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THE DEMOLITION OF EXISTING SUPERSTRUCTURES AT CAROLINE HILL ROAD SITE, CAUSEWAY BAY (PROGRAMME NO. 794CL)

TRAFFIC IMPACT ASSESSMENT - UPDATED REPORT

DECEMBER 2017

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

The Government targets to make available the existing Superstructures at Caroline Hill Road Site (CHRS) located the junction of Leighton Road and Caroline Hill Road in Causeway Bay for future development. The site covers an area of about 26,300m².

The CHRS comprises a private lot previously granted to PCCW and 3 allocations currently allocated by Lands Department to Electrical and Mechanical Services Department (EMSD), Civil Aids Service (CAD) and Hong Kong Post.

In 2016 a Traffic Impact Assessment (TIA) was commissioned for this demolition project during the feasibility stage. The TIA report, namely "Traffic Impact Assessment for The Demolition of Existing Superstructures at Caroline Hill Road Site, Causeway Bay", had been submitted and accepted by Transport Department (TD) on 27 January 2017. The TIA was updated with information on the progress of the committed developments in the vicinity area of the project site and was approved by TD on 29 June 2017.

Following recent local consultation, the local community has raised concern on the traffic performance of some existing road junctions which were beyond the original TIA study scope, this TIA therefore extend the original study scope to cover two additional junctions, namely Moreton Terrace/ Causeway Road junction and Moreton Terrace/ Tung Lo Wan Road junction.

The demolition works are targeted to commence in the 2nd quarter of 2018 for completion in the 3rd quarter of 2019. The design year for the traffic forecast was set for year 2019 in the approved TIAs and this remains unchanged.

The purpose of the TIA report is to conduct traffic surveys and determine the adverse traffic impact caused by the above demolition project during demolition period on the adjacent road networks.

1.2 SCOPE

The scope of this TIA is outlined as below:
- Conduct traffic surveys to collect the existing vehicular traffic flows within the study area;
- Analyse the existing traffic condition in the vicinity of the CHRS;
- Estimate the potential construction traffic generation and attraction due to the demolition of the existing superstructures;
- Assess the future traffic situation in the adjacent road networks and junction capacities could satisfactorily accommodate the additional traffic volumes during the construction phase of the project; and
- Recommend traffic engineering solutions/improvement measures or traffic control and management measures at the problem areas identified, if required.

2 THE PROJECT

2.1 SITE LOCATION

The project site is located at the junction of Leighton Road and Caroline Hill Road in Causeway Bay. Currently, the project site is an empty lot previously granted to EMSD Headquarters, CAD Building, Post Office Recreation Club and PCCW Recreation Club. Figure 2.1.1 shows the location of the proposed site and the adjacent road network within the Area of Influence (AOI).

Figure 2.1.1   Proposed Site of the Project and the Area of Influence
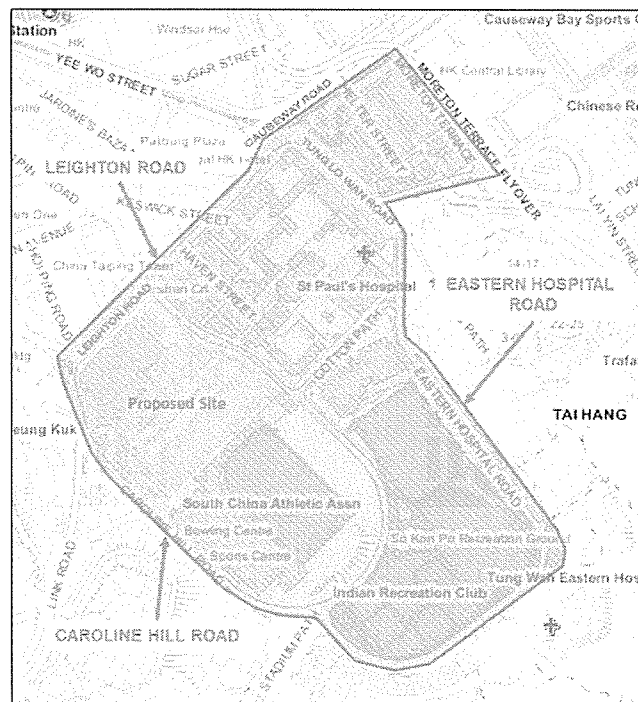
2.2 THE PROPOSED DEMOLITION WORKS

The CHRS demolition works included the following existing superstructure:

- ex-Electrical and Mechanical Services Department Headquarters including;
  - a 11-storey office building,
  - a 5-storey building for Apprentice Workshop,
  - a 7-sorey building for staff quarters,
  - three 1-storey workshops,
  - a 1-storey storage shed and
  - a covered vehicle workshop.
- a 6-storey ex-Civil Aid Service building;
- a 1-storey building for Post Office Recreation Club; and
- a 3-storey building for Pacific Century Cyber Works Recreation Club.

The demolition will be led by the ArchSD. Private contractor will be employed for the demolition of the CHRS as well as associated works. The CHRS will be handed over to the Planning Department / ArchSD for future development work.

This study is mainly focus on the traffic impact during demolition period.

2.3   DEMOLITION PERIOD

During construction, it will involve demolition of the existing superstructures that will generate construction traffic. The demolition works are targeted to commence in the 2nd quarter of 2018 for completion in the 3rd quarter of 2019. The design year for the traffic forecast was set for year 2019 in the approved TIAs and this remains unchanged.

3 TRANSPORT PROVISION

3.1 ACCESS ARRANGEMENT

The proposed construction vehicular access to the CHRS is on Caroline Hill Road. Figure 3.1.1 shows the proposed access road of the CHRS at Caroline Hill Road.

Figure 3.1.1 Proposed Construction Vehicular and Workers Access to the CHRS
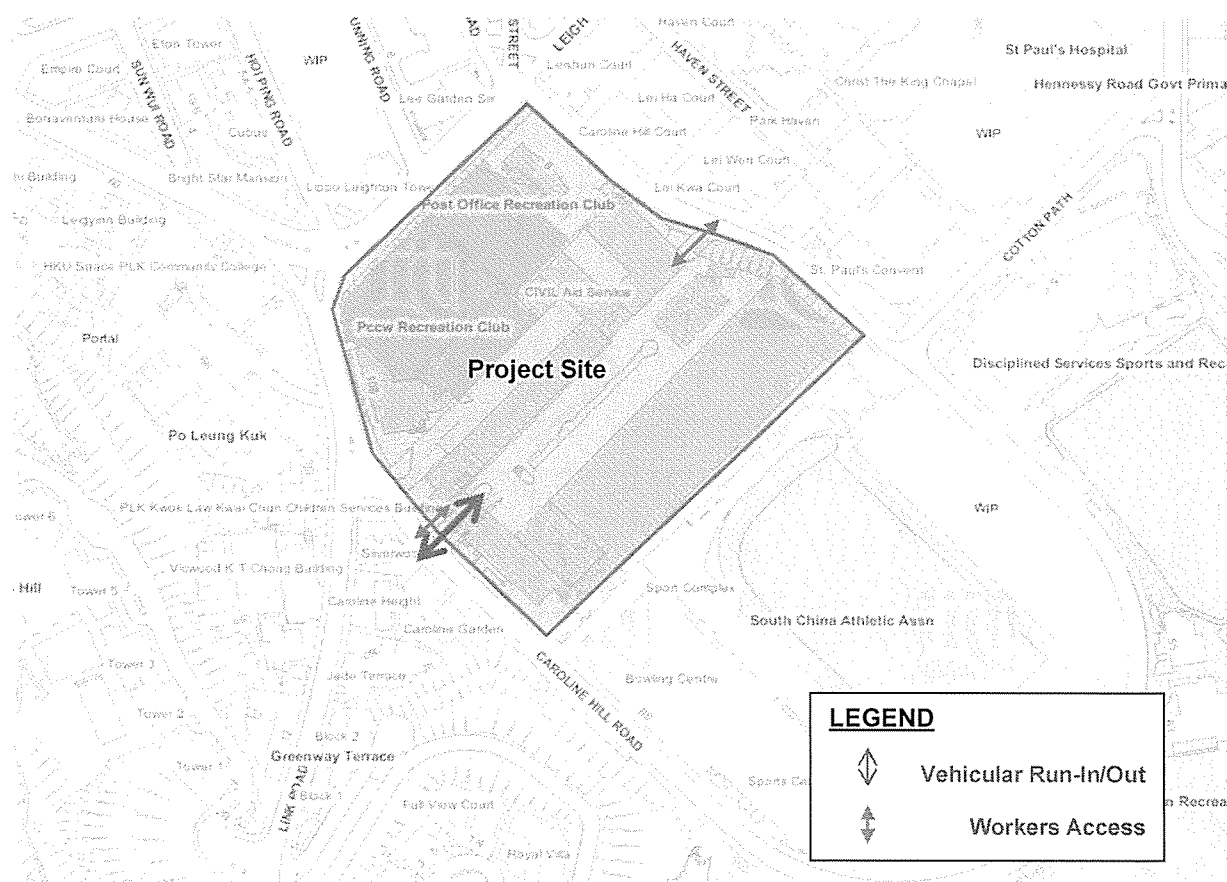
3.2 CONSTRUCTION TRAFFIC ROUTING

Since the study area is located in the busier district in Hong Kong Island, therefore in order to minimise the impact to the local road network, it is proposed to have the designated construction traffic routes to and from the CHRS.

According to the information from Environmental Protection Department (EPD), the inert construction and demolition waste is assigned to the Chai Wan Public Fill Barging Point and Tseung Kwan O Area 137 Fill Bank designated disposal sites. Other construction waste are assigned to the South East New Territories (SENT) Landfill at Tseung Kwan O. From the traffic points of view, the outbound construction traffic will be head to the Chai Wan or Tseung Kwan O via Eastern Corridor (Eastbound).

Based on the EPD information, all construction traffic will travel from either Kowloon East or Hong Kong Island East via Eastern Corridor. Figure 3.2.1 shows the proposed construction traffic route to and from the CHRS at Caroline Hill Road. The details inbound and outbound construction routes are proposed as follow:

Inbound Route –

Eastern Corridor (Westbound) → Hing Fat Street (Southbound) → Wing Hing Street (Eastbound) → King's Road (Westbound) → Causeway Road (Westbound) → Leighton Road (Westbound) → Caroline Hill Road (Southbound) → CHRS

Outbound Route –

CHRS → Caroline Hill Road (Southbound) → Cotton Path (Eastbound) → Eastern Hospital Road (Northbound) → Tung Lo Wan Road (Eastbound) → Moreton Terrace (Northbound) → Causeway Road (Eastbound) → Hing Fat Street (Northbound) → Eastern Corridor (Eastbound)

Figure 3.2.1   Proposed Construction Inbound and Outbound Route to and from CHRS
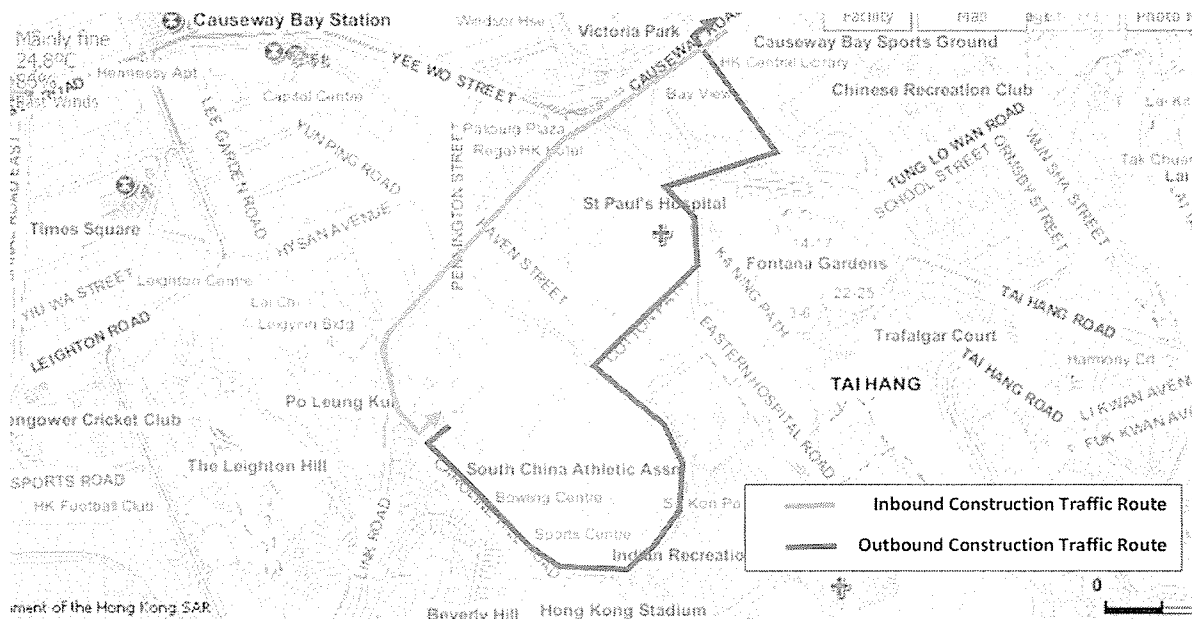
4 EXISTING TRAFFIC CONDITION

4.1 ROAD NETWORK

The existing vehicular and pedestrian access to the CHRS is Caroline Hill Road which connects to the Eastbound of Leighton Road.

Caroline Hill Road - It is a Local Distributor (LD) road with two-lane two way connecting Leighton Road. The width of the Caroline Hill Road is 7.7m.

Leighton Road - It is a District Distributor (DD) road with 3-4 lanes carriageway connecting east of Causeway Road and the west of the junction of Morrison Hill Road and Canal Road. The width of the Leighton Road is 12m.

4.2 PUBLIC TRANSPORT

The CHRS is located close to high capacity public transport services. The MTR Causeway Bay Station is located within 500m, or about 10 minutes' walk from the CHRS.

In terms of the public bus, there are 30 day-time bus routes and 4 over-night bus routes stop on Leighton Road, Caroline Hill Road and Tung Lo Wan Road. The details of franchised bus routes are given in Table 4.2.1.

Table 4.2.1   Franchised Bus Routes

Operator	Route No.	Route	Nearest Stop
CTB	5B	Kennedy Town – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road / Caroline Hill Road
CTB	8X	Siu Sai Wan – Happy Valley	Bonaventure House, Leighton Road / Caroline Hill Road
CTB	10	Kenneth Town – North Point Ferry Pier	Bonaventure House, Leighton Road / Caroline Hill Road
CTB	11	Central – Jardine's Lookout	St. Paul's Hospital, Tung Lo Wan Road
CTB	19	Siu Sai Wan – Happy Valley	Bonaventure House, Leighton Road / Caroline Hill Road
CTB	19P	Shau Kei Wan – Happy Valley	Caroline Hill Road
CTB	25A	Wan Chai – Baraemar Hill	St. Paul's Hospital, Tung Lo Wan Road
CTB	72	Wah Kwai Estate – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	72A	Sham Wan – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	76	Shek Pai Wan – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road / Bonaventure House, Leighton Road / Caroline Hill Road
CTB	96	Lei Tung Estate – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	511	Central – Tai Hang Drive	St. Paul's Hospital, Tung Lo Wan Road
CTB	592	South Horizons – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	962	Tuen Mun – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	962B	Tuen Mun – Admiralty	St. Paul's Hospital, Tung Lo Wan Road
CTB	962P	Tuen Mun – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	962S	Tuen Mun – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	962X	Tuen Mun – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	969	Tin Shui Wai Town Centre – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	969P	Tin Shui Wai Town Centre – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	N11	Central – Airport	St. Paul's Hospital, Tung Lo Wan Road
CTB	N962	Tuen Mun – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
CTB	N969	Tin Shui Wai Town Centre – Causeway Bay	St. Paul's Hospital, Tung Lo Wan Road
KMB	108	Shing Tak Street – Braemer Hill	Bonaventure House, Leighton Road

Operator	Route No.	Route	Nearest Stop
NWFB	23B	Braemar Hill – Park Road / Robinson Road	Bonaventure House, Leighton Road / Caroline Hill Road
KMB / CTB	690	Tseung Kwan O – Central	Caroline Hill Road
KMB / CTB	N182	Central – Sha Tin	St. Paul's Hospital, Tung Lo Wan Road
KMB / NWFB	112	North Point – So Uk Estate	Bonaventure House, Leighton Road
KMB / NWFB	116	Quarry Bay – Tsz Wan Shan	Bonaventure House, Leighton Road
KMB / NWFB	601	Admiralty – Po Tat Estate	Caroline Hill Road
KMB / NWFB	680	Admiralty – Ma On Shan	Caroline Hill Road
KMB / NWFB	680A	Ma On Shan - Admiralty	Caroline Hill Road
KMB / NWFB	680B	Ma On Shan - Admiralty	Caroline Hill Road
KMB / NWFB	680P	Ma On Shan - Admiralty	Caroline Hill Road

In addition, 15 Green Mini-Bus (GMB) Routes around the CHRS. The detail of the GMB route is given in Table 4.2.2.

Table 4.2.2   GMB Route

Route No.	Routes	Frequency (Mins)
14M	Causeway Bay – Jardine's Lookout	4 – 10
21A	Causeway Bay – Lai Tak Tsuen	5 – 10
21M	Causeway Bay – Tai Hang Drive	6 – 12
26	Causeway Bay – HK Adventist Hospital	15 – 20
28	Upper Baguio Villa – Causeway Bay	5 – 15
28S	Providence Bay – Shatin Town Centre	30
30	Causeway Bay – Happy Valley	6 - 10
36	Ap Lei Chau – Wan Chai	4 per day (AM only)
36S	Ap Lei Chau – Causeway Bay	20 – 40
36X	Ap Lei Chau – Causeway Bay	8 – 15
39M	Yue On Court – Tin Hau Station	8 – 15
40	Stanley Village – Causeway Bay	3 – 15
40X	Stanley Prison – Causeway Bay	4 – 9
56	Robinson Road – North Point	6 – 8
56A	Robinson Road – Causeway Bay	8 – 15

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5 TRAFFIC FORECAST

5.1 METHODOLOGY

In accordance with the proposed schedule of demolition works are targeted to commence in the 2nd quarter of 2018 for completion in the 3rd quarter of 2019. The design year for the traffic forecast was set for year 2019 in the approved TIAs and this remains unchanged.

It is anticipated that the future local road network will remain unchanged and there is no plan for any major road infrastructure in any connection with the Leighton Road and Caroline Hill Road by year 2019. The growth factor method was used to project the traffic forecast for the design year (2019) based on the historic traffic volumes for the past five years in Annual Traffic Census (ATC) Reports published by Transport Department, 2011-based Territorial Population and Employment Data Matrices (TPEDM) from Planning Department (PlanD) and existing counts in the vicinity of the study area.

The forecast were further updated to produce the design year 2019 traffic forecasts for this project. The additional traffic was then assigned to the future local road network and combined with the background traffic to create the design year forecast for assessment.

