crossing at Castle Peak Road Tsing Lung Tau (near Vista Cove); and
 - J4: Castle Peak Road Tsing Lung Tau / Access Road to Vista Cove.
- 2.5 The counts were classified by vehicle type to enable traffic flows in passenger car units ("pcu") to be calculated. From the survey, the AM and PM peak hours were found to be between 0730 0830 and 1745 1845 hours respectively, and the existing AM and PM peak hour traffic flows are presented in **Figure 2.6**.

Operational Performance of the Surveyed Junctions

2.6 The existing operational performance of the surveyed junctions is calculated based on the observed traffic counts and the analysis is undertaken using the methods outlined in Volume 2 of Transport Planning and Design Manual ("TPDM"). The existing operational performance of the junctions are summarised in **Table 2.1** and the detailed calculations are found in **Appendix 1**.

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TABLE 2.1 EXISTING JUNCTION OPERATIONAL PERFORMANCE

Ref.	Junction	Type of Junction	Parameter ⁽¹⁾	AM Peak Hour	PM Peak Hour
J1	Castle Peak Road – Tsing Lung Tau /	Priority	RFC	0.191	0.306
	Access Road to Hong Kong Garden				
J2	Castle Peak Road – Tsing Lung Tau /	Roundabout	RFC	0.448	0.244
	Lung Yue Road				
J3	Signalised Pedestrian Crossing at	Signal	RC	>100%	>100%
	Castle Peak Road – Tsing Lung Tau				
	(near Vista Cove)				
J4	Castle Peak Road – Tsing Lung Tau /	Roundabout	RFC	0.301	0.096
	Access Road to Vista Cove				
N. L A			•.		

Notes: ⁽¹⁾ RC – reserve capacity RFC – Ratio of Flow to Capacity

2.7 **Table 2.1** shows that the junctions now operate with capacity.

Public Transport Facilities

2.8 The Subject Site is located close to public transport services with numerous franchised bus and public light bus routes operating in the vicinity. Details of the franchised bus and green minibus ("GMB") routes operating in the vicinity of the Subject Site are presented in **Figure 2.7** and **Table 2.2**.

TABLE 2.2FRANCHISED BUS AND GMB SERVICES OPERATING CLOSE TO
THE SUBJECT SITE

Route	Routing	Frequency (minutes)
KMB 48P ⁽¹⁾	Tsing Lung Tau – Fo Tan Chun Yeung Estate	4 – 5 per day
KMB 52X	Tuen Mun Central – Mong Kok (Park Avenue)	5 – 25
KMB 53	Yoho Mall (Yuen Long) – Tsuen Wan (Nina Tower)	25 - 35
KMB 234D ⁽¹⁾	Tsing Lung Tau – Kwun Tong (Tsui Ping North Estate)	2 – 3 per day
KMB 261B ⁽²⁾	Tuen Mun (Sam Shing Estate)→ Kowloon Station	1 – 3 per day
KMB N252	Mei Foo → Tuen Mun (Sam Shing Estate)	Overnight
CTB 952	Tuen Mun (Chi Lok Fa Yuen) – Admiralty (West) / Causeway	10 – 30
	Bay (Moreton Terrace)	
CTB 952C ⁽¹⁾	So Kwun Wat – Taikoo (Kornhill Plaza)	2 – 3 per day
CTB N952	Tuen Mun (Chi Lok Fa Yuen) – Causeway Bay (Moreton	Overnight
	Terrace)	
LWB A38	Tsuen Wan (Allway Gardens) – Airport (Ground Transportation	30 - 60
	Centre)	
GMB 96	Tsing Lung Tau – Tsuen Wan (Hoi Pa Street)	6 – 10
GMB 96M	Tsing Lung Tau – Tsuen Wan Station	6 – 15
GMB 302	Hong Kong Garden – Kwai Fong	5 – 30
Note: KMB – K	owloon Motor Bus LWB – Long Win Bus	
CTB – Ci	ty Bus GMB – Green Minibus	

CTB – City Bus (1) Mondays – Fridays only GMB – Green Minibus ⁽²⁾ Mondays – Saturdays only

Utilisation of Existing Bus Stops

Eastbound (towards Tsuen Wan)

2.9 An utilisation survey was conducted on Friday, 31st May 2024, which is a normal working day, at the Hong Kong Garden and Rhine Garden eastbound (towards Tsuen Wan) bus stops and the results are presented in **Tables 2.3** and **2.4**, respectively.

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TABLE 2.3RESULTS OF THE UTILISATION SURVEY AT THE HONG KONG
GARDEN EASTBOUND (TOWARDS TSUEN WAN) BUS STOP

Route ⁽¹⁾	No. of Vehicle	No. of Passengers on-board ⁽²⁾ [a]	Capacity ⁽³⁾ [b]	Vacancy [b] – [a]	Occupancy [a] / [b]
AM Peak					
KMB 48P	2	81	256	175	31.6%
KMB 52X	7	510	896	386	56.9%
KMB 53	2	32	124	92	25.8%
KMB 234D	3	90	384	294	23.4%
KMB 261B	2	42	256	214	16.4%
CTB 952	7	454	896	442	50.7%
CTB 952C	2	111	256	145	43.4%
Total	25	<u>1320</u>	<u>3068</u>	<u>1748</u>	<u>43.0%</u>
PM Peak					
KMB 48P	1	7	128	121	5.5%
KMB 52X	5	187	512	325	36.5%
KMB 53	2	37	124	87	29.8%
CTB 952	4	105	384	279	27.3%
Total	12	336	<u>1148</u>	<u>812</u>	29.3%

Note: ⁽¹⁾ KMB – Kowloon Motor Bus CTB – Citybus

⁽²⁾ Passengers counted the moment before the vehicles departed from the bus stop

⁽³⁾ Assumed capacities: Double-decker = 128, Single-decker = 62

TABLE 2.4RESULTS OF THE UTILISATION SURVEY AT RHINE GARDEN
EASTBOUND (TOWARDS TSUEN WAN) BUS STOP

Route ⁽¹⁾	No. of Vehicles	No. of Passengers on-board ⁽²⁾ [a]	Capacity ⁽³⁾ [b]	Vacancy [b] — [a]	Occupancy [a] / [b]
AM Peak					
KMB 48P	2	166	256	90	64.8%
KMB 52X	7	740	896	156	82.6%
KMB 53	2	79	124	45	63.7%
KMB 234D	3	203	384	181	52.9%
KMB 261B	2	152	256	104	59.4%
CTB 952	8	824	896	72	92.0%
CTB 952C	2	166	256	90	64.8%
KMB 234A ⁽⁴⁾	5	523	640	117	81.7%
KMB 234B ⁽⁴⁾	2	165	256	91	64.5%
KMB 234C ⁽⁴⁾	4	49	512	463	9.6%
LWB A38(4)	1	85	128	43	66.4%
Total	37	3152	4604	1452	68.5%
PM Peak					
KMB 48P	1	10	128	118	7.8%
KMB 52X	5	232	384	152	60.4%
KMB 53	2	17	124	107	13.7%
CTB 952	4	106	384	278	27.6%
KMB 234A ⁽⁴⁾	3	84	384	300	21.9%
KMB 234B ⁽⁴⁾	3	120	256	136	46.9%
LWB A38 ⁽⁴⁾	1	11	128	117	8.6%
Total	<u>19</u>	580	<u>1788</u>	<u>1208</u>	32.4%

Note: ⁽¹⁾ KMB – Kowloon Motor Bus CTB – Citybus LWB – Long Win Bus

⁽²⁾ Passengers counted the moment before the vehicles departed from the bus stop

⁽³⁾ Assumed capacities: Double-decker = 128, Single-decker = 62

⁽⁴⁾ These routes do not stop at Hong Kong Garden

2.10 **Table 2.3** shows that the utilisation of the franchised buses at Hong Kong Garden eastbound (towards Tsuen Wan) bus stop is <u>43.0%</u> during the AM Peak Hour and <u>29.3%</u> during the PM Peak Hour. Whilst, **Table 2.4** shows that the utilisation of the franchised buses at the Rhine Garden eastbound (towards Tsuen Wan) bus stop is <u>68.5%</u> during the AM Peak Hour and <u>32.4%</u> during the PM Peak Hour.

