Appendix 4.7

Working Example Illustration

Table 1a Conversion Factors for 10 vehicle classes to 16 vehicle classes

Traffic Count Survey - 10 Vehicle Classes	Name of 16 Vehicle Classes	Fuel Type	% By fuel	% for 10 veh to 16 veh	Source
MC	MC	Petrol	100%	100%	-
PC	PC	Petrol	99.5%	100%	Monthly Traffic and Transport Digest (January 2011) published by TD
		Diesel	0.5%		
Taxi	Taxi	Diesel	0.0%	100%	
		LPG	100.0%		
Coach	NFB <6.4t	Diesel	4.9%	4.9%	
	NFB 6.4-15t	Diesel	71.7%	71.7%	
	NFB >15t	Diesel	1.4%	1.4%	
	PriLB <3.5t	Petrol	0.0%	7.7%	
		Diesel	5.8%		
		LPG	1.8%		
	PriLB >3.5t	Petrol	0.0%	14.3%	
		Diesel	10.9%		
		LPG	3.4%		
LGV	LGV <2.5t	Petrol	0.0%	0.1%	2008 Licensed Vehicle by Age and Technology Group Fractions published by EPD
		Diesel	0.1%		
	LGV 2.5t-3.5t	Petrol	2.2%	75.7%	
		Diesel	73.5%		
	LGV >3.5t	Diesel	24.2%	24.2%	
MGV	HGV <15t	Diesel	100%	100%	-
HGV	HGV >15t	Diesel	100%	100%	-
Container					
PLB	PLB	Diesel	35.4%	100%	Monthly Traffic and Transport Digest (January 2011) published by TD
		LPG	64.6%		
BUS	FBSD	Diesel	7.0%	7%	
	FBDD	Diesel	93.0%	93%	

Example

Table 1 - Forecast Traffic Flows (2031) in 16 vehicle classes (0800-0900, Design Case)

Step 1: Traffic Model Flow in year 2031 (pcu/hr)

Link No	Road Name	Total	PV	GV	PT
59	WANG CHIU ROAD	602.6	491.9	98.2	12.4

Step 2: Break Down into 10 vehicle classes pcu per hour (pcu/hr)

Link No	Road Name	Total	MC	Pr Car	Taxi	LGV	MGV	HGV	GMB/ RMB	Container	COACH	BUS
59	WANG CHIU ROAD	602.6	14.9	335.3	110.7	37.7	20.6	30.9	3.0	9.0	31.0	9.3

Step 3: Convert to vehicle (veh/hr)

Link No	Road Name	Total Veh	MC	Pr Car	Taxi	LGV	MGV	HGV	GMB/ RMB	Container	COACH	BUS
59	WANG CHIU ROAD	538.6	19.9	335.3	110.7	25.1	10.3	12.4	2.0	3.6	15.5	3.7

Step 4: Break Down into 16 vehicle classes vehicle per hour (veh/hr)

Link No	Road Name	Total Veh	Motor Cycles	PC	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	LGV <2.5t	LGV 2.5-3.5t	LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
59	WANG CHIU ROAD	538.6	19.9	335.3	110.7	0.8	11.1	0.2	1.2	2.2	0.2	18.9	6.0	10.3	16.0	0.3	3.5	2.0

Step 5: Calculate the percentage of each vehicle class in vehicle per hour (veh/hr)

Link No	Road Name	Total Veh	Motor Cycles	PC	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	LGV <2.5t	LGV 2.5-3.5t	LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
59	WANG CHIU ROAD	538.6	3.7%	62.3%	20.6%	0.1%	2.1%	0.0%	0.2%	0.4%	0.0%	3.5%	1.1%	1.9%	3.0%	0.0%	0.6%	0.4%

Example

Table 2 - Forecast 24-hour vehicular trip ends using petrol and LPG fuel in study area

Step 1: Extract Vehicle Trip Generation in year 2031 Model (pcu/hr)

	PV	GV
AM (0800-0900)	3098	1136

Step 2: Extract hourly profile of screenline K-K

Hour	Hour Factor
0800-0900	7.28
1100-1200	5.4

Step 3: Calculate trip end for non-peak hour

Hour	PV	GV
0800-0900	3098	1136
1100-1200	2298	843

Step 4: Breakdown the trip end using the vehicle proportion in screenline K-K for each hour

Hour	PC	LGV	PriLB	MC
0800-0900	1832	765	84	132
1100-1200	1260	527	94	112

Step 5: Convert to vehicle per hour

Hour	PC	LGV	PriLB	MC
0800-0900	1832	510	42	176
1100-1200	1260	351	47	150

Step 6: Calculate the number of the petrol vehicle using the proportion in Monthly Traffic and Transport Digest

Hour	PC	Taxi	LGV <= 2.5t	LGV 2.5-3.5t	PLB	PriLB <=3.5t		PriLB > 3.5t		MC
	Petrol	LPG	Petrol	Petrol	LPG	Petrol	LPG	Petrol	LPG	Petrol
0800-0900	1823	0	0	11	8	0	4	0	7	176
1100-1200	1254	0	0	8	4	0	4	0	7	150

Example

Table 3 - Forecast 24-hour speed fraction in 16 vehicle classes

Step 1: Extract 16 vehicle classes breakdown in 0800-0900

Link No.	Road Name	Total Veh	Motor Cycles	PC	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	LGV <2.5t	LGV 2.5-3.5t	LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	Total
50	Lam Chak Street	371	2.2%	17.6%	70.2%	0.3%	4.7%	0.1%	0.5%	0.9%	0.0%	2.1%	0.7%	0.2%	0.4%	0.0%	0.0%	0.0%	100.0%
58	Wang Chiu Road	244	2.3%	49.4%	20.9%	0.4%	6.6%	0.1%	0.7%	1.3%	0.0%	1.5%	0.5%	2.4%	2.4%	0.6%	8.2%	2.6%	100.0%
59	Wang Chiu Road	539	3.7%	62.3%	20.6%	0.1%	2.1%	0.0%	0.2%	0.4%	0.0%	3.5%	1.1%	1.9%	3.0%	0.0%	0.6%	0.4%	100.0%