5.2 TRAFFIC COUNT SURVEY

In order to evaluate the existing traffic conditions, classified turning movement surveys were conducted at the key junctions (J1 to J7) in the study area, as detailed in Table 5.2.1 and shown in Figure 5.2.1, on a normal weekday 1 November 2016 between 7:30am – 10:00am, 11:30am – 13:30pm and 5:00pm – 7:00pm.

From the observed vehicular traffic count survey, the morning, noon and evening peak hours were identified as 8:15am – 9:15am, 12:00noon – 1:00pm and 5:30pm – 6:30pm respectively. The detail of the junction performance analysis is presented in Section 6.4 of this report.

The AOI covered in this TIA has been extended to cover two additional junctions, namely Moreton Terrace/ Causeway Road junction and Moreton Terrace/ Tung Lo Wan Road junction which are identified as J8 and J9 respectively. Classified turning movement surveys for these two junctions were conducted on a normal weekday 12 December 2017 at the same peak hours as previous identified for J1 to J7.

Table 5.2.1 Key Junctions in the Study Area

Junction No.	Junction Name	Junction Type
J1	Caroline Hill Road / Link Road	Priority
J2	Caroline Hill Road / Leighton Road	Signal
J3	Caroline Hill Road / Leighton Road / Pennington Street	Signal
J4	Leighton Road / Tung Lo Wan Road	Signal
J5	Eastern Hospital Road / Tung Lo Wan Road / Ka Ning Path	Signal
J6	Eastern Hospital Road / Cotton Path	Priority
J7	Caroline Hill Road / Cotton Path	Priority
J8	Causeway Road / Moreton Terrace	Signal
J9	Tung Lo Wan Road / Moreton Terrace	Signal

Figure 5.2.1 Key Junctions Location
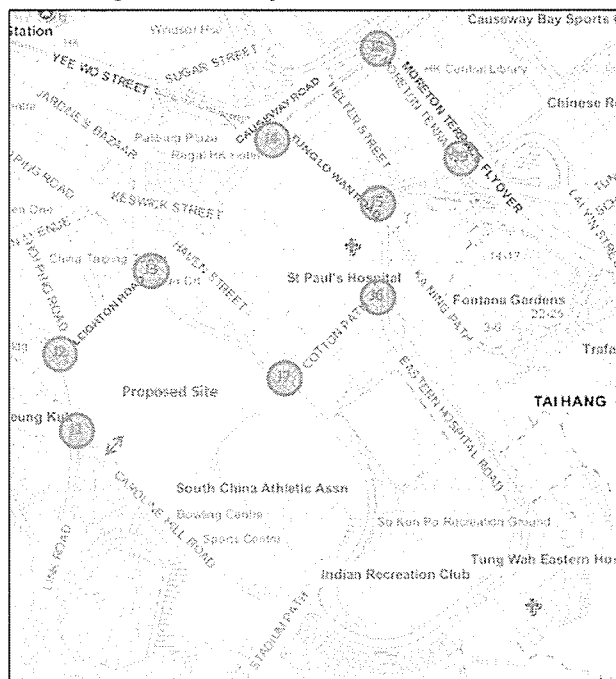
5.3 TRAFFIC GROWTH FACTOR

As mentioned in Section 5.1, the growth factor method was used to project the traffic forecast for the design year (2019) with reference to the historic traffic growth trend between 2011 and 2015 for J1 to J7 and between 2012 and 2016 for J8 and J9 respectively in Annual Traffic Census (ATC) Reports published by Transport Department, 2011-based Territorial Population and Employment Data Matrices (TPEDM) from Planning Department (PlanD) and existing counts in the vicinity of the study area.

The Average Annual Daily Traffic (AADT) data in the ATC Reports from 2011 to 2015 and from 2012 to 2016 were extracted and complied in Table 5.3.1 and Table 5.3.2 below.

Table 5.3.1 Average Annual Daily Traffic Data from 2011 to 2015

Station (Road Link)	2011	2012	2013	2014	2015	Weighted Average Annual Growth (%)
2608 - Caroline Hill Rd (Leighton Rd and Yun Ping Rd)	5060	5060	5340	4640	5290	+0.54%
1212 - Irving St & Pennington St (Leighton Rd and Yee Wo St)	12150*	12340*	11280	13950	14130*	
1847 - Leighton Rd (Canal Rd E and Wong Nai Chung Rd)	29140	30100	29700*	29490*	28550*	
2036 - Leighton Rd (Irving St and Percival St)	18760*	15960	15040	14930*	14450*	
1631 - Leighton Rd (Morrison Hill Rd and Canal Rd E)	36800	36720*	36240*	35980*	44490	
1414 - Leighton Rd (Tung Lo Wan Rd and Irving St)	23600*	23970*	23960*	24660	25060	
2035 - Leighton Rd (Wong Nai Chung Rd and Percival St)	31050*	27640	29140	28930*	28000*	

* AADT estimated values by Growth Factor

Table 5.3.2 Average Annual Daily Traffic Data from 2012 to 2016

Station (Road Link)	2012	2013	2014	2015	2016	Weighted Average Annual Growth (%)
2608 - Caroline Hill Rd (Leighton Rd and Yun Ping Rd)	5060	5340	4640	5290	6630	+1.10%
1212 - Irving St & Pennington St (Leighton Rd and Yee Wo St)	12340*	11280	13950	14130*	14130*	
1847 - Leighton Rd (Canal Rd E and Wong Nai Chung Rd)	30100	29700*	29490*	28550*	22620	
2036 - Leighton Rd (Irving St and Percival St)	15960	15040	14930*	14450*	14430*	
1631 - Leighton Rd (Morrison Hill Rd and Canal Rd E)	36720*	36240*	35980*	44490	40440	
1414 - Leighton Rd (Tung Lo Wan Rd and Irving St)	23970*	23960*	24660	25060	25060*	
2035 - Leighton Rd (Wong Nai Chung Rd and Percival St)	27640	29140	28930*	28000*	27960*	

* AADT estimated values by Growth Factor

Linear regression analysis was applied to the AADT data, including the estimated values, from year 2011 to 2015 for J1 to J7 and from year 2012 to 2016 for J8 and J9 to obtain an annual growth factor for the study area. The calculated average annual growth rate, weighted by traffic volume, are +0.54% between years 2011 and 2015 for J1 to J7 and +1.1% between years 2012 and 2016 for J8 and J9.

Reference was also made to the 2011-based Territorial Population and Employment Data Matrices (TPEDM) land use data. The TPEDM data have been adopted and the data should have included the most up-to-date development planning in the vicinity. The population and employment forecast is summarized in Table 5.3.2 to estimate the traffic growth from year of 2011 to 2016 and 2016 to 2021.

Table 5.3.3 Population and Employment Forecast

Description	CTS Zone	Data	2011	2021	Annual Growth Rate (11 – 21)
Wan Chai	036	Population	17300	16400	-0.5
		Employment	7500	6050	-2.1
		036 Total	*24800*	*22450*	*-1.0*
	039	Population	14350	13050	-0.9
		Employment	9350	7200	-2.6
		039 Total	*23700*	*20250*	*-1.6*
Total Population			*31650*	*29450*	-0.7
Total Employment			*16850*	*13250*	-2.4
Overall Total			**48500**	**42700**	-1.3

From the Table 5.3.3, it showed that the local area overall total growth is -1.3% per annum for 2011 to 2021.

Hence, it is proposed to adopt a conservative annual growth of +0.54% p.a. for J1 to J7 and +1.1% p.a. for J8 and J9 from 2016 to 2019 for the traffic assessment in this study. This growth factor assumes a natural growth of background traffic in the future and represents a conservative estimation of the traffic demand in the design year(s).

5.4　TRAFFIC GENERATION IN DEMOLITION PERIOD

With reference to the information provided by ArchSD, based on the estimate demolition waste, it is estimated that the construction activities will generate and attract in average 24 trips of construction truck per day for each direction. Considering 8 working hours per day and pcu factor of 3 for construction truck, it is estimated that 9 pcu/hr/direction will be generated during peak hours in the demolition peak period.

5.5 FUTURE DEVELOPMENT BY YEAR 2019

According to the information from Planning Department, there are three committed development and redevelopment proposals in the vicinity of the CHRS. The details are shown below:

5.5.1 ST PAUL'S HOSPITAL EXTENSION

The building plans for the St Paul's Hospital Extension has been approved in February 2016 and March 2016 and according to the information from St. Paul's Hospital Extension project lead architect, P&T Architects and Engineers Limited, the proposed consultation work of the project is scheduled in the 4th quarter of 2017 or 1st quarter of 2018 and targeted to be completed in 1st quarter of 2021. For the worst case scenario, it was assumed that the trip generation/attraction of the construction traffic from St Paul's Hospital Extension and the construction traffic route would be the same as CHRS, with the construction traffic of the extension project being 9 pcu/hr/direction.

5.5.2 REDEVELOPMENT OF GRAND STAND AT 88 CAROLINE RD

Based on the provided information, South China Athletic Association (SCAA) confirmed that construction for the redevelopment of the Grand Stand was commenced on 12 May 2016. As the traffic count survey for CHRS was conducted on 1 November 2016, the construction traffic generated by the redevelopment of the Grand Stand was included in the traffic survey count as a part of the local background traffic. Therefore, no additional traffic in either the construction traffic or development traffic will be further considered from this study.

5.5.3 THE REDEVELOPMENT OF EAST WING OF PO LEUNG KUK

Po Leung Kuk is contemplating to redevelop the East Wing of its headquarters which is located at 66 Leighton Road. Based on the provided information, Po Leung Kuk confirmed that the redevelopment is still at its preliminarily design stage without a solid programme. Therefore, no additional traffic in either the construction traffic or development traffic will be considered from this study.

6 VEHICULAR TRAFFIC ANALYSIS

6.1 METHODOLOGY

The junction capacity analysis was carried out at the key junctions highlighted in Table 5.2.1 that are likely to be affected by the proposed CHRS during demolition. The design years for junction capacity analysis are listed as below:

- Year 2016 (Existing)

- Year 2019 (Construction)

The junction capacity analysis was carried out in accordance with the procedures outlined in the Transport Planning and Design Manual (TPDM). The analysis was based on the observed traffic flows and traffic forecasts for the "Reference" scenarios (2019) and "Construction" scenarios (2019).

6.2 JUNCTION PERFORMANCE ANALYSIS - EXISTING

Based on the observed traffic flows, the performance of the key junctions in the vicinity of the CHRS during the AM, Noon and PM peak hours were assessed. The results are summarised in Table 6.2.1. Figure 6.2.1 shows the peak hour observed traffic flows at key junctions.

Table 6.2.1   Results of Junction Analysis for Background Traffic Flows[1]

Junction No.	Junction Name	Junction Type [2]	AM Peak Hour	Noon Peak Hour	PM Peak Hour
J1	Caroline Hill Road / Link Road	Priority / DFC	0.53	0.35	0.59
J2	Caroline Hill Road / Leighton Road	Signal / R.C.	38.9%	56.3%	50.9%
J3	Caroline Hill Road / Leighton Road / Pennington Street	Signal / R.C.	63.8%	48.5%	25.9%
J4	Leighton Road / Tung Lo Wan Road	Signal / R.C.	50.9%	31.8%	31.1%
J5	Eastern Hospital Road / Tung Lo Wan Road / Ka Ning Path	Signal / R.C.	>100%	>100%	>100%
J6	Eastern Hospital Road / Cotton Path	Priority / DFC	0.11	0.11	0.09
J7	Caroline Hill Road / Cotton Path	Priority / DFC	0.11	0.16	0.07
J8	Causeway Road / Moreton Terrace	Signal / R.C.	31.3%	58.7%	48%
J9	Tung Lo Wan Road / Moreton Terrace	Signal / R.C.	64.9%	66.5%	76.4%

Note: [1] Background Traffic in 2016 for J1 to J7 and in 2017 for J8 & J9.

[2] The junction performance is expressed in Reserve Capacity (R.C. in %) for signalised junction and Design Flow/ Capacity Ratio (DFC) for priority junction.

From Table 6.2.1, in term of signal junctions, it can be seen that all junctions are operating in good performance in the AM, Noon and PM peak hours which the reserve capacity (R.C.) is above 25% especially junction 5 (J5 - Eastern Hospital Road / Tung Lo Wan Road / Ka Ning Path), the reserve capacity (R.C.) is currently operating over 100% in peak hours.

In term of priority junctions, it can be seen that all priority junctions (J1 - Caroline Hill Road / Link Road, J6 - Eastern Hospital Road / Cotton Path, J7 - Caroline Hill Road / Cotton Path and J9 - Moreton Terrace / Tung Lo Wan Road) are operating under capacity with Design Flow/Capacity (DFC) Ratios far less than 0.85 in the AM, Noon and PM peak hours. It means that those junctions have significant capacity to cope with additional traffic.

6.3 REFERENCE AND DESIGN FLOWS

The Reference Flows for the design years are calculated by using the following formula:

Design Year Reference Flows = 2016 Observed Flows x (1 + growth factor)$^{(\text{design year} - 2016)}$

- For example: 2019 Reference Flows = 2016 Observed Flow x $(1 + 0.0054)^3$

Figures 6.3.1 shows the Reference Flows in 2019.

The Construction Flows for the relevant design years are calculated by using the following formula:

Design Year Design [Construction] Flows = Design year Reference Flows + Traffic generation during construction (demolition period)

- For example: 2019 Design [Construction] Flows = 2019 Reference Flows + Traffic generation during construction (9 pcu/hr in one direction)

Figures 6.3.2 shows the Design [Construction] Flows in 2019 for either to Chai Wan Public Fill Barging Point or to South East New Territories (SENT) Landfill at Tseung Kwan O landfill sites.

6.4 JUNCTION PERFORMANCE ANALYSIS - DESIGN

The junction capacity analysis was undertaken to assess the key junctions in local road network for Reference, and Design (Construction) scenarios in 2016 and 2019 where relevant. The results are summarised in Tables 6.4.1. The detailed calculations are presented in Appendix A.

In design year 2019, the reference background traffic flow for those junctions (both signalised and priority junctions) will operate under the capacity level which the signalised junction R.C. is above 15% and priority junction DFC is below 0.85.

For signalised junctions, the R.C. of signalised junction are in good performance in 2019 either with or without the construction traffic (9 pcu/hr/direction) from the development.

The DFCs of all priority junctions will operate under 0.85 in 2019 either with or without the estimated construction traffic. It indicated that the priority junctions have enough capacity to accommodate additional construction traffic flows to/from the CHRS.

In terms of the construction period may overlap with the St Paul's Hospital Extension, due to the lack of information on the construction traffic routes and number of construction traffic from such St Paul's Hospital Extension site, scenarios of "with" and "without" the construction traffic flows in the study area are included in the analysis. The result are summarised in Table 6.4.2.

The result indicated that all key junctions will operate under the capacity level with the construction traffic of St Paul's Hospital Extension (9 pcu/hr/direction).

Therefore, based on the results of junction performance analysis, it is concluded that all junctions have adequate reserve capacity to accommodate the additional construction traffic generated by the CHRS and the impact to the existing and design year road network is insignificant.

Table 6.4.1 Junction Performance Analysis – (2019 Reference and Design [Construction] Traffic)

No.	Junction Name	Junction Type[2]	Existing[1] (AM)	2019 (AM)		Existing[1] (Noon)	2019 (Noon)		Existing[1] (PM)	2019 (PM)	
			Reference	Reference	CHRS C.T. only	Reference	Reference	CHRS C.T. only	Reference	Reference	CHRS C.T. only
J1	Caroline Hill Road / Link Road	Priority / DFC	0.53	0.54	0.54	0.35	0.35	0.35	0.59	0.60	0.60
J2	Caroline Hill Road / Leighton Road	Signal / R.C.	38.9%	36.8%	36.2%	56.3%	53.7%	52.9%	50.9%	48.6%	47.9%
J3	Caroline Hill Road / Leighton Road / Pennington Street	Signal / R.C.	63.8%	61.2%	59.8%	48.5%	46.3%	46.3%	25.9%	23.9%	23.9%
J4	Leighton Road / Tung Lo Wan Road	Signal / R.C.	50.9%	48.5%	48.1%	31.8%	29.7%	29.4%	31.1%	29%	28.7%
J5	Eastern Hospital Road / Tung Lo Wan Road / Ka Ning Path	Signal / R.C.	>100%	>100%	>100%	>100%	>100%	98.3%	>100%	>100%	>100%
J6	Eastern Hospital Road / Cotton Path	Priority / DFC	0.11	0.11	0.12	0.11	0.11	0.11	0.09	0.09	0.10
J7	Caroline Hill Road / Cotton Path	Priority / DFC	0.11	0.12	0.12	0.16	0.17	0.17	0.07	0.07	0.07
J8	Causeway Road / Moreton Terrace	Signal / R.C.	31.3%	**28.4%**	**27.4%**	58.7%	**55.3%**	**53.8%**	48%	**44.8%**	**43.4%**
J9	Tung Lo Wan Road / Moreton Terrace	Signal / R.C.	64.9%	**61.4%**	**60.5%**	66.5%	**62.9%**	**62%**	72.6%	**74.5%**	**71.6%**

Note: [1] Classified turning movement surveys conducted in 2016 for J1 to J7 and in 2017 for J8 & J9.

[2] The junction performance is expressed in Reserve Capacity (R.C. in %) for signalised junction and Design Flow/ Capacity Ratio (DFC) for priority junction.

Table 6.4.2   Junction Performance Analysis – (2019 Design [Construction] Traffic) without and with St Paul's Hospital Extension

No.	Junction Name	Junction Type	2019 (AM)			2019 (Noon)			2019 (PM)		
			Reference	CHRS C.T. only	CHRS and St Paul's C.T	Reference	CHRS C.T. only	CHRS and St Paul's C.T	Reference	CHRS C.T. only	CHRS and St Paul's C.T
J1	Caroline Hill Road / Link Road	Priority / DFC	0.54	0.54	0.54	0.35	0.35	0.35	0.60	0.60	0.60
J2	Caroline Hill Road / Leighton Road	Signal / R.C.	36.8%	36.2%	35.5%	53.7%	52.9%	52.2%	48.6%	47.9%	47.2%
J3	Caroline Hill Road / Leighton Road / Pennington Street	Signal / R.C.	61.2%	59.8%	58.4%	46.3%	46.3%	46.3%	23.9%	23.9%	23.9%
J4	Leighton Road / Tung Lo Wan Road	Signal / R.C.	48.5%	48.1%	47.7%	29.7%	29.4%	29.1%	29%	28.7%	28.5%
J5	Eastern Hospital Road / Tung Lo Wan Road / Ka Ning Path	Signal / R.C.	>100%	>100%	>100%	>100%	98.3%	95.1%	>100%	>100%	>100%
J6	Eastern Hospital Road / Cotton Path	Priority / DFC	0.11	0.12	0.13	0.11	0.11	0.12	0.09	0.10	0.11
J7	Caroline Hill Road / Cotton Path	Priority / DFC	0.12	0.12	0.12	0.17	0.17	0.17	0.07	0.07	0.07
J8	Causeway Road / Moreton Terrace	Signal / R.C.	**28.4%**	**27.4%**	**26.3%**	**55.3 %**	**53.8%**	**52.3%**	**44.8%**	**43.4%**	**42.1%**
J9	Tung Lo Wan Road / Moreton Terrace	Signal / R.C.	**61.4%**	**60.5%**	**59.9%**	**62.9%**	**62.0%**	**61.1%**	**72.6%**	**71.6%**	**70.7%**

7 TRAFFIC ARRANGEMENT DURING SPEICAL EVENTS IN HONG KONG STADIUM

Hong Kong Stadium is the major location to held major sport events, such as World Rugby Sevens annually. Temporary traffic arrangement including traffic division and temporary road closure will be implemented by the Hong Kong Police / Transport Department.