Westbound (towards Tuen Mun)

2.11 An utilisation survey was conducted on Friday, 31st May 2024, which is a normal working day, at the Hong Kong Garden westbound (towards Tuen Mun) bus stops and the results are presented in **Tables 2.5**.

TABLE 2.5RESULTS OF THE UTILISATION SURVEY AT THE HONG KONG
GARDEN WESTBOUND (TOWARDS TUEN MUN) BUS STOP

Route ⁽¹⁾	No. of Vehicles	No. of Passenger on-board ⁽²⁾ [a]	Capacity ⁽³⁾ [b]	Vacancy [b] – [a]	Occupancy [a] / [b]
AM Peak					
KMB 48P	1	6	128	122	4.7%
KMB 52X	3	261	384	123	68.0%
KMB 53	1	37	62	25	59.7%
Total	5	<u>304</u>	574	<u>270</u>	<u>53.0%</u>
PM Peak					
KMB 48P	1	20	128	108	15.6%
KMB 52X	6	274	768	494	35.7%
KMB 53	2	65	190	125	34.2%
CTB 952	6	268	768	500	34.9%
CTB 952C	1	37	128	91	28.9%
Total	16	<u>664</u>	<u>1982</u>	<u>1318</u>	<u>33.5%</u>

Note: ⁽¹⁾ KMB – Kowloon Motor Bus CTB – Citybus

⁽²⁾ Passengers counted the moment before the vehicles departed from the bus stop

⁽³⁾ Assumed capacities: Double-decker = 128, Single-decker = 62

2.12 **Table 2.5** shows that the utilisation of the franchised buses at Hong Kong Garden westbound (towards Tuen Mun) bus stop is <u>53.0%</u> during the AM Peak Hour and <u>33.5%</u> during the PM Peak Hour.

3.0 THE PROPOSED DEVELOPMENT

Development Schedule

- 3.1 The Proposed Development comprises of 1 residential block with 112 flats, a RCHE with no more than 320 beds, and a training centre for staff. The Proposed Development has total gross floor area ("GFA") 18,942m², of which 6,942m² is residential, 11,750m² is RCHE, and a small training centre with 250m² GFA.
- 3.2 Due to the night-shift training, the small training centre has accommodation for night-shift trainees.
- 3.3 The detailed flat mix for residential use is shown in **Table 3.1**.

Flat Type	Flat Size (GFA)	Number of Flats
А	$\leq 40m^2$	21
В	$40.1 - 70m^2$	91
	112	

TABLE 3.1DETAILS OF THE RESIDENTIAL FLATS

Vehicular Access of Proposed Development

3.4 The location and design of vehicular access to the Proposed Development is the same as the Approved A/TWW/122 which is shown in **Figure 3.1**. This vehicular access is provided at Castle Peak Road – Tsing Lung Tau, after the realignment of the existing footbridge NF437. The measured length of visibility splay for the motorists leaving the Proposed Development is 70m to the left, which is illustrated in **Figure 3.3**. The Owner of the Proposed Development will bear the design and implementation cost of the modification works.

Provision of Internal Transport Facilities

Residential Use

3.5 A comparison of the proposed internal transport facilities for residential use and the recommendations of the Hong Kong Planning Standards and Guidelines ("HKPSG") is presented in **Table 3.2**.

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TABLE 3.2COMPARISON OF THE HKPSG RECOMMENDATIONS AND
THE PROPOSED INTERNAL TRANSPORT FACILITIES FOR
RESIDENTIAL USE

<u>Use</u>	$\frac{\text{HKPSG Recommendation}}{112 \text{ flats comprising of}}$ 21 flats @ $\leq 40\text{m}^2$ and 91 flats @ 40.1 – 70m ²	Proposed Provision				
	Car Parking Space					
Residential (I)	Number of space = GPS x R1 x R2 x R3, where: Global Parking Standard (GPS) = 1 space per 4 - 7 flats R1 = 0.5 for flat size of $\leq 40m^2$; 1.2 for flat size of $40.1 - 70m^2$ R2 = 1.0 for development outside 500m of rail station R3 = 1.0 for domestic plot ratio (PR) = 2.1 Minimum	Residential (a) 31 @ 5m (L) x 2.5m (W) x 2.4m (H); Visitor (b) 5 @ 5m (L) x 2.5m (W) x 2.4m (H);				
	$\frac{\text{Minimum}}{= (21 \times 0.5 \div 7 \times 1 \times 1) + (91 \times 1.2 \div 7 \times 1 \times 1)}$ = 1.5 + 15.6 = 2 + 16 = <u>18 nos.</u> $\frac{\text{Maximum}}{= (21 \times 0.5 \div 4 \times 1 \times 1) + (91 \times 1.2 \div 4 \times 1 \times 1)}$ = 2.6 + 27.3 = 3 + 28 = 31 nos.	Total (a) + (b) = $31 + 5$ = 36 nos. = maximum, OK				
Visitor (II)	Visitor car parking spaces: 5 visitor spaces per block with > 75 units per block = 5 nos. for 1 residential block	In addition, 1 accessible car parking space @ 5m				
Total (I) + (II)	Minimum = $18 + 5 = 23 \text{ nos.}$ Maximum = $31 + 5 = 36 \text{ nos.}$	(L) x 3.5m (W) x 2.4m (H) is provided at B/F.				
	Motorcycle Parking Space					
Residential	1 motorcycle parking space per $100 - 150$ flats Minimum = $112 / 150 = 0.7$, say <u>1 no.</u> Maximum = $112 / 100 = 1.1$, say <u>2 nos.</u>	2 @ 2.4m (L) x 1m (W) x 2.4m (H) = Maximum, OK				
	Loading / Unloading Bav					
Residential	Minimum of 1 loading / unloading bay for goods vehicles within the site for every 800 flats or part thereof, subject to a minimum of 1 bay for each housing block = <u>1no.</u> for 1 residential block	1 for HGV @ 11m (L) x 3.5m (W) x 4.7m <u>= HKPSG</u> recommendation, OK				

3.6 **Table 3.2** shows that the internal transport facilities provided for residential use comply with the maximum recommendations of the HKPSG.

RCHE Use

3.7 The HKPSG has no recommendation on the provision of internal transport facilities for RCHE use, hence, reference is made to 4 RCHEs which are located far from rail station. These are presented in **Table 3.3**, and their internal transport facilities are found in **Table 3.4**.

TABLE 3.34 RCHES LOCATED FAR FROM RAIL STATION

Ref.	RCHE	Address	No. of beds	Distance from nearest MTR Station
1	Freni Care and Attention Home	1H, Shiu Fai Terrace, Wan Chai, Hong Kong	200	3.2km (Wan Chai Station)
2	Heung Hoi Ching Kok Lin Association Buddhist Li Ka Shing Care and Attention Home for the Elderly	133 Tai Hang Road, Hong Kong	262	2.6km (Causeway Bay Station)
3	Caritas Li Ka Shing Care and Attention Home, Tuen Mun	16 Wah Fat Street, Tuen Mun	260	2.2km (Yuen Mun Station)
4	The Hong Kong Society for the Aged Bradbury Home for the Elderly and Quan Chuen Home for the Elderly	60 - 62 Tin Wan Street, Tin Wan	392	3.0km (Wong Chuk Hang Station)

TABLE 3.4 INTERNAL TRANSPORT FACILITIES PROVIDED IN THE 4 RCHES

Ref.	RCHE	No. of beds	Internal Transport Facilities		
		Car	Light Bus / Ambulance		
Parki	ng Provision				
1	Freni Care and Attention Home	200	10	1	
2	Heung Hoi Ching Kok Lin Association Buddhist Li Ka Shing Care and Attention Home for the Elderly	262	7	1	
3	Caritas Li Ka Shing Care and Attention Home, Tuen Mun	200	5	1	
4	The Hong Kong Society for the Aged Bradbury Home for the Elderly and Quan Chuen Home for the Elderly	392	8 0		
Provi	sion rate (space / bed)				
1	Freni Care and Attention Home	200	0.0500	0.0050	
2	Heung Hoi Ching Kok Lin Association Buddhist Li Ka Shing Care and Attention Home for the Elderly	262	0.0267	0.0038	
3	Caritas Li Ka Shing Care and Attention Home, Tuen Mun	200	0.0192	0.0038	
4	The Hong Kong Society for the Aged Bradbury Home for the Elderly and Quan Chuen Home for the Elderly	392	0.0204	0	
	Adopted provisio	on rate =	0.0500	0.0050	

3.8 The adopted provision rate is presented in **Table 3.4**, and based on this rate, the internal transport facilities of RCHE use is calculated and presented in **Table 3.5**.