Step 2: Extract the properties of each road link

Link No.	Road Name	No. of lane	Post Speed	Length (metre)
50	Lam Chak Street	2	50	92
58	Wang Chiu Road	2	50	284
59	Wang Chiu Road	1	50	284

Step 3: Calculate the speed for each class using speed flow curve (kph)

Link No.	Road Name	Motor Cycles	PC	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	LGV <2.5t	LGV 2.5-3.5t	LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses
50	Lam Chak Street	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
58	Wang Chiu Road	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
59	Wang Chiu Road	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42

Step 4: Calculate the VKT for each road link

Link No.	Road Name	Motor Cycles	PC	Taxi	Non-franchised Buses <6.4t	Non-franchised Buses 6.4-15t	Non-franchised Buses >15t	Private Light Buses <3.5t	Private Light Buses >3.5t	LGV <2.5t	LGV 2.5-3.5t	LGV >3.5t	HGV<15t	HGV>15t	Single Deck Franchised Buses	Double Deck Franchised Buses	Public Light Buses	Total
50	Lam Chak Street	0.75	6.00	23.99	0.11	1.61	0.03	0.17	0.32	0.00	0.73	0.23	0.08	0.13	0.00	0.00	0.00	34.16
58	Wang Chiu Road	1.59	34.21	14.48	0.31	4.55	0.09	0.49	0.91	0.02	1.05	0.33	1.69	1.63	0.43	5.68	1.83	69.28
59	Wang Chiu Road	5.66	95.22	31.44	0.21	3.16	0.06	0.34	0.63	0.05	5.38	1.71	2.93	4.54	0.07	0.98	0.58	152.96
TOTAL		**8.00**	**135.43**	**69.91**	**0.63**	**9.32**	**0.18**	**1.00**	**1.86**	**0.07**	**7.15**	**2.28**	**4.70**	**6.30**	**0.50**	**6.66**	**2.41**	**256.41**

Step 5: Calculate the VKT for different speed in 16 vehicle classes (3 road links in total)

Vehicle Classes	VKT by different Speed (KPH)																			
	0	0 - 8	8 - 16	16 - 24	24 - 32	32 - 40	40 - 48	48 - 56	56 - 64	64 - 72	72 - 80	80 - 88	88 - 96	96 - 104	104 - 112	112 - 120	120 - 128	128 - 136	136 - 144	Total
Motor Cycles	0.00	0.00	0.00	0.00	0.00	0.00	6.41	1.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
PC	0.00	0.00	0.00	0.00	0.00	0.00	101.22	34.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	135.43
Taxi	0.00	0.00	0.00	0.00	0.00	0.00	55.43	14.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69.91
Non-franchised Buses <6.4t	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63
Non-franchised Buses 6.4-15t	0.00	0.00	0.00	0.00	0.00	0.00	4.77	4.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.32
Non-franchised Buses >15t	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
Private Light Buses <3.5t	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Private Light Buses >3.5t	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86
LGV <2.5t	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
LGV 2.5-3.5t	0.00	0.00	0.00	0.00	0.00	0.00	6.11	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.15
LGV >3.5t	0.00	0.00	0.00	0.00	0.00	0.00	1.95	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.28
HGV<15t	0.00	0.00	0.00	0.00	0.00	0.00	3.01	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.70
HGV>15t	0.00	0.00	0.00	0.00	0.00	0.00	4.66	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.30
Single Deck Franchised Buses	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
Double Deck Franchised Buses	0.00	0.00	0.00	0.00	0.00	0.00	0.98	5.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.66
Public Light Buses	0.00	0.00	0.00	0.00	0.00	0.00	0.58	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.41
TOTAL	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**187.12**	**69.28**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**256.41**

Step 6: Convert to percentage

Vehicle Classes	Speed fraction (KPH)																			
	0	0 - 8	8 - 16	16 - 24	24 - 32	32 - 40	40 - 48	48 - 56	56 - 64	64 - 72	72 - 80	80 - 88	88 - 96	96 - 104	104 - 112	112 - 120	120 - 128	128 - 136	136 - 144	Total
Motor Cycles	0%	0%	0%	0%	0%	0%	80%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
PC	0%	0%	0%	0%	0%	0%	75%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Taxi	0%	0%	0%	0%	0%	0%	79%	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Non-franchised Buses <6.4t	0%	0%	0%	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Non-franchised Buses 6.4-15t	0%	0%	0%	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Non-franchised Buses >15t	0%	0%	0%	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Private Light Buses <3.5t	0%	0%	0%	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Private Light Buses >3.5t	0%	0%	0%	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LGV <2.5t	0%	0%	0%	0%	0%	0%	75%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LGV 2.5-3.5t	0%	0%	0%	0%	0%	0%	85%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
LGV >3.5t	0%	0%	0%	0%	0%	0%	85%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
HGV<15t	0%	0%	0%	0%	0%	0%	64%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
HGV>15t	0%	0%	0%	0%	0%	0%	74%	26%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Single Deck Franchised Buses	0%	0%	0%	0%	0%	0%	15%	85%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Double Deck Franchised Buses	0%	0%	0%	0%	0%	0%	15%	85%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Public Light Buses	0%	0%	0%	0%	0%	0%	24%	76%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%