The CHRS is located near the Hong Kong Stadium and the Caroline Hill Road is the main corridor for both pedestrian and vehicular to access the Hong Kong Stadium during the major sport events.

The project coordinator / the awarded contractor will work closely with the Hong Kong Police / Transport Department prior any events in Hong Kong Stadium to determent the construction traffic situation on the event day(s) and proposed the feasible temporary traffic arrangement to Transport Department for endorsement. The feasible temporary traffic arrangement including, but not limited to, restricted the number of construction traffic inbound and outbound during the sport events period. The awarded contractor will also prepare to provide assistant for the implement any temporary traffic and crowd control measures as request by the government authorities.

8 CONCLUSIONS

The Government targets to make available the existing Superstructures at Caroline Hill Road Site (CHRS) located the junction of Leighton Road and Caroline Hill Road in Causeway Bay for future development. The site covers an area of about 26,300m².

The demolition works are targeted to commence in the 2nd quarter of 2018 for completion in the 3rd quarter of 2019. For conservative purpose, the design year of the traffic forecast is set in year 2019.

The purpose of the TIA report is to conduct traffic surveys and determine the adverse traffic impact caused by the above demolition project during demolition period on the adjacent road networks.

From the observed vehicular traffic count survey, the morning, noon and evening peak hours were identified as 8:15am – 9:15am, 12:00noon – 1:00pm and 5:30pm – 6:30pm respectively.

Linear regression analysis was applied to the latest five years of AADT data, including the estimated values, to obtain an annual growth factor for the study area. The calculated weighted average annual growth rate of the traffic volume is +0.54% between year 2011 and 2015 and +1.10% between 2012 and 2016. Reference was also made to the 2011-based Territorial Population and Employment Data Matrices (TPEDM) land use data. The TPEDM data have been adopted and the data should have included the most up-to-date development planning in the vicinity. For the purpose of the study, an overall growth factor of +0.54% per annum for J1 to J7 and +1.10% per annum for J8 and J9 are adopted for the projection of background traffic in design year.

With reference to the information provided by ArchSD, based on the estimate demolition waste, it is estimated that the construction activities will generate and attract 24 trips of construction truck per day for each direction. Considering 8 working hours per day and pcu factor of 3 for construction truck, it is estimated that 9 pcu/hr/direction will be generated during peak hours in the demolition peak period.

In design year 2019, the reference background traffic flow for those junctions (both signalised and priority junctions) will operate under the capacity level which the signalised junction R.C. is above 15% and priority junction DFC is below 0.85.

For signalised junctions, the R.C. of signalised junction are in good performance in 2019 either with or without the construction traffic (9 pcu/hr/direction) from the development.

The DFCs of all priority junctions will operate under 0.85 in 2019 either with or without the estimated construction traffic. It indicated that the priority junctions have enough capacity to accommodate additional construction traffic flows to/from the CHRS.

In terms of the construction period may overlap with the St Paul's Hospital Extension, due to the lack of information on the construction traffic routes and number of construction traffic from such St Paul's Hospital Extension site, scenarios of "with" and "without" the construction traffic flows in the study area are included in the analysis.

The trip generation/attraction of the construction traffic from St Paul's Hospital Extension and the construction traffic route are assumed to be the same as CHRS.

The result indicated that all key junctions will operate under the capacity level with the construction traffic of St Paul's Hospital Extension (9 pcu/hr/direction)

Therefore, based on the results of junction performance analysis, it is concluded that all junctions have adequate reserve capacity to accommodate the additional construction traffic generated by the CHRS and the impact to the existing and design year road network is insignificant.
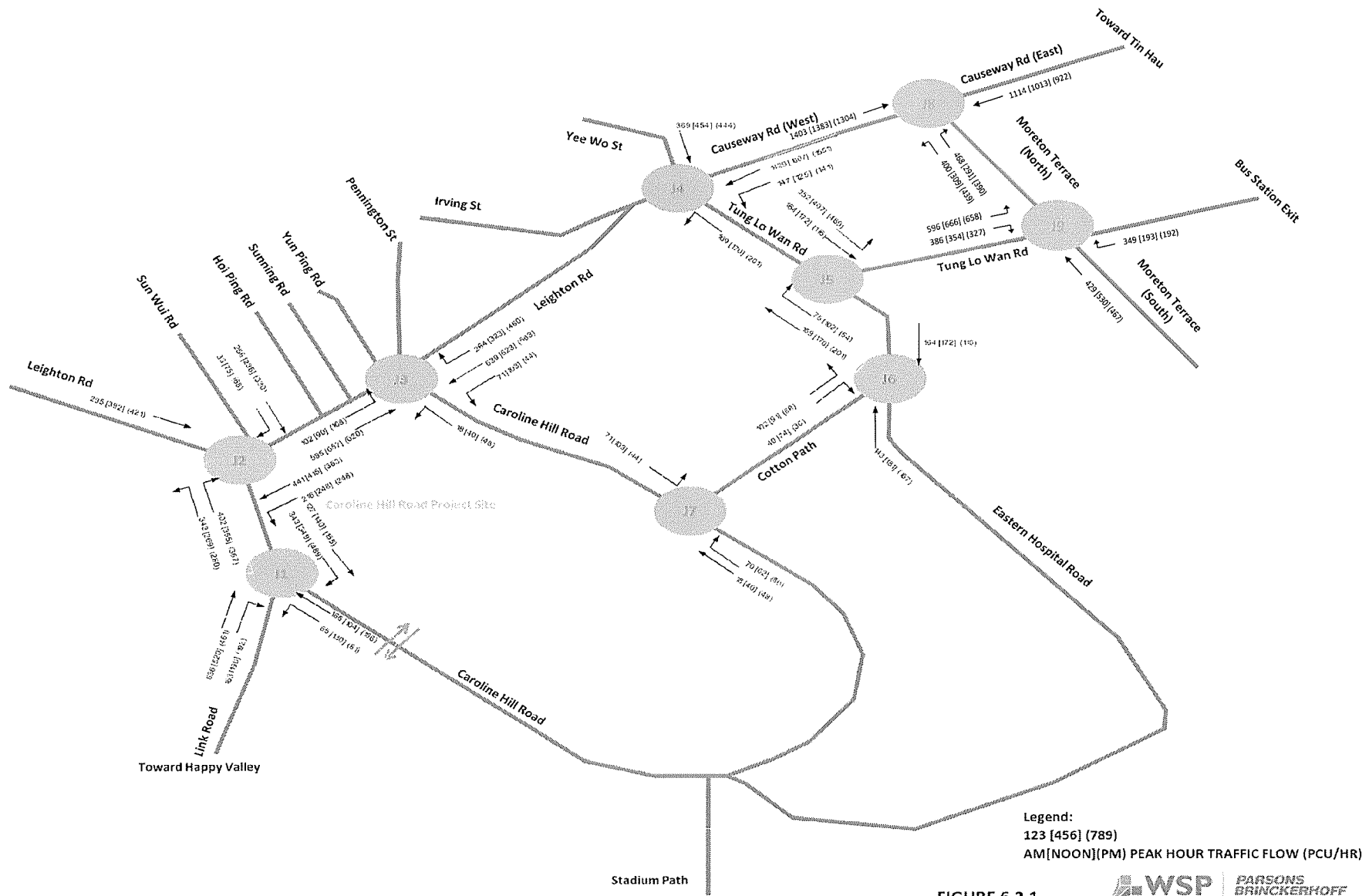
FIGURE

EXISTING TRAFFIC - REFERENCE FLOW

Legend:
123 [456] (789)
AM[NOON](PM) PEAK HOUR TRAFFIC FLOW (PCU/HR)

FIGURE 6.2.1

2019 FORECAST TRAFFIC - REFERENCE FLOW

Toward Tin Hau

Causeway Rd (East)

1139 [1035] (942)

375 [461] (451)

Causeway Rd (West)
1434 [1414] (1332)

Yee Wo St

Moreton Terrace
(North)

478 [297] (398)
408 [316] (449)

Bus Station Exit

145 [150] (156)
149 [127] (143)

Pennington St

Irving St

Tung Lo Wan Rd

338 [414] (417)
167 [175] (118)

609 [681] (673)
394 [362] (334)

356 [197] (196)

172 [173] (204)

Tung Lo Wan Rd

438 [542] (477)

Moreton Terrace
(South)

Yun Ping Rd

Sunning Rd

Hoi Ping Rd

Sun Wui Rd

Leighton Rd

265 [328] (467)
649 [675] (572)
72 [105] (45)

77 [104] (55)

172 [173] (204)

167 [175] (118)

Leighton Rd

300 [388] (428)

280 [240] (335)
34 [76] (79)

104 [91] (171)
605 [668] (630)
448 [424] (369)
220 [257] (252)

18 [41] (49)

Caroline Hill Road

72 [105] (45)

104 [92] (69)
41 [75] (37)

Cotton Path

Eastern Hospital Road

Caroline Hill Road Project Site

128 [142] (159)
349 [353] (497)

71 [63] (81)
18 [41] (49)

145 [181] (170)

646 [228] (483)
156 [193] (195)

169 [106] (189)
65 [132] (82)

Caroline Hill Road

495 [362] (363)
565 [272] (262)

Link Road

Toward Happy Valley

Stadium Path

Legend:
123 [456] (789)
AM[NOON](PM) PEAK HOUR TRAFFIC FLOW (PCU/HR)

FIGURE 6.3.1

WSP | PARSONS BRINCKERHOFF

2019 FORECAST TRAFFIC - DESIGN FLOW (CONSTRUCTION)

FIGURE 6.3.2

Legend:
123 [456] (789)
AM[NOON](PM) PEAK HOUR TRAFFIC FLOW (PCU/HR)
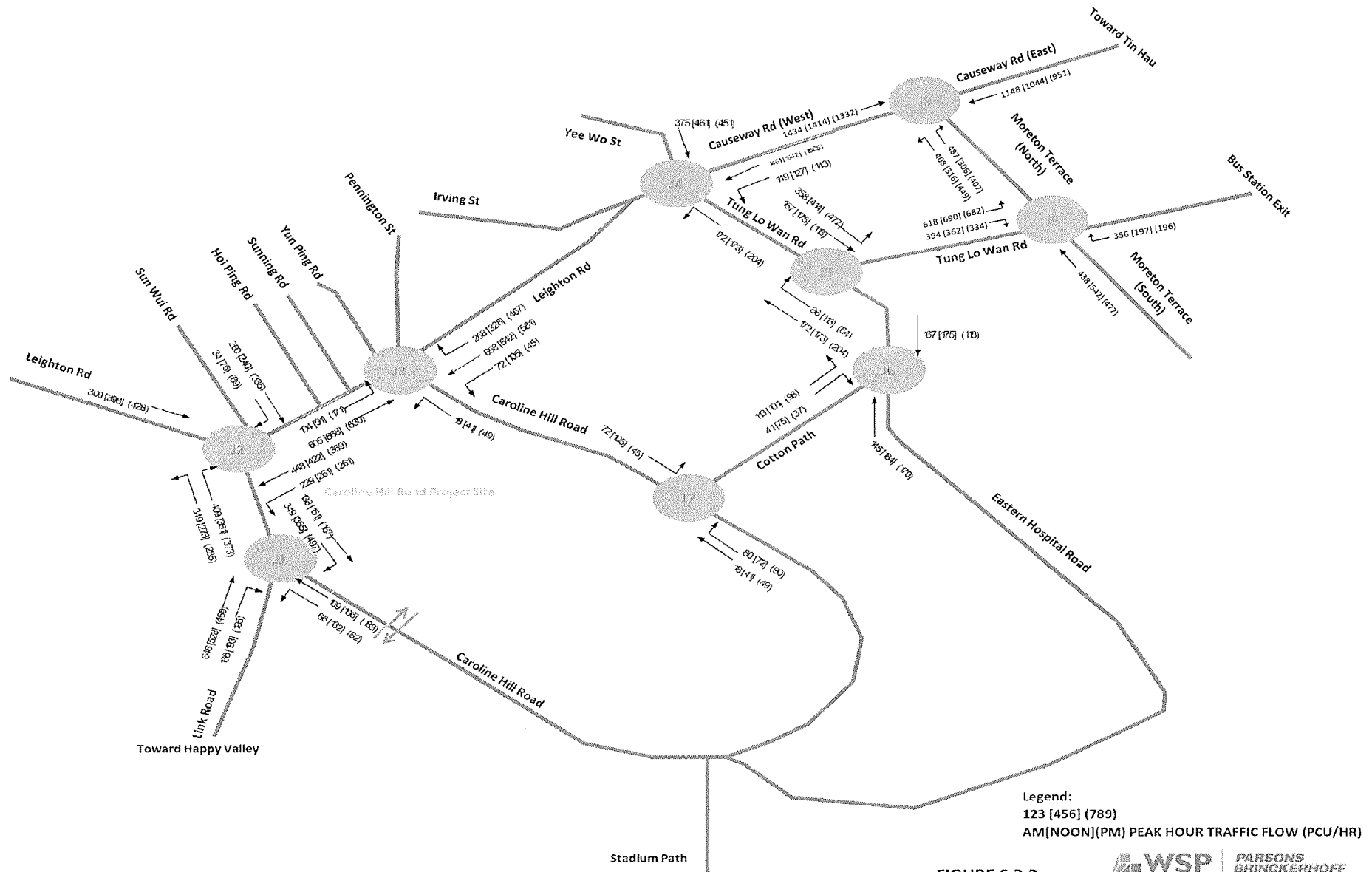
APPENDIX A
CALCULATION SHEET FOR JUNCTION PERFORMANCE

J1
CAROLINE HILL ROAD / LINK ROAD

TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2016 EXISTING TRAFFIC (AM) CHECKED BY:	AL	Nov-16
	REVIEWED BY:	CW	Nov-16

Minor Road
(ARM D)

[A6] 636 →
[A5] 163 →
(ARM C)
Link Road

(ARM A)
Link Road

← 343 [A1]
⌐ 127 [A2]

===================

65 166
[A4] [A3]   (ARM B)
Caroline Hill Road

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)
W cr =	1.5	(metres)

Y = 0.748

MAJOR ROAD (ARM A)

W a-c =	3.65	(metres)
Vl a-c =	200	(metres)
q a-b =	100	(pcu/hr)
q a-c =	300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	2.60	(metres)
Vr c-b =	40	(metres)
q c-a =	600	(pcu/hr)
q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	3.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	29	(metres)
Vr b-a =	80	(metres)
Vr b-c =	90	(metres)
q b-a =	166	(pcu/hr)
q b-c =	65	(pcu/hr)
q b-d =		(pcu/hr)

MINOR ROAD (ARM D)

W d-c =		(metres)
W d-a =		(metres)
Vl d-c =		(metres)
Vr d-c =		(metres)
Vr d-a =		(metres)
q d-c =		(pcu/hr)
q d-a =		(pcu/hr)
q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.839	Z b	=	1.154
E	=	0.836	X d	=	0.533
F	=	0.905	Z d	=	0.586
M b	=	0.839	M d	=	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	0.9222		r d-c	=	0.000
ql b-d =	0	(pcu/hr)	ql d-b	=	0 (pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b	=	0 (pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c	=	180 (pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a	=	341 (pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d	=	581 (pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b	=	193 (pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b	=	193 (pcu/hr)

TOTAL FLOW = 1431 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.5270
DFC b-c	=	0.0899
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.53

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:		KM	Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2016 EXISTING TRAFFIC (Noon)	CHECKED BY:		AL	Nov-16
		REVIEWED BY:		CW	Nov-16

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GEOMETRIC FACTORS :

COMPARISION OF DESIGN FLOW TO CAPACITY:

GENERAL

W =	7.30	(metres)			D =	0.839	Zb =	1.154	DFC b-a =	0.3302
W cr =	1.5	(metres)	Y =	0.748	E =	0.836	X d =	0.533	DFC b-c =	0.1798
					F =	0.905	Z d =	0.586	DFC c-b =	0.3472
					M b =	0.839	M d =	0.533	DFCl b-d =	0.0000

MAJOR ROAD (ARM A)   **MAJOR ROAD (ARM C)**

W a-c =	3.65	(metres)	W c-b =	2.60	(metres)				DFCr b-d =	0.0000
Vl a-c =	200	(metres)	Vr c-b =	40	(metres)	**PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :**			DFC d-c =	0.0000
q a-b =	100	(pcu/hr)	q c-a =	600	(pcu/hr)	r b-a = 0.5909	r d-c =	0.000	DFC d-a =	0.0000
q a-c =	300	(pcu/hr)	q c-b =	200	(pcu/hr)	ql b-d = 0 (pcu/hr)	ql d-b =	0 (pcu/hr)	DFC a-d =	0.0000
						qr b-d = 0 (pcu/hr)	qr d-b =	0 (pcu/hr)	DFCl d-b =	0.0000
									DFCr d-b =	0.0000

MINOR ROAD (ARM B)   **MINOR ROAD (ARM D)**

CAPACITY OF MOVEMENT :

W b-a =	3.00	(metres)	W d-c =		(metres)				
W b-c =	3.00	(metres)	W d-a =		(metres)	Q b-a = 315 (pcu/hr)	Q d-c =	176 (pcu/hr)	
Vl b-a =	29	(metres)	Vl d-c =		(metres)	Q b-c = 723 (pcu/hr)	Q d-a =	341 (pcu/hr)	
Vr b-a =	80	(metres)	Vr d-c =		(metres)	Q c-b = 576 (pcu/hr)	Q a-d =	581 (pcu/hr)	**CRITICAL DFC = 0.35**
Vr b-c =	30	(metres)	Vr d-a =		(metres)	Ql b-d = 315 (pcu/hr)	Ql d-b =	193 (pcu/hr)	
q b-a =	104	(pcu/hr)	q d-c =		(pcu/hr)	Qr b-d = 315 (pcu/hr)	Qr d-b =	193 (pcu/hr)	
q b-c =	130	(pcu/hr)	q d-a =		(pcu/hr)				
q b-d =		(pcu/hr)	q d-b =		(pcu/hr)	TOTAL FLOW =	1434	(PCU/HR)	