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TABLE 3.5PROVISIONOFINTERNALTRANSPORTFACILITIESFORPROPOSED RCHE USE

Use	No. of	Adopted I	Provision rate (space / bed)	Pr	oposed Provision
	beds	Car	Light Bus / Ambulance	Car ⁽¹⁾	Light Bus / Ambulance
RCHE	320	0.0500	0.0050	16	2

Note: ⁽¹⁾ including 1 no. car parking space for persons with disabilities (5m (L) x 3.5m (W) x 2.4m (H))

3.9 The internal transport facilities provided by the Proposed Redevelopment is summarised in **Table 3.6**.

TABLE 3.6SUMMARY OF INTERNAL TRANSPORT FACILITIES OF THE
PROPOSED DEVELOPMENT

Item	Use	Proposed Provision
Car Parking Space	Residential	31
	Visitor	5
	RCHE	16
	Total	<u>52</u>
Motorcycle Parking Space	Residential	2
Loading / Unloading Bay	Residential	<u>1</u>
Light Bus / Ambulance Parking Space	RCHE	2

3.10 The carpark layout plans for G/F and B/F are shown in **Figures 3.1 – 3.2.**

Swept Path Analysis

3.11 The CAD-based swept path analysis program, *Autodesk Vehicle Tracking*, was used to check the ease of vehicle manoeuvring. Vehicles are found to have no manoeuvring problems and all vehicles could enter and leave the spaces with ease. The swept path analysis drawings for critical movements are found in **Appendix 2**.

4.0 TRAFFIC IMPACT

Design Year

4.1 The Proposed Development is expected to be completed by 2032, and the design year adopted for the capacity analysis is 2035, i.e. *3 years after the completion of the Proposed Development*.

Traffic Forecasting

- 4.2 The 2035 traffic flows used for the junction analysis are produced with reference to the following:
 - (i) 2031 traffic flows derived with reference to Base District Traffic Model ("BDTM");
 - (ii) traffic growth from 2031 to 2035 based on the higher of: (a) 2019–based Territorial Population and Employment Data Matrix ("TPEDM") produced by Planning Department, or (b) historic Annual Average Daily Traffic Growth ("AADT") from the Annual Traffic Census published by Transport Department; and
 - (iii) Traffic generated by the Proposed Development.
- 4.3 The (ii) estimated traffic growth from 2031 to 2035, and (iii) traffic generated by the Proposed Development are presented in the paragraphs below.

Estimated Traffic Growth Rate from 2031 to 2035

4.4 The 2019–based TPEDM for Tsuen Wan District, and (b) historic AADT are summarised in **Tables 4.1 and 4.2** respectively.

TABLE 4.1 2019-BASED TPEDM FOR TSUEN WAN DISTRICT

Item	TPEDM Estimation / Projection			An	nual Growth R	ate
	2019	2026	2031	2019 to 2026	2026 to 2031	2019 to 2031
Population	293,700	279,450	249,400	-0.71%	-2.25%	-1.35%
Employment	165,000	166,100	160,650	0.09%	-0.67%	-0.22%

TABLE 4.2	AADT OF THE CORE STATION LOCATED IN THE VICINITY OF
	THE SUBJECT SITE

.			• "
Station	5657	6209	Overall
Road	Castle Peak Road – Sham Tseng,	Castle Peak Rd - Tsuen Wan,	
	Tsing Lung Tau & Tai Lam	Ting Kau & Sham Tseng	
From	Sham Tseng	Tuen Mun Rd	
То	Siu Lam	Sham Tseng	
2014	11,000	12,270	23,270
2015	11,060	11,340	22,400
2016	12,350	11,520	23,870
2017	12,160	11,520	23,680
2018	12,460	11,110	23,570
	Averas	ge Annual Growth (2014 to 2018)	0.32%

Note: Due to the social events in 2019 and the COVID-19 pandemic in 2020 - 2022, the 2019 to 2022 AADT are not used 4.5 **Table 4.1** shows that the highest annual growth rate for population is -0.71% and for employment is 0.09%. Whilst, **Table 4.2** shows that in the historic AADT of the stations between 2014 and 2018 in the vicinity has average annual growth rate of 0.32% per annum. To be conservative, the growth rate of **1.00%** per annum is adopted for the traffic growth between 2031 and 2035.

Traffic Generated by the Proposed Development

- 4.6 Traffic generation of the residential use is calculated based on medium-density / R(A) with an average flat size of $60m^2$ of TPDM.
- 4.7 In view that the TPDM does not provide trip generation rates of RCHE, trip generation survey was conducted during the AM and PM weekday peak periods at 4 RCHEs found in **Table 3.3**. The derived trip rates for these 4 RCHEs are presented in **Table 4.3** and traffic generation associated with the Proposed Development is presented in **Table 4.4**.

Ref. Data Centre		AM Peak Hour		PM Peak Hour	
		IN OUT		IN	OUT
Traff	ic Generation (pcu/hr)				
1	Freni Care and Attention Home	3	3	2	3
2	2 Heung Hoi Ching Kok Lin Association Buddhist Li Ka Shing Care and Attention Home for the Elderly		3	2	4
3 Caritas Li Ka Shing Care and Attention Home, Tuen Mun		9	6	7	13
4 The Hong Kong Society for the Aged Bradbury Home for the Elderly and Quan Chuen Home for the Elderly		10	3	4	9
Trip	Rates (pcu/hour/100m ²)		•		
1	Freni Care and Attention Home	0.0079	0.0079	0.0053	0.0079
2	Heung Hoi Ching Kok Lin Association Buddhist Li Ka Shing Care and Attention Home for the Elderly	0.0115	0.0115	0.0076	0.0153
3	Caritas Li Ka Shing Care and Attention Home, Tuen Mun	0.0385	0.0346	0.0231	0.0154
4	The Hong Kong Society for the Aged Bradbury Home for the Elderly and Quan Chuen Home for the Elderly	0.0153	0.0077	0.0102	0.0153
	Adonted (maximum rates) -	0 0385	0 0346	0.0231	0 0154

FABLE 4.3	TRIP RATES OF 4 RCHES

TABLE 4.4 TRAFFIC GENERATION OF THE PROPOSED DEVELOPMENT

Item	AM Peak Hour			PM Peak Hour		
	In	Out	2-way	In	Out	2-way
Trip Generation Rates for residential us	e (pcu/hou	ır/flat)				
Private Housing: Medium-Density /	0.0425	0.0718	NA	0.037	0.0286	NA
R(A) with an average flat size of 60m ²						
Trip Generation Rates for RCHE (pcu/ho	Trip Generation Rates for RCHE (pcu/hour/bed)					
RCHE (Table 4.3)	0.0385	0.0346	NA	0.0231	0.0154	NA
Traffic Generation of Proposed Redevelopment (pcu/hour)						
Residential Use: 112 flats [a]	5	9	14	5	4	9
RCHE: 320 beds [b]	13	13	25	8	5	13
Total [a] + [b]	<u>18</u>	<u>21</u>	<u>39</u>	<u>13</u>	9	22

4.8 **Table 4.4** shows that the total 2-way traffic generated by the Proposed Development is only 39 and 22 pcu/hour (2-way) during the AM and PM peak hours respectively.