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2016 EXISTING TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

```
               Minor Road
                (ARM D)

  [A6]   461  ───────►           (ARM A)
  [A5]   192  ──────►            Link Road
  (ARM C)                        ◄─────── 489  [A1]
  Link Road                        ┌────  155  [A2]
                                   ▼
               ===================
                    ◄──  ──►
               81   186
              [A4]  [A3]      (ARM B)
                           Caroline Hill Road
```

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)
W cr =	1.5	(metres)

Y = 0.748

MAJOR ROAD (ARM A)

W a-c =	3.65	(metres)
Vl a-c =	200	(metres)
q a-b =	100	(pcu/hr)
q a-c =	300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	2.60	(metres)
Vr c-b =	40	(metres)
q c-a =	600	(pcu/hr)
q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	3.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	29	(metres)
Vr b-a =	80	(metres)
Vr b-c =	30	(metres)
q b-a =	186	(pcu/hr)
q b-c =	81	(pcu/hr)
q b-d =		(pcu/hr)

MINOR ROAD (ARM D)

W d-c =		(metres)
W d-a =		(metres)
Vl d-c =		(metres)
Vr d-c =		(metres)
Vr d-a =		(metres)
q d-c =		(pcu/hr)
q d-a =		(pcu/hr)
q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D =	0.839		Zb =	1.154
E =	0.836		X d =	0.533
F =	0.905		Z d =	0.586
M b =	0.839		M d =	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	1.0508		r d-c =	0.000	
ql b-d =	0	(pcu/hr)	ql d-b =	0	(pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b =	0	(pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c =	177	(pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a =	341	(pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d =	581	(pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b =	193	(pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b =	193	(pcu/hr)

TOTAL FLOW = 1467 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.5905
DFC b-c	=	0.1120
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC   =   0.59

TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2019 FORECAST TRAFFIC (AM)	CHECKED BY: AL	Nov-16
		REVIEWED BY: CW	Nov-16

Minor Road
(ARM D)

[A6] 646
[A5] 166
(ARM C)
Link Road

(ARM A)
Link Road
349 [A1]
129 [A2]

66 169
[A4] [A3]   (ARM B)
Caroline Hill Road

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)
W cr =	1.5	(metres)

Y = 0.748

MAJOR ROAD (ARM A)

W a-c =	3.65	(metres)
Vl a-c =	200	(metres)
q a-b =	100	(pcu/hr)
q a-c =	300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	2.60	(metres)
Vr c-b =	40	(metres)
q c-a =	600	(pcu/hr)
q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	3.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	29	(metres)
Vr b-a =	80	(metres)
Vr b-c =	80	(metres)
q b-a =	169	(pcu/hr)
q b-c =	66	(pcu/hr)
q b-d =		(pcu/hr)

MINOR ROAD (ARM D)

W d-c =		(metres)
W d-a =		(metres)
Vl d-c =		(metres)
Vr d-c =		(metres)
Vr d-a =		(metres)
q d-c =		(pcu/hr)
q d-a =		(pcu/hr)
q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D =	0.839		Zb =	1.154	
E =	0.836		Xd =	0.533	
F =	0.905		Zd =	0.586	
Mb =	0.839		Md =	0.533	

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	0.9389		r d-c =	0.000	
ql b-d =	0	(pcu/hr)	ql d-b =	0	(pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b =	0	(pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c =	180	(pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a =	341	(pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d =	581	(pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b =	193	(pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b =	193	(pcu/hr)

TOTAL FLOW = 1435 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.5365
DFC b-c	=	0.0913
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.54

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

```
                Minor Road
                 (ARM D)



   [A6]   528  ──────────►      (ARM A)
   [A5]   193  ──────────►      Link Road
   (ARM C)                              ◄───────── 355 [A1]
   Link Road                        ┌───────────  142 [A2]
                                    │
              ==================    ▼
                    ┌──┐  ┌──►
                 ◄──┘  │  │
                       │  │
               132  106
               [A4]  [A3]      (ARM B)
                     Caroline Hill Road
```

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)				
W cr =	1.5	(metres)	Y	=	0.748	

MAJOR ROAD (ARM A) | MAJOR ROAD (ARM C)

W a-c =	3.65	(metres)	W c-b =	2.60	(metres)
Vl a-c =	200	(metres)	Vr c-b =	40	(metres)
q a-b =	100	(pcu/hr)	q c-a =	600	(pcu/hr)
q a-c =	300	(pcu/hr)	q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B) | MINOR ROAD (ARM D)

W b-a =	3.00	(metres)	W d-c =		(metres)
W b-c =	3.00	(metres)	W d-a =		(metres)
Vl b-a =	29	(metres)	Vl d-c =		(metres)
Vr b-a =	80	(metres)	Vr d-c =		(metres)
Vr b-c =	80	(metres)	Vr d-a =		(metres)
q b-a =	106	(pcu/hr)	q d-c =		(pcu/hr)
q b-c =	132	(pcu/hr)	q d-a =		(pcu/hr)
q b-d =		(pcu/hr)	q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D =	0.839		Zb =	1.154
E =	0.836		X d =	0.533
F =	0.905		Z d =	0.586
M b =	0.839		M d =	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	0.6057		r d-c =	0.000
ql b-d =	0	(pcu/hr)	ql d-b =	0	(pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b =	0	(pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c =	175	(pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a =	341	(pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d =	581	(pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b =	193	(pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b =	193	(pcu/hr)

TOTAL FLOW = 1438 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3365
DFC b-c	=	0.1826
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.35

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Reference Flow - 2019 FORECAST TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Minor Road
(ARM D)

[A6] 469
[A5] 195
(ARM C)
Link Road

(ARM A)
Link Road

497 [A1]
158 [A2]

82 189
[A4] [A3]   (ARM B)
Caroline Hill Road

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)			
W cr =	1.5	(metres)	Y =	0.748	

MAJOR ROAD (ARM A) | **MAJOR ROAD (ARM C)**

W a-c =	3.65	(metres)	W c-b =	2.60	(metres)
Vl a-c =	200	(metres)	Vr c-b =	40	(metres)
q a-b =	100	(pcu/hr)	q c-a =	600	(pcu/hr)
q a-c =	300	(pcu/hr)	q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B) | **MINOR ROAD (ARM D)**

W b-a =	3.00	(metres)	W d-c =		(metres)
W b-c =	3.00	(metres)	W d-a =		(metres)
Vl b-a =	29	(metres)	Vl d-c =		(metres)
Vr b-a =	80	(metres)	Vr d-c =		(metres)
Vr b-c =	80	(metres)	Vr d-a =		(metres)
q b-a =	189	(pcu/hr)	q d-c =		(pcu/hr)
q b-c =	82	(pcu/hr)	q d-a =		(pcu/hr)
q b-d =		(pcu/hr)	q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D =	0.839		Zb =	1.154
E =	0.836		X d =	0.533
F =	0.905		Z d =	0.586
M b =	0.839		M d =	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	1.0739		r d-c =	0.000	
ql b-d =	0	(pcu/hr)	ql d-b =	0	(pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b =	0	(pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c =	176	(pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a =	341	(pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d =	581	(pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b =	193	(pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b =	193	(pcu/hr)

TOTAL FLOW =   1471 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.6000
DFC b-c	=	0.1134
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC   =   0.60

TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM Nov-16
J1 - Link Road / Caroline Hill Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (AM)	CHECKED BY:	AL Nov-16
		REVIEWED BY:	CW Nov-16

Minor Road (ARM D)

[A6] 646
[A5] 166
(ARM C)
Link Road

(ARM A)
Link Road

349 [A1]
138 [A2]

66 169
[A4] [A3]
(ARM B)
Caroline Hill Road

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W =	7.30	(metres)
W cr =	1.5	(metres)

Y = 0.748

MAJOR ROAD (ARM A)

W a-c =	3.65	(metres)
Vl a-c =	200	(metres)
q a-b =	100	(pcu/hr)
q a-c =	300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	2.60	(metres)
Vr c-b =	40	(metres)
q c-a =	600	(pcu/hr)
q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	3.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	29	(metres)
Vr b-a =	80	(metres)
Vr b-c =	80	(metres)
q b-a =	169	(pcu/hr)
q b-c =	66	(pcu/hr)
q b-d =		(pcu/hr)

MINOR ROAD (ARM D)

W d-c =		(metres)
W d-a =		(metres)
Vl d-c =		(metres)
Vr d-c =		(metres)
Vr d-a =		(metres)
q d-c =		(pcu/hr)
q d-a =		(pcu/hr)
q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.839	Zb	=	1.154
E	=	0.836	X d	=	0.533
F	=	0.905	Z d	=	0.586
M b	=	0.839	M d	=	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	0.9389		r d-c	=	0.000
ql b-d =	0	(pcu/hr)	ql d-b	=	0 (pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b	=	0 (pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c	=	180 (pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a	=	341 (pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d	=	581 (pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b	=	193 (pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b	=	193 (pcu/hr)

TOTAL FLOW =   1435 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.5365
DFC b-c	=	0.0913
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.54

TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Minor Road (ARM D)

[A6] 528
[A5] 193
(ARM C)
Link Road

(ARM A)
Link Road
355 [A1]
151 [A2]

132 196
[A4] [A3]
(ARM B)
Caroline Hill Road

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

W	=	7.30	(metres)		
W cr	=	1.5	(metres)	Y =	0.748

MAJOR ROAD (ARM A)　　**MAJOR ROAD (ARM C)**

W a-c =	3.65	(metres)	W c-b =	2.60	(metres)
Vl a-c =	200	(metres)	Vr c-b =	40	(metres)
q a-b =	100	(pcu/hr)	q c-a =	600	(pcu/hr)
q a-c =	300	(pcu/hr)	q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)　　**MINOR ROAD (ARM D)**

W b-a =	3.00	(metres)	W d-c =		(metres)
W b-c =	3.00	(metres)	W d-a =		(metres)
Vl b-a =	29	(metres)	Vl d-c =		(metres)
Vr b-a =	80	(metres)	Vr d-c =		(metres)
Vr b-c =	80	(metres)	Vr d-a =		(metres)
q b-a =	106	(pcu/hr)	q d-c =		(pcu/hr)
q b-c =	132	(pcu/hr)	q d-a =		(pcu/hr)
q b-d =		(pcu/hr)	q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D =	0.839		Zb =	1.154
E =	0.836		X d =	0.533
F =	0.905		Z d =	0.586
M b =	0.839		M d =	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	0.6057		r d-c =	0.000
ql b-d =	0 (pcu/hr)		ql d-b =	0 (pcu/hr)
qr b-d =	0 (pcu/hr)		qr d-b =	0 (pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315 (pcu/hr)		Q d-c =	175 (pcu/hr)
Q b-c =	723 (pcu/hr)		Q d-a =	341 (pcu/hr)
Q c-b =	576 (pcu/hr)		Q a-d =	581 (pcu/hr)
Ql b-d =	315 (pcu/hr)		Ql d-b =	193 (pcu/hr)
Qr b-d =	315 (pcu/hr)		Qr d-b =	193 (pcu/hr)

TOTAL FLOW = 1438 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3365
DFC b-c	=	0.1826
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.35

TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J1 - Link Road / Caroline Hill Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

```
                    Minor Road
                     (ARM D)

[A6]   469  ──────────►          (ARM A)
[A5]   195  ──────────►          Link Road
(ARM C)                                ◄────────  497 [A1]
Link Road                              ┌───────   167 [A2]

                ===================
                   ┌──┐
                ◄──┘  └──►

           82   189
          [A4] [A3]      (ARM B)
                    Caroline Hill Road
```

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
X a	=	STREAM-SPECIFIC (RIGHT TURN FROM A)
X b	=	STREAM-SPECIFIC (RIGHT TURN FROM B)
Z b	=	STREAM-SPECIFIC (LEFT TURN FROM B)
M b	=	STREAM-SPECIFIC (STRAIGHT AHEAD FROM B - LEFT LANE)
Y	=	(1-0.0345W)
r b-a	=	RATIO OF FLOW TO CAPACITY IN STREAM b-a

GEOMETRIC DETAILS:

GENERAL

| W | = | 7.30 | (metres) |
| W cr | = | 1.5 | (metres) | Y | = | 0.748 |

MAJOR ROAD (ARM A)

W a-c =	3.65	(metres)
Vl a-c =	200	(metres)
q a-b =	100	(pcu/hr)
q a-c =	300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	2.60	(metres)
Vr c-b =	40	(metres)
q c-a =	600	(pcu/hr)
q c-b =	200	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	3.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	29	(metres)
Vr b-a =	80	(metres)
Vr b-c =	80	(metres)
q b-a =	189	(pcu/hr)
q b-c =	82	(pcu/hr)
q b-d =		(pcu/hr)

MINOR ROAD (ARM D)

W d-c =		(metres)
W d-a =		(metres)
Vl d-c =		(metres)
Vr d-c =		(metres)
Vr d-a =		(metres)
q d-c =		(pcu/hr)
q d-a =		(pcu/hr)
q d-b =		(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.839		Zb	=	1.154
E	=	0.836		X d	=	0.533
F	=	0.905		Z d	=	0.586
M b	=	0.839		M d	=	0.533

PROPORTION OF MINOR STRAIGHT AHEAD TRAFFIC :

r b-a =	1.0739		r d-c =	0.000
ql b-d =	0	(pcu/hr)	ql d-b =	0	(pcu/hr)
qr b-d =	0	(pcu/hr)	qr d-b =	0	(pcu/hr)

CAPACITY OF MOVEMENT :

Q b-a =	315	(pcu/hr)	Q d-c	=	176	(pcu/hr)
Q b-c =	723	(pcu/hr)	Q d-a	=	341	(pcu/hr)
Q c-b =	576	(pcu/hr)	Q a-d	=	581	(pcu/hr)
Ql b-d =	315	(pcu/hr)	Ql d-b	=	193	(pcu/hr)
Qr b-d =	315	(pcu/hr)	Qr d-b	=	193	(pcu/hr)

TOTAL FLOW = 1471 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.6000
DFC b-c	=	0.1134
DFC c-b	=	0.3472
DFCl b-d	=	0.0000
DFCr b-d	=	0.0000
DFC d-c	=	0.0000
DFC d-a	=	0.0000
DFC a-d	=	0.0000
DFCl d-b	=	0.0000
DFCr d-b	=	0.0000

CRITICAL DFC = 0.60

J2
CAROLINE HILL ROAD / LEIGHTON ROAD

WSP PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assessment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2016 EXISTING TRAFFIC (AM)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Junction layout diagram: Hoi Ping Road, Leighton Road, Caroline Hill Road. Movements [1] 295, [2] 343, [3] 402, [4] 216, [5] 441, [6] 256, [7] 33.

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	120 sec
Sum(y)		Y =	0.556
Loss time		L =	17 sec
Total Flow		=	1986 pcu
Co	= (1.5*L+5)/(1-Y)	=	68.7 sec
Cm	= L/(1-Y)	=	38.3 sec
Yult		=	0.773
R.C.ult	= (Yult-Y)/Y*100%	=	38.9 %
Cp	= 0.9*L/(0.9-Y)	=	44.5 sec
Ymax	= 1-L/C	=	0.858
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	38.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage diagrams: Stage 1 (P1, P2, P3), Stage 2 (P2, P5, P6), Stage 3 (P3, P4).

Movement	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow pcu/h	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		295		295	0.00	4020			4020	0.073	0.167		14	31	0.284	36	36
4,5	1	3.50		1	20		N	1965	216	97		313	0.69	1868			1868	0.167			31	31	0.648	39	43
5	1	3.00		1				2055		344		344	0.00	2055			2055	0.167			31	31	0.648	43	42
2	2,3	3.00		1	30		N	1915	343			343	1.00	1824			1824	0.188			35	37	0.608	39	38
3	2	4.00		1	20			2155			402	402	1.00	2005			2005	0.201	0.201		37	37	0.648	46	38
6	3	3.00		1			N	1915		256		256	0.00	1915			1915	0.134	0.188		25	37	0.432	29	34
7	3	3.00		1	10			2055			33	33	1.00	1787			1787	0.018			3	37	0.060	4	29

NOTE: O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF | TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2016 EXISTING TRAFFIC (Noon)		Checked By:	AL	Nov-16
			Reviewed By:	CW	Nov-16

Hoi Ping Road

N

[7] [6]
75 236

[1] 392

Leighton Road

Leighton Road

←415 [5]

269   355   ─248 [4]
[2]   [3]

Caroline Hill Road

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	120 sec
Sum(y)		Y =	0.494
Loss time		L =	17 sec
Total Flow		=	1990 pcu
Co	= (1.5*L+5)/(1-Y)	=	60.3 sec
Cm	= L/(1-Y)	=	33.6 sec
Yult		=	0.773
R.C.ult	= (Yult-Y)/Y*100%	=	56.3 %
Cp	= 0.9*L/(0.9-Y)	=	37.7 sec
Ymax	= 1-L/C	=	0.858
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	56.3 %

Pedestrian Phase	Width (m)	Stage	Green Time Required		Green Time Provided (s)		Check
			SG	FG	SG	FG	
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage 1 — P2, P3, P1
Stage 2 — P2, P6, P5
Stage 3 — P3, P4

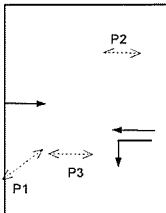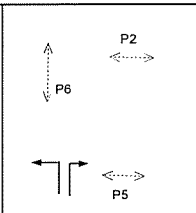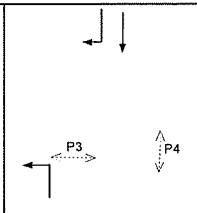| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		392		392	0.00	4020			4020	0.098	0.170		20	35	0.331	46	34	1
4,5	1	3.50		1	20		N	1965	248	67		315	0.79	1855			1855	0.170			35	35	0.576	37	38	
5	1	3.00		1				2055		348		348	0.00	2055			2055	0.170			35	35	0.576	41	38	
2	2,3	3.00		1	30		N	1915	269			269	1.00	1824			1824	0.147			31	37	0.479	31	35	
3	2	4.00		1	20			2155			355	355	1.00	2005			2005	0.177	0.177		37	37	0.576	41	37	1
6	3	3.00		1			N	1915		236		236	0.00	1915			1915	0.123	0.147		26	40	0.369	26	32	1
7	3	3.00		1	10			2055			75	75	1.00	1787			1787	0.042			9	40	0.126	8	28	

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2016 EXISTING TRAFFIC (PM)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Hoi Ping Road

[7] 68 [6] 330

[1] 421 →

Leighton Road

Leighton Road

363 [5]
280 367 248 [4]
[2] [3]

Caroline Hill Road

N ↑

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	120	sec
Sum(y)		Y =	0.512	
Loss time		L =	17	sec
Total Flow		=	2077	pcu
Co	= (1.5*L+5)/(1-Y)	=	62.5	sec
Cm	= L/(1-Y)	=	34.8	sec
Yult		=	0.773	
R.C.ult	= (Yult-Y)/Y*100%	=	50.9	%
Cp	= 0.9*L/(0.9-Y)	=	39.4	sec
Ymax	= 1-L/C	=	0.858	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	50.9	%

P2
P2
P6
P3
P1
P5
Stage 1

P2
P2
P6
P3
P5
Stage 2

P3 P4
Stage 3

Pedestrian Phase	Width (m)	Stage	Green Time Required		Green Time Provided (s)		Check
			SG	FG	SG	FG	
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK
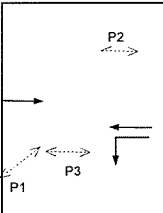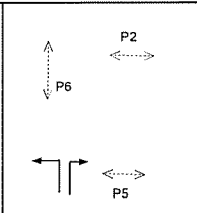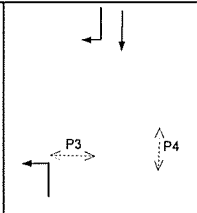
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	m Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		421		421	0.00	4020			4020	0.105	0.157		21	32	0.399	52	37
4,5	1	3.50		1	20		N	1965	248	41		289	0.86	1846			1846	0.157			32	32	0.597	36	41
5	1	3.00		1				2055		322		322	0.00	2055			2055	0.157			32	32	0.597	40	41
2	2,3	3.00		1	30		N	1915	280			280	1.00	1824			1824	0.154			31	37	0.500	32	36
3	2	4.00		1	20			2155			367	367	1.00	2005			2005	0.183	0.183		37	37	0.597	42	37
6	3	3.00		1			N	1915		330		330	0.00	1915			1915	0.172	0.172		35	40	0.516	37	34
7	3	3.00		1	10			2055			68	68	1.00	1787			1787	0.038			8	40	0.114	8	28

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2019 FORECAST TRAFFIC (AM)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Hoi Ping Road

[7] [6]
34 260

[1] 300 →

Leighton Road ————— Leighton Road

←—448 [5]
349 408 —219 [4]
[2] [3]

Caroline Hill Road

N ↑

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	120 sec
Sum(y)		Y =	0.565
Loss time		L =	17 sec
Total Flow		=	2018 pcu
Co	= (1.5*L+5)/(1-Y)	=	70.1 sec
Cm	= L/(1-Y)	=	39.1 sec
Yult		=	0.773
R.C.ult	= (Yult-Y)/Y*100%	=	36.8 %
Cp	= 0.9*L/(0.9-Y)	=	45.7 sec
Ymax	= 1-L/C	=	0.858
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	36.8 %

Pedestrian Phase Table

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage diagrams

Stage 1 — P2, P6, P1, P3
Stage 2 — P2, P6, P5
Stage 3 — P3, P4

Movement Calculation Table

Movement	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		300		300	0.00	4020			4020	0.075	0.170		14	31	0.289	37	36
4,5	1	3.50		1	20		N	1965	219	99		318	0.69	1868			1868	0.170			31	31	0.658	39	43
5	1	3.00		1				2055		349		349	0.00	2055			2055	0.170			31	31	0.658	43	42
2	2,3	3.00		1	30		N	1915	349			349	1.00	1824			1824	0.191			35	37	0.619	40	38
3	2	4.00		1	20			2155			408	408	1.00	2005			2005	0.204	0.204		37	37	0.658	47	38
6	3	3.00		1			N	1915		260		260	0.00	1915			1915	0.136	0.191		25	37	0.437	30	34
7	3	3.00		1	10			2055			34	34	1.00	1787			1787	0.019			3	37	0.061	4	29

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP PARSONS BRINCKERHOFF

	INITIALS	DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By: KM — Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	Checked By: AL — Nov-16
		Reviewed By: CW — Nov-16

Hoi Ping Road

N

[7] [6]
76 240

[1] 398 →

Leighton Road   Leighton Road

274 361
[2] [3]
←422 [5]
←252 [4]

Caroline Hill Road

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	120 sec
Sum(y)		Y =	0.503
Loss time		L =	17 sec
Total Flow		=	2023 pcu
Co	= (1.5*L+5)/(1-Y)	=	61.3 sec
Cm	= L/(1-Y)	=	34.2 sec
Yult		=	0.773
R.C.ult	= (Yult-Y)/Y*100%	=	53.7 %
Cp	= 0.9*L/(0.9-Y)	=	38.5 sec
Ymax	= 1-L/C	=	0.858
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	53.7 %

Pedestrian

Pedestrian Phase	Width (m)	Stage	Green Time Required		Green Time Provided (s)		Check
			SG	FG	SG	FG	
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage 1 / Stage 2 / Stage 3 diagrams

P2, P6, P3, P1, P5 (Stage 1 and Stage 2)

P3, P4 (Stage 3)

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		398		398	0.00	4020			4020	0.099	0.172		20	35	0.336	47	34
4,5	1	3.50		1	20		N	1965	252	68		320	0.79	1855			1855	0.172			35	35	0.586	38	38
5	1	3.00		1				2055		354		354	0.00	2055			2055	0.172			35	35	0.586	42	38
2	2,3	3.00		1	30		N	1915	274			274	1.00	1824			1824	0.150			31	37	0.489	32	36
3	2	4.00		1	20			2155			361	361	1.00	2005			2005	0.180	0.180		37	37	0.586	42	37
6	3	3.00		1			N	1915		240		240	0.00	1915			1915	0.125	0.150		26	40	0.375	27	32
7	3	3.00		1	10			2055			76	76	1.00	1787			1787	0.043			9	40	0.127	8	28

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP PARSONS BRINCKERHOFF

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road		
Project No.: 2531052A		
Reference Flow - 2019 FORECAST TRAFFIC (PM)		
Prepared By:	KM	Nov-16
Checked By:	AL	Nov-16
Reviewed By:	CW	Nov-16

Junction layout diagram: Hoi Ping Road, Leighton Road, Caroline Hill Road, with flows [7] 69, [6] 335, [1] 428, [5] 368, [4] 252, 284 [2], 373 [3]. North arrow shown.

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	120	sec
Sum(y)		Y =	0.520	
Loss time		L =	17	sec
Total Flow		=	2109	pcu
Co	= (1.5*L+5)/(1-Y)	=	63.5	sec
Cm	= L/(1-Y)	=	35.4	sec
Yult		=	0.773	
R.C.ult	= (Yult-Y)/Y*100%	=	48.6	%
Cp	= 0.9*L/(0.9-Y)	=	40.3	sec
Ymax	= 1-L/C	=	0.858	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	48.6	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage diagrams: Stage 1 (P2, P6, P3, P1), Stage 2 (P2, P6, P5), Stage 3 (P3, P4).

Movement	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		428		428	0.00	4020			4020	0.106	0.159		21	31	0.406	53	37
4,5	1	3.50		1	20		N	1965	252	41		293	0.86	1846			1846	0.159			31	31	0.606	36	41
5	1	3.00		1				2055		327		327	0.00	2055			2055	0.159			31	31	0.606	40	41
2	2,3	3.00		1	30		N	1915	284			284	1.00	1824			1824	0.156			31	37	0.507	33	36
3	2	4.00		1	20			2155			373	373	1.00	2005			2005	0.186	0.186		37	37	0.606	43	37
6	3	3.00		1			N	1915		335		335	0.00	1915			1915	0.175	0.175		35	40	0.524	37	34
7	3	3.00		1	10			2055			69	69	1.00	1787			1787	0.039			8	40	0.116	8	28

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP | PARSONS BRINCKERHOFF

		INITIALS		DATE

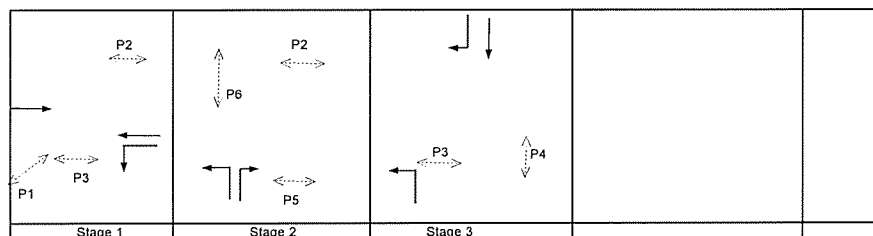| Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Reference Flow - 2019 FORECAST TRAFFIC (AM)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Hoi Ping Road

[7] [6]
34 260

[1] 300

N

Leighton Road — Leighton Road

448 [5]
349 408 228 [4]
[2] [3]

Caroline Hill Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	120	sec
Sum(y)		Y =	0.567	
Loss time		L =	17	sec
Total Flow		=	2027	pcu
Co	= (1.5*L+5)/(1-Y)	=	70.5	sec
Cm	= L/(1-Y)	=	39.3	sec
Yult		=	0.773	
R.C.ult	= (Yult-Y)/Y*100%	=	36.2	%
Cp	= 0.9*L/(0.9-Y)	=	46.0	sec
Ymax	= 1-L/C	=	0.858	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	36.2	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

Stage 1 | Stage 2 | Stage 3

P2 (Stage 1), P2 P6 P5 (Stage 2), P3 P4 (Stage 3)
P1 P3

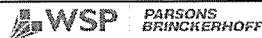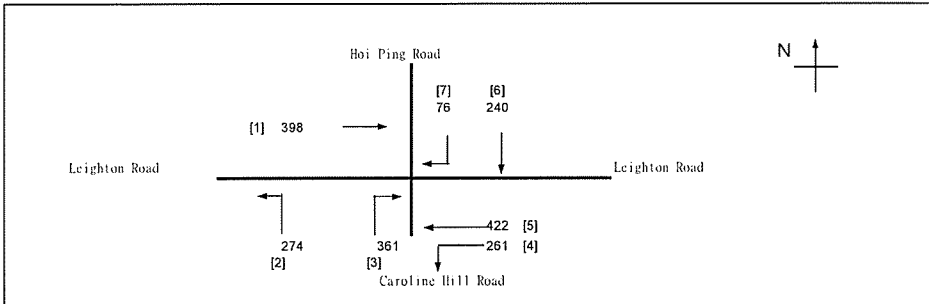| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	m Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		300		300	0.00	4020			4020	0.075	0.172		14	31	0.286	37	36
4,5	1	3.50		1	20		N	1965	228	94		322	0.71	1866			1866	0.172			31	31	0.661	40	43
5	1	3.00		1				2055		354		354	0.00	2055			2055	0.172			31	31	0.661	44	42
2	2,3	3.00		1	30		N	1915	349			349	1.00	1824			1824	0.191			35	37	0.621	40	38
3	2	4.00		1	20			2155			408	408	1.00	2005			2005	0.204	0.204		37	37	0.661	47	39
6	3	3.00		1			N	1915		260		260	0.00	1915			1915	0.136	0.191		25	37	0.437	30	34
7	3	3.00		1	10			2055			34	34	1.00	1787			1787	0.019			3	37	0.061	4	29

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Hoi Ping Road

[7] [6]
76 240

[1] 398

Leighton Road

Leighton Road

422 [5]

274   361   261 [4]
[2]   [3]

Caroline Hill Road

N

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	120	sec
Sum(y)		Y =	0.505	
Loss time		L =	17	sec
Total Flow		=	2032	pcu
Co	= (1.5*L+5)/(1-Y)	=	61.6	sec
Cm	= L/(1-Y)	=	34.3	sec
Yult		=	0.773	
R.C.ult	= (Yult-Y)/Y*100%	=	52.9	%
Cp	= 0.9*L/(0.9-Y)	=	38.7	sec
Ymax	= 1-L/C	=	0.858	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	52.9	%

Pedestrian Phase	Width (m)	Stage	Green Time Required		Green Time Provided (s)		Check
			SG	FG	SG	FG	
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

P2
P2
P6
P3
P1
P3
P5
P4

Stage 1	Stage 2	Stage 3	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		398		398	0.00	4020			4020	0.099	0.175		20	36	0.333	47	33
4,5	1	3.50		1	20		N	1965	261	63		324	0.81	1853			1853	0.175			36	36	0.588	38	38
5	1	3.00		1				2055		359		359	0.00	2055			2055	0.175			36	36	0.588	42	38
2	2,3	3.00		1	30		N	1915	274			274	1.00	1824			1824	0.150			31	37	0.491	32	36
3	2	4.00		1	20			2155			361	361	1.00	2005			2005	0.180	0.180		37	37	0.588	42	37
6	3	3.00		1			N	1915		240		240	0.00	1915			1915	0.125	0.150		26	40	0.375	27	32
7	3	3.00		1	10			2055			76	76	1.00	1787			1787	0.043			9	40	0.127	8	28

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP PARSONS BRINCKERHOFF

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment

J2 - Leighton Road / Caroline Hill Road / Hoi Ping Road

Design Flow (Construction) - Reference Flow - 2019 FORECAST TRAFFIC (PM)

Project No.: 2531052A	Prepared By: KM	Nov-16
	Checked By: AL	Nov-16
	Reviewed By: CW	Nov-16

Hoi Ping Road

[7] [6]
69 335

[1] 428 →

Leighton Road

Leighton Road

←368 [5]

284 373 ←261 [4]
[2] [3]

Caroline Hill Road

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	120 sec
Sum(y)		Y =	0.522
Loss time		L =	17 sec
Total Flow		=	2118 pcu
Co	= (1.5*L+5)/(1-Y)	=	63.9 sec
Cm	= L/(1-Y)	=	35.6 sec
Yult		=	0.773
R.C.ult	= (Yult-Y)/Y*100%	=	47.9 %
Cp	= 0.9*L/(0.9-Y)	=	40.5 sec
Ymax	= 1-L/C	=	0.858
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	47.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3.5	3	5	15	22	6	OK
P2	7	1,2	6	17	56	15	OK
P3	3.5	3	5	19	18	20	OK
P4	7	3	7	17	20	20	OK
P5	3.5	2	5	19	18	15	OK
P6	7	2	7	17	20	20	OK

	Stage 1	Stage 2	Stage 3	
	P2	P2		
		P6		
	P3		P3 P4	
P1		P5		

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straigh pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				17					
1	1	3.25		2			N	4020		428		428	0.00	4020			4020	0.106	0.161		21	32	0.402	52	37
4,5	1	3.50		1	20		N	1965	261	36		297	0.88	1844			1844	0.161			32	32	0.609	36	41
5	1	3.00		1				2055		332		332	0.00	2055			2055	0.161			32	32	0.609	41	41
2	2,3	3.00		1	30		N	1915	284			284	1.00	1824			1824	0.156			31	37	0.509	33	36
3	2	4.00		1	20			2155			373	373	1.00	2005			2005	0.186	0.186		37	37	0.609	43	38
6	3	3.00		1			N	1915		335		335	0.00	1915			1915	0.175	0.175		34	40	0.524	37	34
7	3	3.00		1	10			2055			69	69	1.00	1787			1787	0.039			8	40	0.116	8	28

NOTE: O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

J3
CAROLINE HILL ROAD / LEIGHTON ROAD / PENNINGTON STREET

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

TRAFFIC SIGNAL CALCULATION	INITIALS	DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment

J3 - Leighton Road / Caroline Hill Road / Pennington Street

Reference Flow - 2016 EXISTING TRAFFIC (AM)

Project No.: 2531052A	
Prepared By:	KM — Nov-16
Checked By:	AL — Nov-16
Reviewed By:	CW — Nov-16

Pennington Street

[1] 102
[2] 595

Leighton Road

Leighton Road

264 [6]
639 [5]
71 [4]

18
[3]

Caroline Hill Road

N

Parameter		Value
No. of stages per cycle	$N =$	2
Intergreen Period Stage 1 - 2	$I =$	5 sec
Stage 2 - 1	$I =$	5 sec
Cycle time	$C =$	108 sec
Sum(y)	$Y =$	0.498
Loss time	$L =$	10 sec
Total Flow	$=$	1689 pcu
Co $= (1.5*L+5)/(1-Y)$	$=$	39.9 sec
Cm $= L/(1-Y)$	$=$	19.9 sec
Yult	$=$	0.825
R.C.ult $= (Yult-Y)/Y*100\%$	$=$	65.5 %
Cp $= 0.9*L/(0.9-Y)$	$=$	22.4 sec
Ymax $= 1-L/C$	$=$	0.907
R.C.(C) $= (0.9*Ymax-Y)/Y*100\%$	$=$	63.8 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3	1	5	7	24	6	OK
P2	4	1	5	7	94	15	OK
P3	5	2	5	7	88	20	OK
P4	7	2	5	7	77	20	OK
P5	7	2	5	7	28	15	OK

P1
P2
P3 P4
P5

Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
1,2	1	3.50		1	30		N	1965	102	232		334	0.31	1935			1935	0.173	0.175	10	34	34	0.540	34.096	32
1	1	3.50		1				2105		363		363	0.00	2105			2105	0.173			34	34	0.540	37.084	32
4,5	1	3.50		1	30		N	1965	71	270		341	0.21	1945			1945	0.175	0.175		34	34	0.549	34.819	32
5	1	3.50		1				2105		369		369	0.00	2105			2105	0.175			34	34	0.549	37.688	32
3	2	3.30		1	15		N	1945	18			18	1.00	1768			1768	0.010	0.148		2	29	0.038	1.974	29
6	2	3.50		1	15		N	1965			264	264	1.00	1786			1786	0.148			29	29	0.549	28.946	36

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment

J3 - Leighton Road / Caroline Hill Road / Pennington Street

Reference Flow - 2016 EXISTING TRAFFIC (Noon)

Project No.:	2531052A	Prepared By:	KM	Nov-16
		Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Pennington Street

N

[1] 90
[2] 657

Leighton Road

Leighton Road

323 [6]
623 [5]
103 [4]

40
[3]

Caroline Hill Road

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.550
Loss time		L =	10 sec
Total Flow		=	1836 pcu
Co	= (1.5*L+5)/(1-Y)	=	44.5 sec
Cm	= L/(1-Y)	=	22.2 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	50.0 %
Cp	= 0.9*L/(0.9-Y)	=	25.7 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	48.5 %

P1
P2 P3 P4
P5

Stage 1	Stage 2	Stage 3	Stage 4

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
1,2	1	3.50		1	30		N	1965	90	268		358	0.25	1941			1941	0.185	0.185	10	33	33	0.606	37.378	34	1
1	1	3.50		1				2105		389		389	0.00	2105			2105	0.185			33	33	0.606	40.544	34	
4,5	1	3.50		1	30		N	1965	103	245		348	0.30	1936			1936	0.180	0.185		32	33	0.590	36.286	34	1
5	1	3.50		1				2105		378		378	0.00	2105			2105	0.180			32	33	0.590	39.446	34	
3	2	3.30		1	15		N	1945	40			40	1.00	1768			1768	0.023	0.181		4	32	0.076	4.210	27	1
6	2	3.50		1	15		N	1965			323	323	1.00	1786			1786	0.181			32	32	0.606	33.999	35	

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		
J3 - Leighton Road / Caroline Hill Road / Pennington Street		
Reference Flow - 2016 EXISTING TRAFFIC (PM)		
Project No.: 2531052A		
Prepared By:	KM	Nov-16
Checked By:	AL	Nov-16
Reviewed By:	CW	Nov-16