2035 Traffic Flows

4.9 Year 2035 traffic flows for the following cases are derived:

2035 without the Proposed Development [A]	= (i) 2031 traffic flows derived with reference to BDTM + (ii) estimated total growth from 2031 to 2035
2035 with the Proposed Development [B]	= [A] + (iii) traffic generated by the Proposed Development (Table 4.4)

4.10 The 2035 peak hour traffic flows for the cases without and with the Proposed Development, are shown in **Figures 4.1 - 4.2**, respectively.

2035 Junction Operational Performance

4.11 Year 2035 capacity analysis for the cases without and with the Proposed Development are summarised in **Table 4.5** and detailed calculations are found in the **Appendix 1**.

Ref.	Junction	Type of Junction / Parameter ⁽¹⁾	Witho Prop Develo	out the osed opment	With the Propose Development	
			AM Peak	PM Peak	AM Peak	PM Peak
J1	Castle Peak Road – Tsing Lung Tau / Access Road to Hong Kong Garden	Priority / RFC	0.300	0.350	0.304	0.351
J2	Castle Peak Road – Tsing Lung Tau / Lung Yue Road	Roundabout / RFC	0.765	0.282	0.772	0.283
J3	Signalised Pedestrian Crossing at Castle Peak Road – Tsing Lung Tau (near Vista Cove)	Signal / RC	56%	>100%	54%	>100%
J4	Castle Peak Road – Tsing Lung Tau / Access Road to Vista Cove	Roundabout / RFC	0.576	0.107	0.579	0.111
J5	Proposed vehicular access at Castle Peak Road – Tsing Lung Tau	Priority / RFC	NA	NA	0.069	0.013

TABLE 4.52035 JUNCTION OPERATIONAL PERFORMANCE

Notes: ⁽¹⁾ RC – reserve capacity RFC – Ratio of Flow to Capacity

4.12 **Table 4.5** shows that the junctions operate with capacities during the AM and PM peak hours for the cases without and with the Proposed Development.

Impact on Utilisation of Existing Bus Stops

4.13 The impact of the Proposed Development to the existing bus stops is assessed. The expected number of residents using public transport associated with the

Traffic Impact Assessment Final Report

Proposed Development is estimated with reference to Travel Characteristic Survey 2011 and is presented in **Table 4.6**.

TABLE 4.6EXPECTEDDEMANDFORPUBLICTRANSPORTBYTHEPROPOSEDDEVELOPMENT

Item	Quantity
Anticipated Population ⁽¹⁾ [a]	623
Mechanised trip rate per person ⁽²⁾ [b]	1.83
AM and PM Peak hour factor of daily mechanised trips ⁽³⁾ [c]	12%
Public Transport mode boardings proportion ^{(4) (5)} [d]	70%
Expected number of residents using Public Transport [a] x [b] x [c] x [d]	<u>96</u>

Note: ⁽¹⁾ As stated in the planning statement, the Proposed Development is expected to have an anticipated population of 623

- ⁽²⁾ From Table E.2, Travel Characteristics Survey 2011 Final Report
- ⁽³⁾ From Para. 3.3.7, Travel Characteristics Survey 2011 Final Report
- ⁽⁴⁾ From Table 3.6, Travel Characteristics Survey 2011 Final Report
- ⁽⁵⁾ Including rail, franchised bus and public light bus, by assuming people take franchised bus/public light bus to rail stations to interchange rail
- 4.14 **Table 4.6** shows that the Proposed Development will generate 96 passengers during the AM and PM Peak Hour. The utilisation result for the cases without and with the Proposed Development are summarised in **Table 4.7**.

Bus Stop	Witho Prop Develo	out the osed pment ⁽¹⁾	With Prop Develo	the osed pment
	AM	PM	AM	PM
	Peak	Peak	Peak	Peak
The Hong Kong Garden Eastbound (towards Tsuen Wan) Bus Stop	41.1%	29.3%	44.2%	37.6%
Rhine Garden Eastbound (towards Tsuen Wan) Bus	65.8%	35.0%	67.8%	39.7%
Stop				
The Hong Kong Garden Westbound (towards Tuen Mun) Bus Stop	53.0%	33.5%	69.7%	38.3%

TABLE 4.7SUMMARY OF THE UTILISATION RESULT

Note: ⁽¹⁾ Refer to Tables 2.3, 2.4 and 2.5

4.15 **Table 4.7** shows that the franchised buses have capacity to accommodate the residents from the Proposed Development, and the impact from the Proposed Development is <u>negligible</u>.

5.0 PEDESTRIAN ASSESSMENT OF THE PROPOSED REFUGE AREA

Observed Pedestrian Flows

- 5.1 The vehicular access for the Proposed Development will be provided from Castle Peak Road Tsing Lung Tau, and is shown in **Figure 3.1**. A 2.5m wide refuge area will be provided at the vehicular access, which would be used by (i) pedestrians currently walking to / from the Hong Kong Garden and the Hong Kong Garden eastbound (towards Tsuen Wan) bus stop, and (ii) pedestrians from the Proposed Development walking to / from the Hong Kong Garden eastbound (towards Tsuen Wan) bus stop.
- 5.2 In order to conduct the assessment for this refuge area, the number of pedestrians walking to / from the Hong Kong Garden and the Hong Kong Garden eastbound (towards Tsuen Wan) bus stop were counted during the AM and PM peak periods on Friday, 31st May 2024. The existing pedestrian flow is summarised in **Table 5.1**.

TABLE 5.1	2024 OBSERVED PEDESTRIAN FLOWS

Pedestrian Facility	Peak	2-way Pedestrian Flow (ped/hour)
Northern footpath of Castle Peak Road – Tsing Lung	AM	379
Tau	PM	104

2035 Pedestrian Flows

- 5.3 The 2035 pedestrian flow using this refuge area is estimated with reference to the following, and is presented in **Table 5.2**:
 - (i) 2024 observed pedestrian flow (**Table 5.1**);
 - (ii) Traffic growth from 2024 to 2035 based on the growth factor stated in **Paragraph 4.5** (i.e., +1% per annum);
 - (iii) Pedestrians from the Proposed Development walking to / from the Hong Kong Garden eastbound (towards Tsuen Wan) bus stop (see **Table 4.6**)

Pedestrian Facility	Peak	2-way Pedestrian Flow (ped/hour)
Proposed Refuge Area	AM	607
	PM	209

TABLE 5.2NUMBER OF PEDESTRIANS USING THE REFUGE AREA IN 2035

5.4 With reference to Volume 2 Chapter 3.7 of TPDM, a 2.5m wide pedestrian crossing could handle 1,500 – 3,000 pedestrians (2-way) per hour, which is more than sufficient to serve the 2035 pedestrian flows presented in **Table 5.2**, i.e., 607 in the AM peak hour and 209 in the PM Peak hour.

6.0 CONCLUSION

- 6.1 The Subject Site is located at Lot 94 in D.D. 388 and adjoining government land, Castle Peak Road – Tsing Lung Tau in Tsing Lung Tau, Tsuen Wan. On 8th December 2022, the TPB approved the Section 16 Planning Application (TPB ref.: A/TWW/122) to develop the Subject Site to provide 2 residential blocks with 165 flats.
- 6.2 Subsequent to the Approved A/TWW/122, the Owner now intends to develop the Subject Site into 1 residential block with 112 flats, a RCHE with no more than 320 beds, and a small training centre for the RCHE.
- 6.3 Manual classified counts were conducted at junctions located in the vicinity of the Proposed Development in order to establish the peak hour traffic flows. Currently, these junctions operate with capacities during the AM and PM peak hours.
- 6.4 The location and design of vehicular access to the Proposed Development is the same as the Approved A/TWW/122. After realignment of the existing footbridge NF437, the Proposed Development vehicular access will be provided at Castle Peak Road Tsing Lung Tau. The Owner of the Proposed Development will bear the design and implementation cost of the modification works.
- 6.5 The internal transport facilities provided for residential use comply with maximum recommendations of the HKPSG. Whilst, the internal transport facilities provided for the RCHE use are based on the operational needs with the reference to 4 similar RCHEs.
- 6.6 The Proposed Development is expected to complete by 2032, and the junction capacity analysis is undertaken for year 2035. For the design year 2035, the junctions analysed are expected to operate with capacities during the peak hours for the case without and with the Proposed Development.
- 6.7 Utilisation survey was conducted at the Hong Kong Garden eastbound (towards Tsuen Wan) bus stop, Rhine Garden eastbound (towards Tsuen Wan) bus stop and Hong Kong Garden westbound (towards Tuen Mun) bus stop. It was found that the franchised routes observing these bus stops have capacity to accommodate the residents from the Proposed Development.
- 6.8 Pedestrian assessment of the 2.5m wide refuge area located at the proposed vehicular access to the Proposed Development was conducted and it was found that it is more than sufficient to serve the 2035 peak hour pedestrian flows.
- 6.9 It is concluded that the Proposed Development will result in <u>no adverse traffic</u> <u>impact</u> to the surrounding road network. From traffic engineering grounds, the Proposed Development is acceptable.