Pennington Street

N

[1] 168
[2] 620

Leighton Road

Leighton Road

460 [6]
563 [5]
44 [4]

48
[3]

Caroline Hill Road

No. of stages per cycle	N =	2
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 1	I =	5 sec
Cycle time	C =	108 sec
Sum(y)	Y =	0.649
Loss time	L =	10 sec
Total Flow	=	1903 pcu
Co = (1.5*L+5)/(1-Y)	=	57.0 sec
Cm = L/(1-Y)	=	28.5 sec
Yult	=	0.825
R.C.ult = (Yult-Y)/Y*100%	=	27.1 %
Cp = 0.9*L/(0.9-Y)	=	35.8 sec
Ymax = 1-L/C	=	0.907
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	25.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

P1
P2
P3 P4
P5

Stage 1	Stage 2	Stage 3	Stage 4

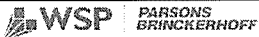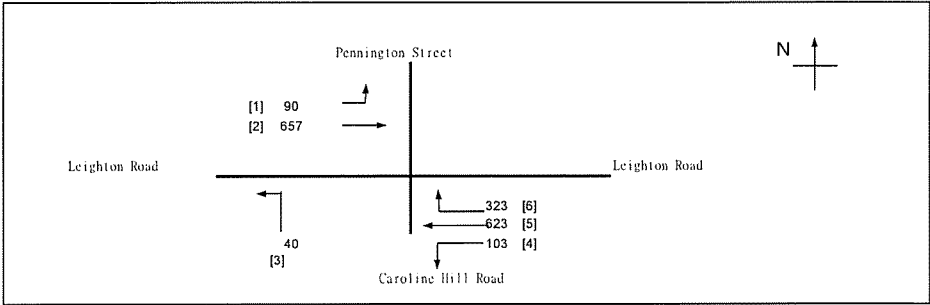| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
																				10						
1,2	1	3.50		1	30		N	1965	168	208		376	0.45	1922			1922	0.196	0.196		30	30	0.715	41.455	39	1
1	1	3.50		1				2105		412		412	0.00	2105			2105	0.196			30	30	0.715	45.305	39	
4,5	1	3.50		1	30		N	1965	44	248		292	0.15	1950			1950	0.150	0.196		23	30	0.547	31.806	35	1
5	1	3.50		1				2105		315		315	0.00	2105			2105	0.150			23	30	0.547	34.329	35	
3	2	3.30		1	15		N	1945	48			48	1.00	1768			1768	0.027	0.258		4	39	0.075	4.607	23	1
6	2	3.50		1	15		N	1965			460	460	1.00	1786			1786	0.258			39	39	0.715	44.407	33	

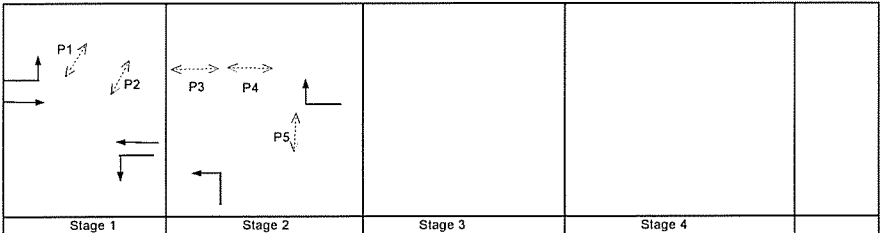NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP PARSONS BRINCKERHOFF

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By:	KM	Nov-16
J3 - Leighton Road / Caroline Hill Road / Pennington Street	Reference Flow - 2019 FORECAST TRAFFIC (AM)		Checked By:	AL	Nov-16
			Reviewed By:	CW	Nov-16

Pennington Street

N ↑

[1] 104 ↑
[2] 605 →

Leighton Road   Leighton Road

269 [6]
←649 [5]
72 [4]

18
[3]

Caroline Hill Road

No. of stages per cycle		N =	2	
Intergreen Period	Stage 1 - 2	I =	5 sec	
	Stage 2 - 1	I =	5 sec	
Cycle time		C =	108 sec	
Sum(y)		Y =	0.507	
Loss time		L =	10 sec	
Total Flow		=	1717 pcu	
Co	= (1.5*L+5)/(1-Y)	=	40.5 sec	
Cm	= L/(1-Y)	=	20.3 sec	
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	62.8 %	
Cp	= 0.9*L/(0.9-Y)	=	22.9 sec	
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	61.2 %	

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3	1	5	7	24	6	OK
P2	4	1	5	7	94	15	OK
P3	5	2	5	7	88	20	OK
P4	7	2	5	7	77	20	OK
P5	7	2	5	7	28	15	OK

Stage 1	Stage 2	Stage 3	Stage 4
P1 ↗ ↱ ↳ ↗ P2	←·····> ←·····> P3 P4 ↑ ↰ ↰ P5		
	← ↱		

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	m Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
																				10						
1,2	1	3.50		1	30		N	1965	104	236		340	0.31	1935			1935	0.175	0.178		34	34	0.550	34.699	32	1
1	1	3.50		1				2105		369		369	0.00	2105			2105	0.175			34	34	0.550	37.741	32	
4,5	1	3.50		1	30		N	1965	72	274		346	0.21	1945			1945	0.178	0.178		34	34	0.558	35.376	32	1
5	1	3.50		1				2105		375		375	0.00	2105			2105	0.178			34	34	0.558	38.290	32	
3	2	3.30		1	15		N	1945	18			18	1.00	1768			1768	0.010	0.151		2	29	0.038	1.972	29	1
6	2	3.50		1	15		N	1965			269	269	1.00	1786			1786	0.151			29	29	0.558	29.468	36	

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By: KM	Nov-16
J3 - Leighton Road / Caroline Hill Road / Pennington Street	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	Checked By: AL	Nov-16
		Reviewed By: CW	Nov-16

Pennington Street

Leighton Road

[1] 91
[2] 667

Leighton Road

328 [6]
633 [5]
104 [4]

41
[3]

Caroline Hill Road

N

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.558
Loss time		L =	10 sec
Total Flow		=	1864 pcu
Co	= (1.5*L+5)/(1-Y)	=	45.3 sec
Cm	= L/(1-Y)	=	22.6 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	47.8 %
Cp	= 0.9*L/(0.9-Y)	=	26.3 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	46.3 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

Stage diagram:

P1 / P2 / P3 / P4 / P5

| Stage 1 | Stage 2 | Stage 3 | Stage 4 |

Move- ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight- Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
																				10						
1,2	1	3.50		1	30		N	1965	91	273		364	0.25	1941			1941	0.187	0.187		33	33	0.615	37.934	34	1
1	1	3.50		1				2105		394		394	0.00	2105			2105	0.187			33	33	0.615	41.145	34	
4,5	1	3.50		1	30		N	1965	104	249		353	0.29	1936			1936	0.182	0.187		32	33	0.599	36.841	34	1
5	1	3.50		1				2105		384		384	0.00	2105			2105	0.182			32	33	0.599	40.047	34	
3	2	3.30		1	15		N	1945	41			41	1.00	1768			1768	0.023	0.184		4	32	0.078	4.315	27	1
6	2	3.50		1	15		N	1965			328	328	1.00	1786			1786	0.184			32	32	0.615	34.518	35	

NOTE: O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment			
J3 - Leighton Road / Caroline Hill Road / Pennington Street — Reference Flow - 2019 FORECAST TRAFFIC (PM)	Project No.: 2531052A	Prepared By: KM	Nov-16
		Checked By: AL	Nov-16
		Reviewed By: CW	Nov-16

Pennington Street

[1] 171
[2] 630

Leighton Road   Leighton Road

467 [6]
572 [5]
44 [4]
49
[3]

Caroline Hill Road

N

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.659
Loss time		L =	10 sec
Total Flow		=	1933 pcu
Co	= (1.5*L+5)/(1-Y)	=	58.7 sec
Cm	= L/(1-Y)	=	29.3 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	25.1 %
Cp	= 0.9*L/(0.9-Y)	=	37.4 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	23.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

Stage 1 | Stage 2 | Stage 3 | Stage 4

P1 P2 P3 P4 P5

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1,2	1	3.50		1	30		N	1965	171	211		382	0.45	1922			1922	0.199	0.199		30	30	0.727	42.453	40
1	1	3.50		1				2105		419		419	0.00	2105			2105	0.199			30	30	0.727	46.368	39
4,5	1	3.50		1	30		N	1965	44	252		296	0.15	1951			1951	0.152	0.199		23	30	0.555	32.273	36
5	1	3.50		1				2105		320		320	0.00	2105			2105	0.152			23	30	0.555	34.829	35
3	2	3.30		1	15		N	1945	49			49	1.00	1768			1768	0.028	0.261		4	39	0.077	4.705	23
6	2	3.50		1	15		N	1965			467	467	1.00	1786			1786	0.261			39	39	0.727	45.423	34

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J3 - Leighton Road / Caroline Hill Road / Pennington Street	Design Flow (Construction) - 2019 FORECAST TRAFFIC (AM)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Pennington Street

[1] 104
[2] 605

Leighton Road — Leighton Road

N ↑

269 [6]
658 [5]
18
[3]
72 [4]

Caroline Hill Road

No. of stages per cycle	N =	2	
Intergreen Period Stage 1 - 2	I =	5	sec
Stage 2 - 1	I =	5	sec
Cycle time	C =	108	sec
Sum(y)	Y =	0.511	
Loss time	L =	10	sec
Total Flow	=	1726	pcu
Co = (1.5*L+5)/(1-Y)	=	40.9	sec
Cm = L/(1-Y)	=	20.5	sec
Yult	=	0.825	
R.C.ult = (Yult-Y)/Y*100%	=	61.4	%
Cp = 0.9*L/(0.9-Y)	=	23.1	sec
Ymax = 1-L/C	=	0.907	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	59.8	%

Stages

P1, P2, P3, P4, P5

Stage 1 | Stage 2 | Stage 3 | Stage 4

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3	1	5	7	24	6	OK
P2	4	1	5	7	94	15	OK
P3	5	2	5	7	88	20	OK
P4	7	2	5	7	77	20	OK
P5	7	2	5	7	28	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1,2	1	3.50		1	30		N	1965	104	236		340	0.31	1935			1935	0.175	0.180		34	35	0.548	34.640	32
1	1	3.50		1				2105		369		369	0.00	2105			2105	0.175			34	35	0.548	37.676	32
4,5	1	3.50		1	30		N	1965	72	279		351	0.21	1945			1945	0.180	0.180		35	35	0.563	35.758	32
5	1	3.50		1				2105		379		379	0.00	2105			2105	0.180			35	35	0.563	38.699	32
3	2	3.30		1	15		N	1945	18			18	1.00	1768			1768	0.010	0.151		2	29	0.038	1.978	29
6	2	3.50		1	15		N	1965			269	269	1.00	1786			1786	0.151			29	29	0.563	29.562	36

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

WSP PARSONS BRINCKERHOFF

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.:	2531052A	Prepared By:	KM	Nov-16
J3 - Leighton Road / Caroline Hill Road / Pennington Street	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)		Checked By:	AL	Nov-16
			Reviewed By:	CW	Nov-16

Pennington Street

N

[1] 91
[2] 667

Leighton Road

Leighton Road

328 [6]
642 [5]
104 [4]
41
[3]

Caroline Hill Road

No. of stages per cycle		N =	2	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 1	I =	5	sec
Cycle time		C =	108	sec
Sum(y)		Y =	0.558	
Loss time		L =	10	sec
Total Flow		=	1873	pcu
Co	= (1.5*L+5)/(1-Y)	=	45.3	sec
Cm	= L/(1-Y)	=	22.6	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	47.8	%
Cp	= 0.9*L/(0.9-Y)	=	26.3	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	46.3	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

P1
P2
P3 P4
P5

Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1,2	1	3.50		1	30		N	1965	91	273		364	0.25	1941			1941	0.187	0.187		33	33	0.615	37.934	34
1	1	3.50		1				2105		394		394	0.00	2105			2105	0.187			33	33	0.615	41.145	34
4,5	1	3.50		1	30		N	1965	104	253		357	0.29	1937			1937	0.185	0.187		32	33	0.606	37.294	34
5	1	3.50		1				2105		389		389	0.00	2105			2105	0.185			32	33	0.606	40.532	34
3	2	3.30		1	15		N	1945	41			41	1.00	1768			1768	0.023	0.184		4	32	0.078	4.315	27
6	2	3.50		1	15		N	1965			328	328	1.00	1786			1786	0.184			32	32	0.615	34.518	35

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m
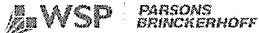
![WSP logo] **WSP** *PARSONS BRINCKERHOFF*	TRAFFIC SIGNAL CALCULATION		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J3 - Leighton Road / Caroline Hill Road / Pennington Street	Design Flow (Construction) - 2019 FORECAST TRAFFIC (PM)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Pennington Street

N ↑

[1] 171
[2] 630

Leighton Road   Leighton Road

467 [6]
581 [5]
49   44 [4]
[3]

Caroline Hill Road

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.659
Loss time		L =	10 sec
Total Flow		=	1942 pcu
Co	= (1.5*L+5)/(1-Y)	=	58.7 sec
Cm	= L/(1-Y)	=	29.3 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	25.1 %
Cp	= 0.9*L/(0.9-Y)	=	37.4 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	23.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	3	1	5	8	30	6	OK
P2	4	1	5	8	30	15	OK
P3	5	2	5	8	24	20	OK
P4	7	2	5	8	24	20	OK
P5	7	2	5	8	24	15	OK

P1
P2   P3   P4
P5

Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
																				10						
1,2	1	3.50		1	30		N	1965	171	211		382	0.45	1922			1922	0.199	0.199		30	30	0.727	42.453	40	1
1	1	3.50		1				2105		419		419	0.00	2105			2105	0.199			30	30	0.727	46.368	39	
4,5	1	3.50		1	30		N	1965	44	257		301	0.15	1951			1951	0.154	0.199		23	30	0.563	32.746	36	1
5	1	3.50		1				2105		324		324	0.00	2105			2105	0.154			23	30	0.563	35.336	35	
3	2	3.30		1	15		N	1945	49			49	1.00	1768			1768	0.028	0.261		4	39	0.077	4.705	23	1
6	2	3.50		1	15		N	1965			467	467	1.00	1786			1786	0.261			39	39	0.727	45.423	34	

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

J4
LEIGHTON ROAD / TUNG LO WAN ROAD

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By: KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Reference Flow - 2016 EXISTING TRAFFIC (AM)	Checked By: AL	Nov-16
		Reviewed By: CW	Nov-16

Causeway Road

N

[4]
369

Leighton Road

Causeway Road

1429 [3]

147 [2]

169
[1]

Tung Lo Wan Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	108	sec
Sum(y)		Y =	0.541	
Loss time		L =	10	sec
Total Flow		=	2114	pcu
Co	= (1.5*L+5)/(1-Y)	=	43.6	sec
Cm	= L/(1-Y)	=	21.8	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	52.5	%
Cp	= 0.9*L/(0.9-Y)	=	25.1	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	50.9	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

P3	P3			
P1	P2	P1		
Stage 1	Stage 2	Stage 3	Stage 4	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	147			147	1.00	1709			1709	0.086	0.226		16	41	0.227	14	23
3	1	3.50		3				6315		1429		1429	0.00	6315			6315	0.226			41	41	0.596	133	27
1	2	3.50		1	10		N	1965	169			169	1.00	1709			1709	0.099	0.099		18	18	0.596	21	46
4	3	3.50		1	10		N	1965			369	369	1.00	1709			1709	0.216	0.216		39	39	0.596	35	30

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m
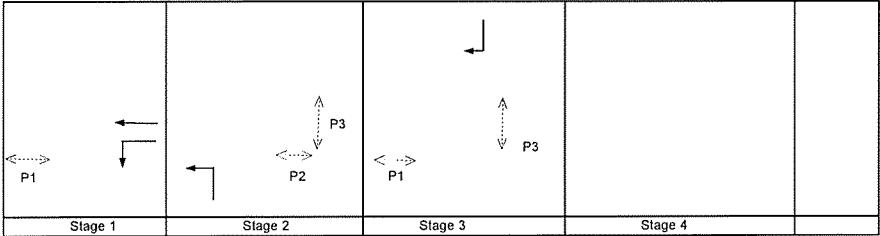
WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment

J4 - Causeway Road / Tung Lo Wan Road

Reference Flow - 2016 EXISTING TRAFFIC (Noon)

Project No.: 2531052A	Prepared By: KM	Nov-16
	Checked By: AL	Nov-16
	Reviewed By: CW	Nov-16

Causeway Road
Leighton Road
Causeway Road
Tung Lo Wan Road
N

[4] 454
1607 [3]
125 [2]
170 [1]

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.620
Loss time		L =	10 sec
Total Flow		=	2356 pcu
Co	= (1.5*L+5)/(1-Y)	=	52.6 sec
Cm	= L/(1-Y)	=	26.3 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	33.1 %
Cp	= 0.9*L/(0.9-Y)	=	32.1 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	31.8 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

Stage 1   P1
Stage 2   P2   P3
Stage 3   P1   P3
Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	125			125	1.00	1709			1709	0.073	0.254		12	40	0.196	12	24
3	1	3.50		3				6315		1607		1607	0.00	6315			6315	0.254			40	40	0.683	151	29
1	2	3.50		1	10		N	1965	170			170	1.00	1709			1709	0.099	0.099		16	16	0.683	23	51
4	3	3.50		1	10		N	1965			454	454	1.00	1709			1709	0.266	0.266		42	42	0.683	42	31

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By: KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Reference Flow - 2016 EXISTING TRAFFIC (PM)	Checked By: AL	Nov-16
		Reviewed By: CW	Nov-16

Causeway Road

[4] 444

Leighton Road

Causeway Road

N

4551 [3]

141 [2]

201
[1]

Tung Lo Wan Road

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	108 sec
Sum(y)	Y =	0.623
Loss time	L =	10 sec
Total Flow	=	2337 pcu
Co $= (1.5*L+5)/(1-Y)$	=	53.1 sec
Cm $= L/(1-Y)$	=	26.5 sec
Yult	=	0.825
R.C.ult $= (Yult-Y)/Y*100\%$	=	32.4 %
Cp $= 0.9*L/(0.9-Y)$	=	32.5 sec
Ymax $= 1-L/C$	=	0.907
R.C.(C) $= (0.9*Ymax-Y)/Y*100\%$	=	31.1 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