Figures

















Appendix 1 – Calculation

Priority Junction Analysis Junction: Castle Peak Road - Tsing Lung Tau / Access Road to Hong Kong Garden 2024 1 August 2024 Design Year: Job Number: J7304 Date: Scenario: **Existing Condition** P. 1 Castle Peak Road - Tsing Lung Tau (Arm C) Castle Peak Road - Tsing Lung Tau (Arm A) 298 244 205 96 891 159 27 55 332 AM PM 156 North [Free Flow] Access Road to Hong Kong Garden (Arm B) The predictive equations of capacity of movement are: Q-BA = D[627 + 14W-CR - Y(0.364q-AC + 0.144q-AB + 0.229q-CA + 0.52q-CB)] Q-BC = E[745 - Y(0.364q-AC + 0.144q-AB)]Q-CB = F[745 - 0.364Y(q-AC + q-AB)]The geometric parameters represented by D, E, F are: D = [1 + 0.094(w-BA - 3.65)][1 + 0.0009(V-rBA - 120)][1 + 0.0006(V-IBA - 150)] E = [1 + 0.094(w-BC - 3.65)][1 + 0.0009(V-rBC - 120)] F = [1 + 0.094(w-CB - 3.65)][1 + 0.0009(V-rCB - 120)] where Y = 1 - 0.0345W q-AB, etc = the design flow of movement AB, etc W = major road width W-CR = central reserve width w-BA, etc = lane width to vehicle v-rBA, etc = visibility to the right for waiting vehicles in stream BA, etc v-IBA, etc = visibility to the left for waiting vehicles in stream BA, etc Geometry : Input Input Calculated Input W* 9.50 V-rBA 0 w-BA 0.00 D 0.5332 W-CR V-IBA Е 1.1066 3.60 0 w-BC 5.00 V-rBC 100 w-CB 3.50 F 0.9682 Υ V-rCB 100 0.6723 Analysis : Traffic Flows, pcu/hr AM ΡM Capacity, pcu/hr AM ΡM q-CA 298 Q-BA 275 244 206 205 Q-BC 580 q-CB 96 775 q-AB 27 55 Q-CB 504 671 q-AC 159 Q-BAC 206 275 891 q-BA 0 0 q-BC 0 0 0.000 0.000 f ΡM Ratio-of-flow to Capacity AM B-A 0.000 0.000 B-C 0.000 0.000 C-B 0.191 0.306 Temporary Traffic Arrangement is facilities at the junction

Priority Junction Analysis Junction: Castle Peak Road - Tsing Lung Tau / Access Road to Hong Kong Garden 2035 1 August 2024 Design Year: Job Number: J7304 Date: Scenario: Without Proposed Development P. 2 Castle Peak Road - Tsing Lung Tau (Arm C) Castle Peak Road - Tsing Lung Tau (Arm A) 334 276 236 112 1702 169 35 67 374 AM PM 187 North [Free Flow] Access Road to Hong Kong Garden (Arm B) The predictive equations of capacity of movement are: Q-BA = D[627 + 14W-CR - Y(0.364q-AC + 0.144q-AB + 0.229q-CA + 0.52q-CB)] Q-BC = E[745 - Y(0.364q-AC + 0.144q-AB)]Q-CB = F[745 - 0.364Y(q-AC + q-AB)]The geometric parameters represented by D, E, F are: D = [1 + 0.094(w-BA - 3.65)][1 + 0.0009(V-rBA - 120)][1 + 0.0006(V-IBA - 150)] E = [1 + 0.094(w-BC - 3.65)][1 + 0.0009(V-rBC - 120)] F = [1 + 0.094(w-CB - 3.65)][1 + 0.0009(V-rCB - 120)] where Y = 1 - 0.0345W q-AB, etc = the design flow of movement AB, etc W = major road width W-CR = central reserve width w-BA, etc = lane width to vehicle v-rBA, etc = visibility to the right for waiting vehicles in stream BA, etc v-IBA, etc = visibility to the left for waiting vehicles in stream BA, etc Geometry : Input Input Calculated Input W 12.50 V-rBA 0 w-BA 0.00 D 0.5332 W-CR V-IBA Е 1.1066 3.60 0 w-BC 5.00 V-rBC 100 w-CB 3.50 F 0.9682 Υ V-rCB 100 0.5688 Analysis : Traffic Flows, pcu/hr AM ΡM Capacity, pcu/hr AM ΡM q-CA 334 Q-BA 279 276 135 236 Q-BC 431 q-CB 780 112 q-AB 35 67 Q-CB 373 674 q-AC 1702 169 Q-BAC 135 279 q-BA 0 0 q-BC 0 0 0.000 0.000 f Ratio-of-flow to Capacity AM ΡM B-A 0.000 0.000 B-C 0.000 0.000 C-B 0.300 0.350

Priority Junction Analysis Junction: Castle Peak Road - Tsing Lung Tau / Access Road to Hong Kong Garden 2035 1 August 2024 Design Year: Job Number: J7304 Date: Scenario: With Proposed Development P. 3 Castle Peak Road - Tsing Lung Tau (Arm A) Castle Peak Road - Tsing Lung Tau (Arm C) 344 305 236 112 1723 178 67 35 374 AM PM 187 North [Free Flow] Access Road to Hong Kong Garden (Arm B) The predictive equations of capacity of movement are: Q-BA = D[627 + 14W-CR - Y(0.364q-AC + 0.144q-AB + 0.229q-CA + 0.52q-CB)] Q-BC = E[745 - Y(0.364q-AC + 0.144q-AB)]Q-CB = F[745 - 0.364Y(q-AC + q-AB)]The geometric parameters represented by D, E, F are: D = [1 + 0.094(w-BA - 3.65)][1 + 0.0009(V-rBA - 120)][1 + 0.0006(V-IBA - 150)] E = [1 + 0.094(w-BC - 3.65)][1 + 0.0009(V-rBC - 120)] F = [1 + 0.094(w-CB - 3.65)][1 + 0.0009(V-rCB - 120)] where Y = 1 - 0.0345W q-AB, etc = the design flow of movement AB, etc W = major road width W-CR = central reserve width w-BA, etc = lane width to vehicle v-rBA, etc = visibility to the right for waiting vehicles in stream BA, etc v-IBA, etc = visibility to the left for waiting vehicles in stream BA, etc Geometry : Input Input Calculated Input W 12.50 V-rBA 0 w-BA 0.00 D 0.5332 W-CR V-IBA Е 1.1066 3.60 0 w-BC 5.00 V-rBC 100 w-CB 3.50 F 0.9682 Υ V-rCB 100 0.5688 Analysis : Traffic Flows, pcu/hr AM PΜ Capacity, pcu/hr AM ΡM q-CA 344 Q-BA 278 305 131 236 Q-BC 427 q-CB 778 112 q-AB 35 67 Q-CB 369 672 q-AC 1723 178 Q-BAC 131 278 q-BA 0 0 q-BC 0 0 0.000 0.000 f Ratio-of-flow to Capacity AM ΡM B-A 0.000 0.000 B-C 0.000 0.000 C-B 0.304 0.351

Location	Castle Peak Road – Tsing Lung Tau / Lung Yue Road										
Scenario	Existing C	Condition						Page	4		
Design Ye	ar:	2024	_	Job Number	J7304		Date	01 Au	g 2024		
			-								
AM Peak											
Arm	To A	To B	To C			Total	q _c				
From A	0	80	17			07	1217	1			

	0	00	17	91	1217
From B	46	14	274	334	66
From C	20	1154	49	1223	60
Total	66	1248	340	1654	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	45	14	59	339
From B	150	37	453	640	50
From C	13	266	36	315	187
Total	163	348	503	1014	

Legend

Arm	Road (in clockwise order)
А	Lung Yue Road
В	Castle Peak Road - Tsing Lung Tau (WB)
С	Castle Peak Road - Tsing Lung Tau (EB)

Geometric Parameters

Cometin	o i aramote	// 5					
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	8.00	3.55	21.00	7.00	50.00	18.00	1.02
From B	9.50	7.80	21.00	16.00	50.00	40.00	0.17
From C	9.50	7.75	21.00	6.75	50.00	15.00	0.41

Predictive Equation $Q_E = K(F - f_cq_c)$

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
к	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
М	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
S	= 1.6(e-v)/l

Limitation

man	6 11	
е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q_E		Entry Flow		RFC	
Arm	x ₂	М	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	5.017	0.368	1.366	1.044	1520.021	0.574	857	1384	97	59	0.113	0.043
From B	9.069	0.368	1.366	0.968	2747.803	0.807	2607	2620	334	640	0.128	0.244
From C	8.706	0.368	1.366	1.054	2638.063	0.786	2732	2627	1223	315	0.448	0.120

Location	Castle Pe	ak Road – Tsing Lung T	au / Lung Yue Road					
Scenario	Without F	Proposed Development				Page	5	
Design Ye	ear:	2035	Job Number	J7304	Date	01 Au	ıg 2024	
AM Peak								

Arm	To A	To B	To C	Total	q _c
From A	0	99	19	118	2071
From B	63	17	315	395	73
From C	22	2000	54	2076	80
Total	85	2116	388	2589	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	61	15	76	383
From B	179	42	516	737	54
From C	14	302	39	355	221
Total	193	405	570	1168	

Legend

-	
Arm	Road (in clockwise order)
А	Lung Yue Road
В	Castle Peak Road - Tsing Lung Tau (WB)
С	Castle Peak Road - Tsing Lung Tau (EB)
	1

Geometric Parameters

Connetin		// 5					
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	8.00	3.55	21.00	7.00	50.00	18.00	1.02
From B	9.50	7.80	21.00	16.00	50.00	40.00	0.17
From C	9.50	7.75	21.00	6.75	50.00	15.00	0.41

Predictive Equation $Q_E = K(F - f_cq_c)$

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
к	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
М	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
S	= 1.6(e-v)/l

Limitation

man	6 11	
е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q_E		Entry Flow		RFC	
Arm	x ₂	М	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	5.017	0.368	1.366	1.044	1520.021	0.574	345	1357	118	76	0.342	0.056
From B	9.069	0.368	1.366	0.968	2747.803	0.807	2602	2617	395	737	0.152	0.282
From C	8.706	0.368	1.366	1.054	2638.063	0.786	2715	2598	2076	355	0.765	0.137

Location	Castle Peak Road – Tsing Lung Tau / Lung Yue Road
-	

Scenario	With Pro	posed Devel	opment					Page	6
Design Ye	ar:	2035		Job Number	J7304		Date	01 Aug	g 2024
AM Peak								_	
Arm	To A	To B	To C			Total	q _c]	
From A	0	99	19			118	2092		
From B	63	17	331			411	86		
From C	22	2008	67			2097	80		

Total	85	2124	417	2626	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	61	15	76	392
From B	179	42	517	738	63
From C	14	302	48	364	221
Total	193	405	580	1178	

Legend

-	
Arm	Road (in clockwise order)
А	Lung Yue Road
В	Castle Peak Road - Tsing Lung Tau (WB)
С	Castle Peak Road - Tsing Lung Tau (EB)
	1

Geometric Parameters

Geometri		515					
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	8.00	3.55	21.00	7.00	50.00	18.00	1.02
From B	9.50	7.80	21.00	16.00	50.00	40.00	0.17
From C	9.50	7.75	21.00	6.75	50.00	15.00	0.41

Predictive Equation Q_E = K(F - f_cq_c)

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
к	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
М	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
s	= 1.6(e-v)/l

Limitation

е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q_E		Entry Flow		RFC	
Arm	x ₂	М	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	5.017	0.368	1.366	1.044	1520.021	0.574	332	1352	118	76	0.355	0.056
From B	9.069	0.368	1.366	0.968	2747.803	0.807	2592	2610	411	738	0.159	0.283
From C	8.706	0.368	1.366	1.054	2638.063	0.786	2715	2598	2097	364	0.772	0.140

Signal Junction Analysis

Somethic Uper gene By: Checked By:	Junction:	Signalised	Pedestrian (Crossinę	g at Cas	tle Peak	Road -	Tsing L	ung Tau	ı (near ∖	/istacov	e)			-	Job Nu	mber:	J7304
Design Year Oute Design Usy Checked by Date Date Haugust 224 new image i	Scenario:	Existing Co	ondition														Page	7
19962 19962 19962 10 </td <td>Design Year:</td> <td>2024</td> <td>Design</td> <td>ed By:</td> <td></td> <td></td> <td></td> <td>-</td> <td>Checke</td> <td>ed By:</td> <td></td> <td></td> <td></td> <td>-</td> <td>Date:</td> <td>1 A</td> <td>ugust 2</td> <td>024</td>	Design Year:	2024	Design	ed By:				-	Checke	ed By:				-	Date:	1 A	ugust 2	024
Answer Anton Base Anton Base																		
Calle Peak Road SA A1 1 365 A A 1 365 A <td></td> <td>Approach</td> <td></td> <td>Phase</td> <td>Stage</td> <td>Width (m)</td> <td>Radius (m)</td> <td>% Up-hill</td> <td>Turning %</td> <td>Sat. Flow</td> <td>AM Peak Flow</td> <td>y value</td> <td>Critical y</td> <td>Turning %</td> <td>Sat. Flow</td> <td>PM Peak Flow</td> <td>y value</td> <td>Critical y</td>		Approach		Phase	Stage	Width (m)	Radius (m)	% Up-hill	Turning %	Sat. Flow	AM Peak Flow	y value	Critical y	Turning %	Sat. Flow	PM Peak Flow	y value	Critical y
Cando Peak Read SA A1 1 1 3.65 190 440 022 0222 022 100 10 0.068 190 0.068								Gradient		(pcu/hr)	(pcu/hr)				(pcu/hr)	(pcu/hr)		
- Taing Lung Tau EB SA A2 1 3.65 A2 1 3.65 A2 1 3.65 A3 A4	Castle Peak R	Road	SA	A1	1	3.65				1980	440	0.222	0.222		1980	110	0.056	
Cashe Peak Road SA B2 1 3.65 Image Ling Tau WB SA B2 1 SA S	- Tsing Lung	Tau EB	SA	A2	1	3.65				2120	471	0.222			2120	118	0.056	
Canta Peak Rand SA B1 1 3.65 1 100 110 0.000																		
- Taing Lung Tau W8 SA B2 1 3.65 - 2120 126 0.093 - 2 2 0.073 0.073 - Taing Lung Tau W8 SA B2 1 3.65 - 2 2 1 0.073 0.073 0.073 - Taing Lung Tau W8 SA B2 1 3.65 SA B2 1 3.65 SA B2 1 0.75 0.77 0.77 0.77 - Taing Lung Tau W8 SA B2 1 3.65 SA B2 1 3.65 SA B2 1 0.77 0.77 0.77 - Taing Lung Tau W8 SA B2 1 3.65 SA SA <	Castle Peak R	Road	SA	B1	1	3.65				1980	118	0.060			1980	144	0.073	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	- Tsing Lung	Tau WB	SA	B2	1	3.65				2120	126	0.059			2120	154	0.073	0.073
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$																		
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	pedestrian pha	ase		Ср	2		min c	rossing	time =	8	sec	GM +	15	sec F	GM =	23	sec	
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	AM Traffic Flow (pcu/h	hr)		N	PM Traffic	Flow (pcu/hi	.)			Ν	S = 1940	+ 100 (W	-3.25\$ = 2	080 + 100) (W-3.25)	Note:		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				7						1	S _M = S / (1 + 1.5 f/r)	S _M = (S	s - 230) / (*	1 + 1.5 f/r)			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												ΔΜ	Peak	PM	Peak	1		
$244 \leftarrow 244 \leftarrow 298 \leftarrow 244 \leftarrow 298 $	——•	911	,				228		,			1		1				
$244 \longleftarrow 298 \longleftarrow \frac{1}{(6)} \begin{array}{c} 3600 \\ 972 \\ (6) \\ 972 \\ 0.073 \\ (6) \\ 972 \\ 0.698 \\ (7) \\ 0.698 \\ (7) \\ (8) \\ 960 \\ (8) \\ (8) \\ (9) \\ (7) \\ (8) \\ 972 \\ (8) \\ 3600 \\ (7) \\ (8) \\$												0.000		0.070				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		244 🔸					208				Sum y	0.222		0.073				
$\begin{array}{c c c c} \hline c(s) & 3600 & 3600 \\ \hline pratical y & 0.657 & 0.698 \\ \hline rc. (%) & 196\% & 860\% \end{array}$		244 1					290	•			L (s)	972		810				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											C (s)	3600		3600				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											practical y	0.657		0.698				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$											R.C. (%)	196%		860%				
$A1 \longrightarrow A2 \longrightarrow B2 H = B2 H = C_{PP} + C_{P$	1		2															
$A^{T} \longrightarrow B^{T} \longrightarrow B^{T$	A1																	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	A2	•		4														
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				Ср														
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PM G= I/G=3 G=23 I/G=2 G= I/G= G= I/G= G=	6	=	I/G =	G =		I/G =		G =		I/G =		G =		I/G =		G =		
n m 0- vo-0 0-20 vo-2 0- vo- 0= vo- 0=	PM OF	_	I/G = 3	0-	23		2	0-								0-		
= =	6.	=	I/G =	G =		//G =	-	G =		!/G =		G =		I/G =		G =		