P3

P1   P2   P1   P3

Stage 1 | Stage 2 | Stage 3 | Stage 4
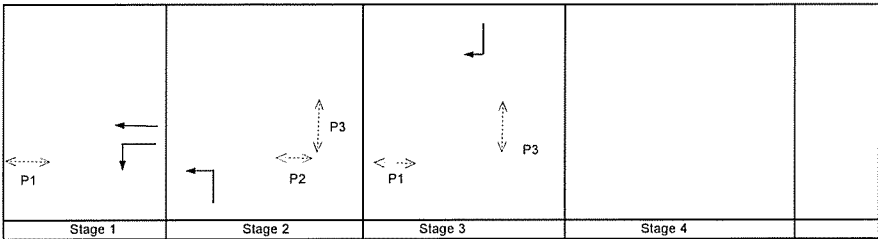
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
										m										10					
2	1	3.50		1	10		N	1965	141			141	1.00	1709			1709	0.083	0.246		13	39	0.231	14	25
3	1	3.50		3				6315		1551		1551	0.00	6315			6315	0.246			39	39	0.687	149	30
1	2	3.50		1	10		N	1965	201			201	1.00	1709			1709	0.118	0.118		19	19	0.687	26	48
4	3	3.50		1	10		N	1965			444	444	1.00	1709			1709	0.260	0.260		41	41	0.687	41	31

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By: KM — Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Reference Flow -2019 FORECAST TRAFFIC (AM)		Checked By: AL — Nov-16
			Reviewed By: CW — Nov-16

Causeway Road

[4]
375

Leighton Road

Causeway Road

←1452 [3]

172   ←149 [2]
[1]

Tung Lo Wan Road

N

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	108 sec
Sum(y)	Y =	0.550
Loss time	L =	10 sec
Total Flow	=	2148 pcu
Co = (1.5*L+5)/(1-Y)	=	44.4 sec
Cm = L/(1-Y)	=	22.2 sec
Yult	=	0.825
R.C.ult = (Yult-Y)/Y*100%	=	50.0 %
Cp = 0.9*L/(0.9-Y)	=	25.7 sec
Ymax = 1-L/C	=	0.907
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	48.5 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

Stage 1 — P1
Stage 2 — P2, P3
Stage 3 — P1, P3
Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	149			149	1.00	1709			1709	0.087	0.230		16	41	0.230	14	24
3	1	3.50		3				6315		1452		1452	0.00	6315			6315	0.230			41	41	0.606	135	27
1	2	3.50		1	10		N	1965	172			172	1.00	1709			1709	0.101	0.101		18	18	0.606	22	46
4	3	3.50		1	10		N	1965			375	375	1.00	1709			1709	0.219	0.219		39	39	0.606	36	31

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By: KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	Checked By: AL	Nov-16
		Reviewed By: CW	Nov-16

Causeway Road

[4]
461

N

Leighton Road

Causeway Road

1633 [3]

173   127 [2]
[1]

Tung Lo Wan Road

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	108 sec
Sum(y)	Y =	0.630
Loss time	L =	10 sec
Total Flow	=	2394 pcu
Co = (1.5*L+5)/(1-Y)	=	54.0 sec
Cm = L/(1-Y)	=	27.0 sec
Yult	=	0.825
R.C.ult = (Yult-Y)/Y*100%	=	31.0 %
Cp = 0.9*L/(0.9-Y)	=	33.3 sec
Ymax = 1-L/C	=	0.907
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	29.7 %
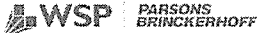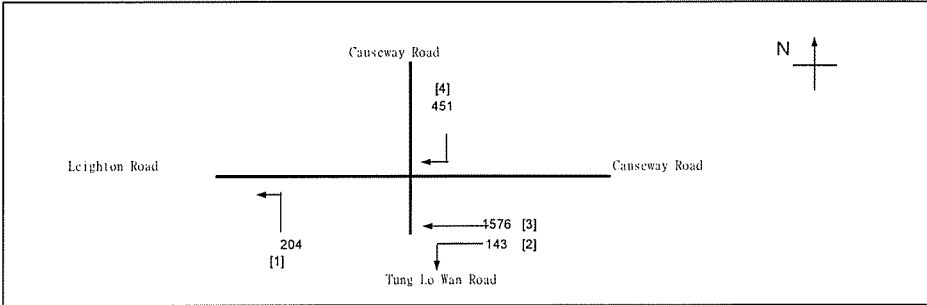
Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

Stage 1 | Stage 2 | Stage 3 | Stage 4
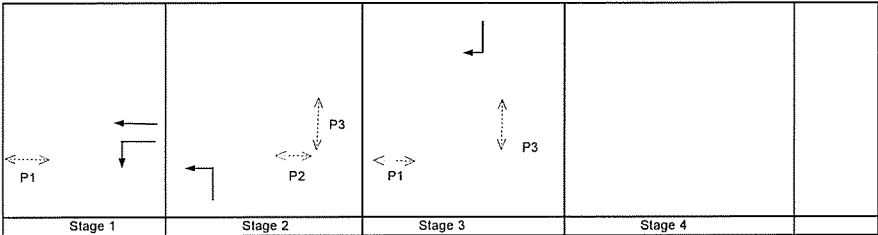
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	127			127	1.00	1709			1709	0.074	0.259		12	40	0.199	12	24
3	1	3.50		3			N	6315		1633		1633	0.00	6315			6315	0.259			40	40	0.694	154	29
1	2	3.50		1	10		N	1965	173			173	1.00	1709			1709	0.101	0.101		16	16	0.694	23	52
4	3	3.50		1	10		N	1965			461	461	1.00	1709			1709	0.270	0.270		42	42	0.694	42	31

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Reference Flow - 2019 FORECAST TRAFFIC (PM)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Causeway Road

N

[4]
451

Leighton Road

Causeway Road

1576 [3]
143 [2]
204
[1]

Tung Lo Wan Road

No. of stages per cycle	N =	3	
Intergreen Period Stage 1 - 2	I =	5	sec
Stage 2 - 3	I =	5	sec
Stage 3 - 1	I =	5	sec
Cycle time	C =	108	sec
Sum(y)	Y =	0.633	
Loss time	L =	10	sec
Total Flow	=	2374	pcu
Co = (1.5*L+5)/(1-Y)	=	54.5	sec
Cm = L/(1-Y)	=	27.2	sec
Yult	=	0.825	
R.C.ult = (Yult-Y)/Y*100%	=	30.4	%
Cp = 0.9*L/(0.9-Y)	=	33.7	sec
Ymax = 1-L/C	=	0.907	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	29.0	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

P3
P1
P2
P1
P3

| Stage 1 | Stage 2 | Stage 3 | Stage 4 |

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	143			143	1.00	1709			1709	0.084	0.250		13	39	0.234	14	25
3	1	3.50		3				6315		1576		1576	0.00	6315			6315	0.250			39	39	0.697	152	30
1	2	3.50		1	10		N	1965	204			204	1.00	1709			1709	0.119	0.119		18	18	0.697	27	49
4	3	3.50		1	10		N	1965			451	451	1.00	1709			1709	0.264	0.264		41	41	0.697	42	32

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Design Flow (Construction) -2019 FORECAST TRAFFIC (AM)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Causeway Road
[4]
375

Leighton Road   Causeway Road

1461 [3]
172   149 [2]
[1]
Tung Lo Wan Road

N

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	108	sec
Sum(y)		Y =	0.551	
Loss time		L =	10	sec
Total Flow		=	2157	pcu
Co	= (1.5*L+5)/(1-Y)	=	44.6	sec
Cm	= L/(1-Y)	=	22.3	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	49.6	%
Cp	= 0.9*L/(0.9-Y)	=	25.8	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	48.1	%
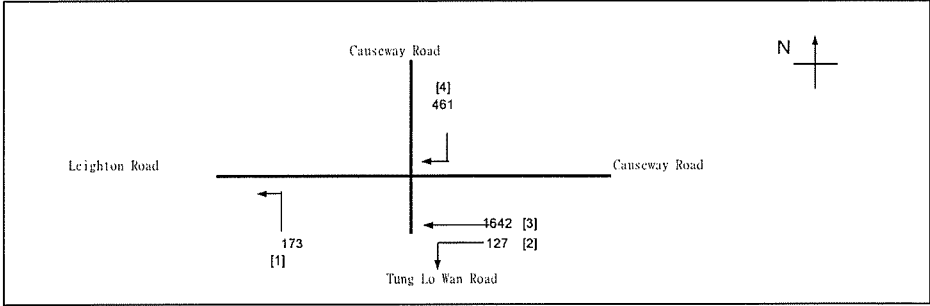
Pedestrian Phase	Width (m)	Stage	Green Time Required SG	Green Time Required FG	Green Time Provided (s) SG	Green Time Provided (s) FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

Stage 1	Stage 2	Stage 3	Stage 4
P1	P3 / P2	P3 / P1	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	149			149	1.00	1709			1709	0.087	0.231		15	41	0.229	14	23
3	1	3.50		3				6315		1461		1461	0.00	6315			6315	0.231			41	41	0.608	136	27
1	2	3.50		1	10		N	1965	172			172	1.00	1709			1709	0.101	0.101		18	18	0.608	22	46
4	3	3.50		1	10		N	1965			375	375	1.00	1709			1709	0.219	0.219		39	39	0.608	36	31

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J4 - Causeway Road / Tung Lo Wan Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Causeway Road

[4]
461

Leighton Road

Causeway Road

N

←1642 [3]
←127 [2]

173
[1]

Tung Lo Wan Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	108	sec
Sum(y)		Y =	0.631	
Loss time		L =	10	sec
Total Flow		=	2403	pcu
Co	= (1.5*L+5)/(1-Y)	=	54.2	sec
Cm	= L/(1-Y)	=	27.1	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	30.7	%
Cp	= 0.9*L/(0.9-Y)	=	33.5	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	29.4	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

P3 ↕		P3 ↕		
←---→ ┌→ P1 ↓	←--→ ↓ P2 ←┘	←-→ P1		
Stage 1	Stage 2	Stage 3	Stage 4	

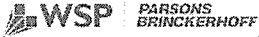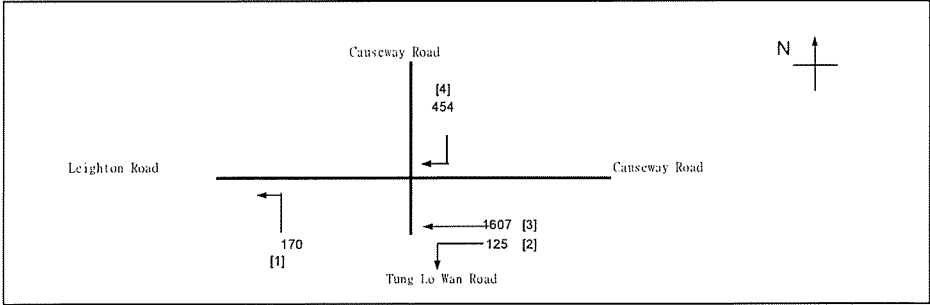| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	127			127	1.00	1709			1709	0.074	0.260		12	40	0.199	12	24
3	1	3.50		3				6315		1642		1642	0.00	6315			6315	0.260			40	40	0.695	154	29
1	2	3.50		1	10		N	1965	173			173	1.00	1709			1709	0.101	0.101		16	16	0.695	24	52
4	3	3.50		1	10		N	1965			461	461	1.00	1709			1709	0.270	0.270		42	42	0.695	42	31

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Causeway Road
Leighton Road
Causeway Road
Tung Lo Wan Road
[4] 451
1585 [3]
143 [2]
204 [1]

N

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	108 sec
Sum(y)		Y =	0.634
Loss time		L =	10 sec
Total Flow		=	2383 pcu
Co	= (1.5*L+5)/(1-Y)	=	54.7 sec
Cm	= L/(1-Y)	=	27.3 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	30.1 %
Cp	= 0.9*L/(0.9-Y)	=	33.9 sec
Ymax	= 1-L/C	=	0.907
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	28.7 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	4	1,3	10	5	79	6	OK
P2	4	2	7	8	8	15	OK
P3	14	2,3	9	11	49	20	OK

Stage 1 | Stage 2 | Stage 3 | Stage 4

P1 P2 P3 P1 P3

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
2	1	3.50		1	10		N	1965	143			143	1.00	1709			1709	0.084	0.251		13	39	0.233	14	25
3	1	3.50		3				6315		1585		1585	0.00	6315			6315	0.251			39	39	0.699	152	30
1	2	3.50		1	10		N	1965	204			204	1.00	1709			1709	0.119	0.119		18	18	0.699	27	49
4	3	3.50		1	10		N	1965			451	451	1.00	1709			1709	0.264	0.264		41	41	0.699	42	32

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

J5
EASTERN HOSPITAL ROAD / TUNG LO WAN
ROAD / KA NING PATH

Tung Lo Wan Road

N

[4] [3]
164 352

Tung Lo Wan Road

169   76
[1]   [2]

Eastern Hospital Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	106	sec
Sum(y)		Y =	0.259	
Loss time		L =	36	sec
Total Flow		=	761	pcu
Co	= (1.5*L+5)/(1-Y)	=	79.6	sec
Cm	= L/(1-Y)	=	48.6	sec
Yult		=	0.630	
R.C.ult	= (Yult-Y)/Y*100%	=	143.1	%
Cp	= 0.9*L/(0.9-Y)	=	50.6	sec
Ymax	= 1-L/C	=	0.660	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	129.4	%

| Pedestrian Phase | Width (m) | Green Time Required | | Green Time Provided (s) | | Check |
		Stage	SG	FG	SG	FG	
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

P2

P1
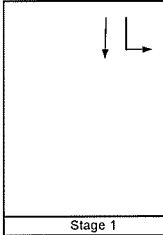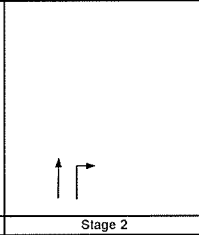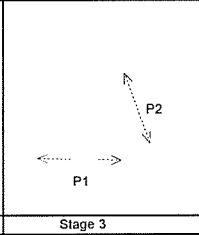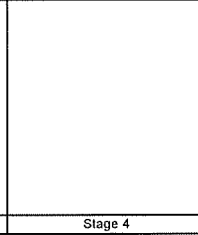
| Stage 1 | Stage 2 | Stage 3 | Stage 4 |

| Move-ment | Stage | Lane Width m. | Phase | No. of lane | Radius m. | O | N | Straight-Ahead Sat. Flow | m | | | Total Flow pcu/h | Proportion of Turning Vehicles | Sat. Flow pcu/h | Flare lane Length m. | Flare lane Effect | Revised Sat. Flow pcu/h | y | Greater y | L sec | g (required) sec | g (input) sec | Degree of Saturation X | Queue Length (m/lane) | Average Delay (sec) | |
									Left pcu/h	Straight pcu/h	Right pcu/h															
																					10						
3	1	3.50		1	18		N	1965	243			243	1.00	1814			1814	0.134	0.134		36	36	0.392	24	28	1
4	1	3.50		1	20			2105	109	164		273	0.40	2044			2044	0.134			36	36	0.392	27	28	
1,2	2	4.00		1	15		N	2015		169	76	245	0.31	1954			1954	0.125	0.125		34	34	0.392	25	29	1
	3		Ped																	26						

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By: KM — Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Reference Flow - 2016 EXISTING TRAFFIC (Noon)		Checked By: AL — Nov-16
			Reviewed By: CW — Nov-16

Tung Lo Wan Road

[4] [3]
172 407

Tung Lo Wan Road

170 102
[1] [2]

Eastern Hospital Road

N

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	106 sec
Sum(y)	Y =	0.290
Loss time	L =	36 sec
Total Flow	=	851 pcu
Co = (1.5*L+5)/(1-Y)	=	83.1 sec
Cm = L/(1-Y)	=	50.7 sec
Yult	=	0.630
R.C.ult = (Yult-Y)/Y*100%	=	117.0 %
Cp = 0.9*L/(0.9-Y)	=	53.1 sec
Ymax = 1-L/C	=	0.660
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	104.7 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Stage 1 | Stage 2 | Stage 3 | Stage 4

P2

P1

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
3	1	3.50		1	18		N	1965	273			273	1.00	1814			1814	0.150	0.150		36	36	0.440	26	28
4	1	3.50		1	20			2105	134	172		306	0.44	2038			2038	0.150			36	36	0.440	30	28
1,2	2	4.00		1	15		N	2015		170	102	272	0.38	1942			1942	0.140	0.140		34	34	0.440	27	30
	3		Ped																	26					

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		
J5 - Tung Lo Wan Road / Eastern Hospital Road		

		Project No.: 2531052A		
	Reference Flow - 2016 EXISTING TRAFFIC (PM)	Prepared By:	KM	Nov-16
		Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Tung Lo Wan Road

[4] [3]
116 469

Tung Lo Wan Road

201 54
[1] [2]
Eastern Hospital Road

N ↑

No. of stages per cycle		$N =$	3	
Intergreen Period	Stage 1 - 2	$I =$	5	sec
	Stage 2 - 3	$I =$	5	sec
	Stage 3 - 1	$I =$	5	sec
Cycle time		$C =$	106	sec
Sum(y)		$Y =$	0.282	
Loss time		$L =$	36	sec
Total Flow		$=$	840	pcu
Co	$= (1.5*L+5)/(1-Y)$	$=$	82.2	sec
Cm	$= L/(1-Y)$	$=$	50.2	sec
Yult		$=$	0.630	
R.C.ult	$= (Yult-Y)/Y*100\%$	$=$	123.3	%
Cp	$= 0.9*L/(0.9-Y)$	$=$	52.4	sec
Ymax	$= 1-L/C$	$=$	0.660	
R.C.(C)	$= (0.9*Ymax-Y)/Y*100\%$	$=$	110.6	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Stage 1	Stage 2	Stage 3	Stage 4
		P2 / P1	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
3	1	3.50		1	18		N	1965	277			277	1.00	1814			1814	0.153	0.153		38	38	0.427	26	27
4	1	3.50		1	20		N	2105	192	116		308	0.62	2011			2011	0.153			38	38	0.427	29	27
1,2	2	4.00		1	15		N	2015		201	54	255	0.21	1973			1973	0.129	0.129		32	32	0.427	26	31
	3		Ped																	26					

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By:	KM	Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Reference Flow - 2019 FORECAST TRAFFIC (AM)		Checked By:	AL	Nov-16
			Reviewed By:	CW	Nov-16

Tung Lo Wan Road

N

[4] [3]
166 357

Tung Lo Wan Road

172 77
[1] [2]

Eastern Hospital Road

No. of stages per cycle		N =	3
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 3		I =	5 sec
Stage 3 - 1		I =	5 sec
Cycle time		C =	106 sec
Sum(y)		Y =	0.263
Loss time		L =	36 sec
Total Flow		=	772 pcu
Co	= (1.5*L+5)/(1-Y)	=	80.1 sec
Cm	= L/(1-Y)	=	48.8 sec
Yult		=	0.630
R.C.ult	= (Yult-Y)/Y*100%	=	139.6 %
Cp	= 0.9*L/(0.9-Y)	=	50.9 sec
Ymax	= 1-L/C	=	0.660
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	126.0 %

Stage 1   Stage 2   Stage 3   Stage 4

P2

P1

Pedestrian Phase	Width (m)	Stage	Green Time Required		Green Time Provided (s)		Check
			SG	FG	SG	FG	
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
3	1	3.50		1	18		N	1965	246			246	1.00	1814			1814	0.136	0.136		36	36	0.398	24	28
4	1	3.50		1	20			2105	111	166		277	0.40	2044			2044	0.136			36	36	0.398	27	28
1,2	2	4.00		1	15		N	2015		172	77	249	0.31	1955			1955	0.127	0.127		34	34	0.398	25	29
	3		Ped																	26					