Signal Junction Analysis

Junction:	Signalise	ed Pedestrian (Crossing	g at Cas	stle Peak	Road -	Tsing L	ung Tau	ı (near ∖	/istacov	e)			-	Job Nu	mber:	J7304
Scenario:	Without I	Proposed Deve	elopmer	nt												Page	8
Design Year:	2035	Design	ed By:					Checke	ed By:					Date:	1 A	August 2	2024
							-						-				
	Approach		Phase	Stare	Width (m)	Radius (m)	% Un-hill	Turning %	Sat Flow	AM Peak	v value	Critical v	Turning %	Sat Flow	PM Peak	v value	Critical v
	Approach		Thase	Otage	widar (iii)		Gradient	Turning 70	(pcu/hr)	(pcu/hr)	y value	Ontioar y	Turning 70	(pcu/hr)	(pcu/hr)	y value	Ontiour y
Castle Peak F	Road	SA	A1	1	3.65				1980	835	0.422			1980	122	0.062	
- Tsing Lung	Tau EB	SA	A2	1	3.65				2120	894	0.422			2120	130	0.061	
Castle Peak F	Road	SA	B1	1	3.65				1980	133	0.067			1980	161	0.081	
- Tsing Lung	Tau WB	SA	B2	1	3.65				2120	143	0.067			2120	173	0.082	0.082
pedestrian ph	ase		Ср	2		min c	rossing	time =	8	sec	GM +	15	sec F	GM =	23	sec	
· · · ·							U										
AM Traffic Flow (pcu/	hr)		N	PM Traffic	Flow (pcu/h	.)			N	S = 1940	+ 100 (W	-3.25\$ = 2	2080 + 100) (W-3.25)	Note:		
			1						1	S _M = S / (1 + 1.5 f/r	S _M = (S	S - 230) / (*	1 + 1.5 f/r)			
		/							,		AM	Peak	PM	Peak			
	▶ 1729	,				252		,			1		1				
										0	0 4 2 2		0.082				
	276	←				334	←			Sun y	0.72		0.002				
										L (S)	972		010				
										C (s)	3600		3600				
										practical y	0.657		0.698				
										R.C. (%)	56%		755%				
1		2															
A1	•																
A2	•		<u></u>														
	•	— в2	Сþ														
	←	—— B1	,														
						L											
AM G	=	I/G = 3	G =	23	I/G =	2	G =		I/G =		G =		I/G =		G =		
G	=	I/G =	G =		I/G =		G =		I/G =		G =		I/G =		G =		
PM G	=	I/G = 3	G =	23	I/G =	2	G =		I/G =		G =		I/G =		G =		
G	-	I/G =	G =		I/G =		G =		I/G =		G =		I/G =		G =		

Signal Junction Analysis

Junction:	Signalise	d Pedestrian (Crossinę	g at Cas	tle Peak	Road -	Tsing L	ung Tau	ı (near V	/istacov	e)			-	Job Nu	mber:	J7304
Scenario:	With Prop	posed Develo	oment													Page	9
Design Year:	2035	Design	ed By:				_	Checke	ed By:				_	Date:	1 A	August 2	024
	Approach		Phase	Stage	Width (m)	Radius (m)	% Up-hill	Turning %	Sat. Flow	AM Peak Flow	y value	Critical y	Turning %	Sat. Flow	PM Peak Flow	y value	Critical y
				-			Gradient		(pcu/hr)	(pcu/hr)				(pcu/hr)	(pcu/hr)		
Castle Peak R	load	SA	A1	1	3.65				1980	844	0.426	0.426		1980	128	0.065	
- Tsing Lung	Tau EB	SA	A2	1	3.65				2120	903	0.426			2120	137	0.065	
Castle Peak R	load	SA	B1	1	3.65				1980	147	0.074			1980	166	0.084	
- Tsing Lung	Tau WB	SA	B2	1	3 65				2120	158	0.075			2120	178	0.084	0.084
		0,1	02		0.00				2120	100	0.010			2120	110	0.001	0.001
					-					-	-	-		-		-	
pedestrian pha	ase		Ср	2		min c	rossing	time =	8	sec	GM +	15	sec F	GM =	23	sec	
AM Traffic Flow (pcu/h	nr)		N	PM Traffic	Flow (pcu/hr)			N	S = 1940	+ 100 (W	-3 258 = 2	080 + 100) (W-3 25)	Note:		
			7						7	S = S / (1 + 1 5 f/r	S = (9	S = 230) / (*	1 + 1 5 f/r)			
		/	/					/	/	01 - 07 (- 0M = (C	- 230)7(1 • 1.5 1/1)			
	• 17/7	/				265		/			AM	Peak	PM	Peak			
	1747					200					1		1				
										Sum y	0.426		0.084				
	305 •	←				344	•			L (s)	972		810				
										C (s)	3600		3600				
										practical v	0.657		0.698				
										practical y	540/		7210/				
										R.C. (%)	J4 %		73170				
1		2															
A1																	
A2	•																
	<u>ــــــ</u>	B2	Ср														
	` •	B1		•													
AM G =	:	I/G = 3	G =	23	I/G =	2	G =		I/G =		G =		I/G =		G =		
G =	:	I/G =	G =		I/G =		G =		I/G =		G =		I/G =		G =		
PM C-		I/G = 3	- -	23		2	-				-		I/G -		- -		
			0-		1/C -	-	0-		1/C -		0-		1/C -		0-		
G	-	1/G -	G =		i/G =		G =		i/G =		G =		i/G =		G =		

Location Castle Peak Road – Tsing Lung Tau / Access Road to Vistacove

Scenario	Existing C	Condition						Page	10
Design Ye	ar:	2024		Job Number	J7304		Date	01 Au	g 2024
AM Peak								_	
Arm	To A	To B	To C			Total	q,	1	

Arm	To A	To B	To C	Total	q _c
From A	0	4	4	8	907
From B	0	15	229	244	4
From C	4	892	0	896	15
Total	4	911	233	1148	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	1	1	2	227
From B	2	12	284	298	1
From C	3	215	0	218	14
Total	5	228	285	518	

Legend

Road (in clockwise order)
Access Road to Vistacove
Castle Peak Road - Tsing Lung Tau (WB)
Castle Peak Road - Tsing Lung Tau (EB)

Geometric Parameters

Geometri	c Falamete	515					
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	5.70	2.80	10.00	11.00	40.00	33.00	0.42
From B	11.70	7.50	40.00	46.00	40.00	50.00	0.15
From C	10.60	7.00	100.00	31.00	40.00	34.00	0.19

Predictive Equation $Q_E = K(F - f_cq_c)$

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
к	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
М	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
S	= 1.6(e-v)/L

Limitatio	on
е	Entry Width

е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q_E		Entry Flow		RFC	
Arm	x ₂	М	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	4.373	0.135	1.440	0.941	1325.012	0.567	763	1125	8	2	0.010	0.002
From B	10.750	0.135	1.440	0.955	3257.352	0.953	3107	3110	244	298	0.079	0.096
From C	9.625	0.135	1.440	1.025	2916.268	0.885	2976	2977	896	218	0.301	0.073

Location Castle Peak Road – Tsing Lung Tau / Access Road to Vistacove	
---	--

Scenario	Without Proposed Development						11
Design Yea	ar:	2035	Job Number	J7304	Date	01 Aug 2	024

AM Peak

/ un i oun					
Arm	To A	To B	To C	Total	q _c
From A	0	5	5	10	1724
From B	1	17	258	276	5
From C	5	1707	0	1712	18
Total	6	1729	263	1998	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	2	3	5	250
From B	3	14	317	334	3
From C	4	236	0	240	17
Total	7	252	220	570	
Total	7	252	320	579	

Legend

Arm	Road (in clockwise order)
А	Access Road to Vistacove
В	Castle Peak Road - Tsing Lung Tau (WB)
С	Castle Peak Road - Tsing Lung Tau (EB)

Geometric Parameters

Coomotine	o i aramote						
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	5.70	2.80	10.00	11.00	40.00	33.00	0.42
From B	11.70	7.50	40.00	46.00	40.00	50.00	0.15
From C	10.60	7.00	100.00 31.00 40.		40.00	34.00	0.19

Predictive Equation $Q_E = K(F - f_cq_c)$

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
Κ	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
М	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
S	= 1.6(e-v)/L

Limitation

muun		
е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q_E		Entry Flow		RFC	
Arm	x ₂	Μ	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	4.373	0.135	1.440	0.941	1325.012	0.567	327	1113	10	5	0.031	0.004
From B	10.750	0.135	1.440	0.955	3257.352	0.953	3106	3108	276	334	0.089	0.107
From C	9.625	0.135	1.440	1.025	2916.268	0.885	2974	2974	1712	240	0.576	0.081

Location Castle Peak Road – Tsing Lung Tau / Access Road to Vistacove

Scenario	With Prop		Page	12			
Design Ye	ar:	2035	Job Number	J7304	Date	01 Au	ıg 2024

AM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	5	5	10	1742
From B	1	33	271	305	5
From C	5	1709	0	1714	34
Total	6	1747	276	2029	

PM Peak

Arm	To A	To B	To C	Total	q _c
From A	0	2	3	5	263
From B	3	15	326	344	3
From C	4	248	0	252	18
Total	7	265	329	601	

Legend

Arm	Road (in clockwise order)
А	Access Road to Vistacove
В	Castle Peak Road - Tsing Lung Tau (WB)
С	Castle Peak Road - Tsing Lung Tau (EB)

Geometric Parameters

Geoineth		13					
Arm	e (m)	v (m)	r (m)	L (m)	D (m)	Ø (°)	S
From A	5.70	2.80	10.00	11.00	40.00	33.00	0.42
From B	11.70	7.50	40.00	46.00	40.00	50.00	0.15
From C	10.60	7.00	100.00	31.00	40.00	34.00	0.19

Predictive Equation $Q_E = K(F - f_cq_c)$

Q_E	Entry Capacity
q _c	Circulating Flow across the Entry
Κ	= 1-0.00347(Ø-30)-0.978[(1/r)-0.05]
F	= 303x ₂
f_c	$= 0.210t_{D}(1+0.2x_{2})$
t _D	= 1+0.5/(1+M)
Μ	= exp[(D-60)/10]
x ₂	= v+(e-v)/(1+2S)
S	= 1.6(e-v)/L

Limitation

muun		
е	Entry Width	4.0 - 15.0 m
v	Approach Half Width	2.0 - 7.3 m
r	Entry Radius	6.0 - 100.0 m
L	Effective Length of Flare	1.0 - 100.0 m
D	Inscribed Circle Diameter	15 - 100 m
Ø	Entry Angle	10° - 60°
S	Sharpness of Flare	0.0 - 3.0

							Q _E		Entry Flow		RFC	
Arm	X ₂	М	t _D	К	F	f _c	AM	PM	AM	PM	AM	PM
From A	4.373	0.135	1.440	0.941	1325.012	0.567	317	1106	10	5	0.032	0.005
From B	10.750	0.135	1.440	0.955	3257.352	0.953	3106	3108	305	344	0.098	0.111
From C	9.625	0.135	1.440	1.025	2916.268	0.885	2959	2974	1714	252	0.579	0.085

Priority Junction Analysis Junction: Proposed vehicular access at Castle Peak Road - Tsing Lung Tau 2035 1 August 2024 Design Year: Job Number: J7304 Date: Scenario: With Proposed Development P. 13 Castle Peak Road - Tsing Lung Tau (Arm C) Castle Peak Road - Tsing Lung Tau (Arm A) 344 305 1737 236 18 13 AM ΡM 21 9 North Proposed Vehicular Access (Arm B) The predictive equations of capacity of movement are: Q-BA = D[627 + 14W-CR - Y(0.364q-AC + 0.144q-AB + 0.229q-CA + 0.52q-CB)] Q-BC = E[745 - Y(0.364q-AC + 0.144q-AB)]Q-CB = F[745 - 0.364Y(q-AC + q-AB)]The geometric parameters represented by D, E, F are: D = [1 + 0.094(w-BA - 3.65)][1 + 0.0009(V-rBA - 120)][1 + 0.0006(V-IBA - 150)] E = [1 + 0.094(w-BC - 3.65)][1 + 0.0009(V-rBC - 120)] F = [1 + 0.094(w-CB - 3.65)][1 + 0.0009(V-rCB - 120)] where Y = 1 - 0.0345W q-AB, etc = the design flow of movement AB, etc W = major road width W-CR = central reserve width w-BA, etc = lane width to vehicle v-rBA, etc = visibility to the right for waiting vehicles in stream BA, etc v-IBA, etc = visibility to the left for waiting vehicles in stream BA, etc Geometry : Input Input Calculated Input W 8.25 V-rBA 0 w-BA 0.00 D 0.5332 W-CR 0.00 V-IBA 4.70 Е 0 w-BC 1.0493 V-rBC 70 w-CB 0.00 F 0.5860 V-rCB 0 Υ 0.7154 Analysis : Traffic Flows, pcu/hr AM PΜ Capacity, pcu/hr AM ΡM q-CA 305 344 Q-BA 66 271 Q-BC 305 716 q-CB 0 0 q-AB 18 13 Q-CB 169 399 q-AC 236 Q-BAC 305 716 1737 q-BA 0 0 q-BC 21 9 1.000 1.000 f Ratio-of-flow to Capacity AM ΡM B-A 0.000 0.000 B-C 0.069 0.013 C-B 0.000 0.000

Appendix 2 – Swept Path Analysis

JOB\J7300-J7349\J7304\2024 08\Fig SP2 - SP10 RevA.dwg

JOB\J7300-J7349\J7304\2024 08\Fig SP2 - SP10 RevA.dwg

JOB\J7300-J7349\J7304\2024 08\Fig SP2 - SP10 RevA.dwg

RevA. SP101

Ŋ 08\Fig SP J730