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Reference Flow - 2019 FORECAST TRAFFIC (Noon)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Tung Lo Wan Road

N ↑

[4]   [3]
175 413

Tung Lo Wan Road

173 103
[1] [2]

Eastern Hospital Road

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	106 sec
Sum(y)	Y =	0.295
Loss time	L =	36 sec
Total Flow	=	864 pcu
Co = (1.5*L+5)/(1-Y)	=	83.7 sec
Cm = L/(1-Y)	=	51.0 sec
Yult	=	0.630
R.C.ult = (Yult-Y)/Y*100%	=	113.8 %
Cp = 0.9*L/(0.9-Y)	=	53.5 sec
Ymax = 1-L/C	=	0.660
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	101.7 %

Stage 1   Stage 2   Stage 3 (P2, P1)   Stage 4

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
										m										10						1
3	1	3.50		1	18		N	1965	277			277	1.00	1814			1814	0.153	0.153		36	36	0.446	27	29	
4	1	3.50		1	20			2105	136	175		311	0.44	2038			2038	0.153	0.153		36	36	0.446	30	28	
1,2	2	4.00		1	15		N	2015		173	103	276	0.37	1943			1943	0.142	0.142		34	34	0.446	28	30	1
	3		Ped																	26						

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.: 2531052A	Prepared By:	KM	Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Reference Flow - 2019 FORECAST TRAFFIC (PM)		Checked By:	AL	Nov-16
			Reviewed By:	CW	Nov-16

Tung Lo Wan Road

[4] [3]
118 477

N

Tung Lo Wan Road

204   54
[1]   [2]
Eastern Hospital Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	106	sec
Sum(y)		Y =	0.286	
Loss time		L =	36	sec
Total Flow		=	853	pcu
Co	= (1.5*L+5)/(1-Y)	=	82.7	sec
Cm	= L/(1-Y)	=	50.4	sec
Yult		=	0.630	
R.C.ult	= (Yult-Y)/Y*100%	=	120.1	%
Cp	= 0.9*L/(0.9-Y)	=	52.8	sec
Ymax	= 1-L/C	=	0.660	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	107.6	%

Stage diagrams:

Stage 1 | Stage 2 | Stage 3 | Stage 4

P2
P1

Pedestrian Phase	Width (m)	Green Time Required		Green Time Provided (s)		Check
		Stage	SG	FG	SG	FG	
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straigh pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
3	1	3.50		1	18		N	1965	282			282	1.00	1814			1814	0.156	0.156		38	38	0.434	27	27
4	1	3.50		1	20			2105	195	118		313	0.62	2011			2011	0.156			38	38	0.434	30	27
1,2	2	4.00		1	15		N	2015		204	54	258	0.21	1974			1974	0.131	0.131		32	32	0.434	27	31
	3		Ped																	26					

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A · Prepared By: KM · Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (AM) · Checked By: AL · Nov-16
	Reviewed By: CW · Nov-16

Tung Lo Wan Road

[4] [3]
166 357

Tung Lo Wan Road

172 86
[1] [2]
Eastern Hospital Road

N

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	106 sec
Sum(y)		Y =	0.268
Loss time		L =	36 sec
Total Flow		=	781 pcu
Co	= (1.5*L+5)/(1-Y)	=	80.6 sec
Cm	= L/(1-Y)	=	49.2 sec
Yult		=	0.630
R.C.ult	= (Yult-Y)/Y*100%	=	135.2 %
Cp	= 0.9*L/(0.9-Y)	=	51.3 sec
Ymax	= 1-L/C	=	0.660
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	121.9 %

Stage 1 · Stage 2 · Stage 3 · Stage 4

P2
P1

Pedestrian Phase	Width (m)	Green Time Required		Green Time Provided (s)		Check
		Stage	SG	FG	SG	FG	
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	m Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)	
																				10						
3	1	3.50		1	18		N	1965	246			246	1.00	1814			1814	0.136	0.136		35	35	0.406	24	29	1
4	1	3.50		1	20			2105	111	166		277	0.40	2044			2044	0.136			35	35	0.406	27	28	
1,2	2	4.00		1	15		N	2015		172	86	258	0.33	1950			1950	0.132	0.132		35	35	0.406	26	29	1
	3		Ped																	26						

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment		Project No.:	2531052A	Prepared By:	KM	Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)			Checked By:	AL	Nov-16
				Reviewed By:	CW	Nov-16

Tung Lo Wan Road

N

[4]   [3]
175   413

Tung Lo Wan Road

173   112
[1]   [2]
Eastern Hospital Road

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	106	sec
Sum(y)		Y =	0.300	
Loss time		L =	36	sec
Total Flow		=	873	pcu
Co	= (1.5*L+5)/(1-Y)	=	84.2	sec
Cm	= L/(1-Y)	=	51.4	sec
Yult		=	0.630	
R.C.ult	= (Yult-Y)/Y*100%	=	110.2	%
Cp	= 0.9*L/(0.9-Y)	=	54.0	sec
Ymax	= 1-L/C	=	0.660	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	98.3	%

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Stage 1	Stage 2	Stage 3	Stage 4	

P2

P1

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
3	1	3.50		1	18		N	1965	277			277	1.00	1814			1814	0.153	0.153		36	36	0.454	27	29
4	1	3.50		1	20			2105	136	175		311	0.44	2038			2038	0.153			36	36	0.454	30	29
1,2	2	4.00		1	15		N	2015		173	112	285	0.39	1939			1939	0.147	0.147		34	34	0.454	28	30
	3		Ped																	26					

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

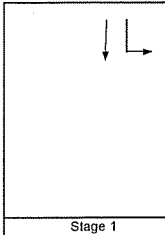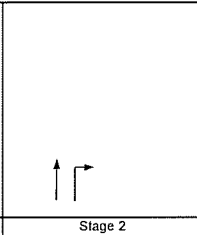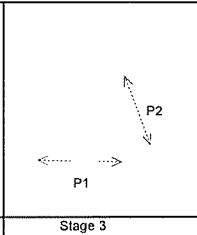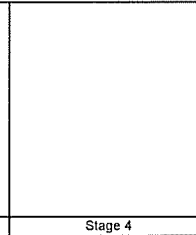|		INITIALS		DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	Project No.: 2531052A	Prepared By:	KM	Nov-16
J5 - Tung Lo Wan Road / Eastern Hospital Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (PM)	Checked By:	AL	Nov-16
		Reviewed By:	CW	Nov-16

Junction diagram:

Tung Lo Wan Road

[4] [3]
118 477

Tung Lo Wan Road

204 63
[1] [2]

Eastern Hospital Road

N ↑

No. of stages per cycle		N =	3
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 3		I =	5 sec
Stage 3 - 1		I =	5 sec
Cycle time		C =	106 sec
Sum(y)		Y =	0.291
Loss time		L =	36 sec
Total Flow		=	862 pcu
Co	= (1.5*L+5)/(1-Y)	=	83.2 sec
Cm	= L/(1-Y)	=	50.8 sec
Yult		=	0.630
R.C.ult	= (Yult-Y)/Y*100%	=	116.4 %
Cp	= 0.9*L/(0.9-Y)	=	53.2 sec
Ymax	= 1-L/C	=	0.660
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	104.1 %

Pedestrian Phase	Width (m)	Stage	Green Time Required SG	FG	Green Time Provided (s) SG	FG	Check
P1	7.5	3	7	8	24	6	OK
P2	10	3	8	14	94	15	OK

Stage diagrams: Stage 1 | Stage 2 | Stage 3 (P1, P2) | Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lan Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
3	1	3.50		1	18		N	1965	282			282	1.00	1814			1814	0.156	0.156	10	37	37	0.441	27	28
4	1	3.50		1	20			2105	195	118		313	0.62	2011			2011	0.156	0.156		37	37	0.441	30	28
1,2	2	4.00		1	15		N	2015		204	63	267	0.24	1969			1969	0.136	0.136		33	33	0.441	27	31
	3		Ped																	26					

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m
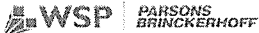
J6
EASTERN HOSPITAL ROAD / COTTON PATH

PRIORITY JUNCTION CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2016 EXISTING TRAFFIC (AM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Cotton Path

[3] [4]   (ARM B)   N

Graden   40 102

[2] 143 →

← 164 [1]

Eastern Hospital Road   Tung Lo Wan Road
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W =	MAJOR ROAD WIDTH
W cr =	CENTRAL RESERVE WIDTH
W b-a =	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c =	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b =	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a =	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a =	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c =	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b =	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D =	STREAM-SPECIFIC B-A
E =	STREAM-SPECIFIC B-C
F =	STREAM-SPECIFIC C-B
Y =	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W =	4.00	(metres)
W cr =	0	(metres)
q a-b =	0	(pcu/hr)
q a-c =	143	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =		(metres)
Vr c-b =		(metres)
q c-a =	164	(pcu/hr)
q c-b =	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	9.00	(metres)
W b-c =	9.00	(metres)
Vl b-a =	20	(metres)
Vr b-a =	25	(metres)
Vr b-c =	25	(metres)
q b-a =	40	(pcu/hr)
q b-c =	102	(pcu/hr)

GEOMETRIC FACTORS :

D =	1.2671987
E =	1.3744021
F =	0.5859548
Y =	0.862

| F for (Qb-ac) = | 0.7183099 |

THE CAPACITY OF MOVEMENT :

Q b-a =	697
Q b-c =	962 Q b-c (O) = 948.2
Q c-b =	410
Q b-ac =	869

TOTAL FLOW = 449 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0574
DFC b-c	=	0.1060
DFC c-b	=	0.0000

CRITICAL DFC   =   0.11

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2016 EXISTING TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Cotton Path

[3] [4]   (ARM B)   N

Graden   74 91

[2] 181 →

← 172 [1]

Eastern Hospital Road   Tung Lo Wan Road
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	181	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	172	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	74	(pcu/hr)
q b-c	=	91	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862

F for (Qb-ac) = 0.5515152

THE CAPACITY OF MOVEMENT :

Q b-a	=	680
Q b-c	=	946	Q b-c (O) =	920.3
Q c-b	=	403
Q b-ac	=	805

TOTAL FLOW = 518 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1088
DFC b-c	=	0.0962
DFC c-b	=	0.0000

CRITICAL DFC = 0.11

PRIORITY JUNCTION CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:		KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2016 EXISTING TRAFFIC (PM)	CHECKED BY:		AL	Nov-16
		REVIEWED BY:		CW	Nov-16

Cotton Path
[3] [4] (ARM B) N
Graden 36 88
[2] 167
116 [1]
Eastern Hospital Road (ARM A)
Tung Lo Wan Road (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W_{cr}	=	CENTRAL RESERVE WIDTH
W_{b-a}	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W_{b-c}	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W_{c-b}	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl_{b-a}	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr_{b-a}	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr_{b-c}	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr_{c-b}	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)
W	=	4.00	(metres)
W_{cr}	=	0	(metres)
q_{a-b}	=	0	(pcu/hr)
q_{a-c}	=	167	(pcu/hr)

MAJOR ROAD (ARM C)
W_{c-b}	=		(metres)
Vr_{c-b}	=		(metres)
q_{c-a}	=	116	(pcu/hr)
q_{c-b}	=	0	(pcu/hr)

MINOR ROAD (ARM B)
W_{b-a}	=	9.00	(metres)
W_{b-c}	=	9.00	(metres)
Vl_{b-a}	=	20	(metres)
Vr_{b-a}	=	25	(metres)
Vr_{b-c}	=	25	(metres)
q_{b-a}	=	36	(pcu/hr)
q_{b-c}	=	88	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862
F for (Q_{b-ac})	=	0.7096774

THE CAPACITY OF MOVEMENT :

Q_{b-a}	=	699
Q_{b-c}	=	952	Q_{b-c} (O) = 939.7
Q_{c-b}	=	406
Q_{b-ac}	=	861
TOTAL FLOW	=	407	(PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0515
DFC b-c	=	0.0924
DFC c-b	=	0.0000

CRITICAL DFC = 0.09

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
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J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2019 FORECAST TRAFFIC (AM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Cotton Path

[3] [4]   (ARM B)   N

Graden   41 104

[2] 145 →

← 167 [1]

Eastern Hospital Road   Tung Lo Wan Road
   (ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	145	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	167	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	41	(pcu/hr)
q b-c	=	104	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862

F for (Qb-ac) = 0.7172414

THE CAPACITY OF MOVEMENT :

Q b-a	=	695
Q b-c	=	961	Q b-c (O) = 946.8
Q c-b	=	410
Q b-ac	=	867

TOTAL FLOW = 457   (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0590
DFC b-c	=	0.1082
DFC c-b	=	0.0000

CRITICAL DFC   =   0.11

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	184	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	175	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	92	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862
F for (Qb-ac)	=	0.5508982

THE CAPACITY OF MOVEMENT :

Q b-a	=	678			
Q b-c	=	945	Q b-c (O) =	918.9	
Q c-b	=	403			
Q b-ac	=	803			
TOTAL FLOW	=	526	(PCU/HR)		

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1106
DFC b-c	=	0.0974
DFC c-b	=	0.0000

CRITICAL DFC   =   0.11

PRIORITY JUNCTION CALCULATION

	INITIALS	DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Reference Flow - 2019 FORECAST TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	170	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	118	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	37	(pcu/hr)
q b-c	=	89	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862

F for (Qb-ac)	=	0.7063492

THE CAPACITY OF MOVEMENT :

Q b-a	=	697			
Q b-c	=	951	Q b-c (O) =	938.4	
Q c-b	=	405			
Q b-ac	=	859			

TOTAL FLOW	=	414	(PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0531
DFC b-c	=	0.0936
DFC c-b	=	0.0000

CRITICAL DFC = 0.09

PRIORITY JUNCTION CALCULATION				INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.:	2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (AM)		CHECKED BY:	AL	Nov-16
			REVIEWED BY:	CW	Nov-16

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	$(1-0.0345W)$

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	145	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	167	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	41	(pcu/hr)
q b-c	=	113	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862
F for (Qb-ac)	=	0.7337662

THE CAPACITY OF MOVEMENT :

Q b-a	=	695		
Q b-c	=	961	Q b-c (O) =	946.8
Q c-b	=	410		
Q b-ac	=	872		

TOTAL FLOW = 466 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0590
DFC b-c	=	0.1176
DFC c-b	=	0.0000

CRITICAL DFC = 0.12

PRIORITY JUNCTION CALCULATION			INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Cotton Path

[3] [4] (ARM B) N

Graden 75 101

[2] 184

175 [1]

Eastern Hospital Road
(ARM A)

Tung Lo Wan Road
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

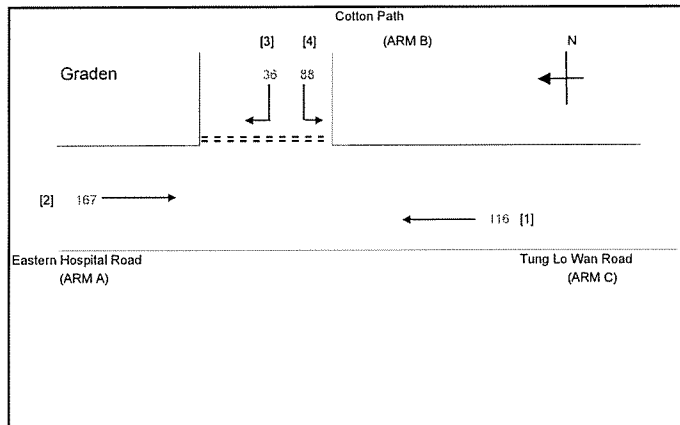|		
W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W =	4.00	(metres)
W cr =	0	(metres)
q a-b =	0	(pcu/hr)
q a-c =	184	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =		(metres)
Vr c-b =		(metres)
q c-a =	175	(pcu/hr)
q c-b =	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	9.00	(metres)
W b-c =	9.00	(metres)
Vl b-a =	20	(metres)
Vr b-a =	25	(metres)
Vr b-c =	25	(metres)
q b-a =	75	(pcu/hr)
q b-c =	101	(pcu/hr)

GEOMETRIC FACTORS :

D =	1.2671987	
E =	1.3744021	
F =	0.5859548	
Y =	0.862	
F for (Qb-ac) =	0.5738636	

THE CAPACITY OF MOVEMENT :

Q b-a =	678	
Q b-c =	945	Q b-c (O) = 918.9
Q c-b =	403	
Q b-ac =	809	
TOTAL FLOW =	535	(PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1106
DFC b-c	=	0.1069
DFC c-b	=	0.0000

CRITICAL DFC = 0.11

PRIORITY JUNCTION CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J6 - Cotton path / Eastern Hospital Road / Tung Lo Wan Road	Design Flow (Construction) - 2019 FORECAST TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Cotton Path
[3] [4] (ARM B) N
Graden 37 98

[2] 170 →
← 118 [1]

Eastern Hospital Road   Tung Lo Wan Road
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	4.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	170	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=		(metres)
Vr c-b	=		(metres)
q c-a	=	118	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	9.00	(metres)
W b-c	=	9.00	(metres)
Vl b-a	=	20	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	37	(pcu/hr)
q b-c	=	98	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.2671987
E	=	1.3744021
F	=	0.5859548
Y	=	0.862
F for (Qb-ac)	=	0.7259259

THE CAPACITY OF MOVEMENT :

Q b-a	=	697		
Q b-c	=	951	Q b-c (O) =	938.4
Q c-b	=	405		
Q b-ac	=	865		
TOTAL FLOW	=	423	(PCU/HR)	

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0531
DFC b-c	=	0.1030
DFC c-b	=	0.0000

CRITICAL DFC = 0.10

J7
CAROLINE HILL ROAD / COTTON PATH

PRIORITY JUNCTION CALCULATION

	INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2016 EXISTING TRAFFIC (AM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Caroline Hill Road
[6]   (ARM B)
71

[4]   18
[3]   70

Caroline Hill Road
(ARM A)

Cotton Path
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	18	(pcu/hr)
q a-c	=	70	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	71	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125
F for (Qb-ac)	=	1

THE CAPACITY OF MOVEMENT :

Q b-a	=	583		
Q b-c	=	625	Q b-c (O) =	625
Q c-b	=	423		
Q b-ac	=	625		
TOTAL FLOW	=	159	(PCU/HR)	

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1136
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1136

CRITICAL DFC   =   0.11

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2016 EXISTING TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	40	(pcu/hr)
q a-c	=	62	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	103	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125
F for (Qb-ac)	=	1

THE CAPACITY OF MOVEMENT :

Q b-a	=	582		
Q b-c	=	625	Q b-c (O) =	625
Q c-b	=	420		
Q b-ac	=	625		
TOTAL FLOW	=	205	(PCU/HR)	

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1648
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1648

CRITICAL DFC   =   0.16

PRIORITY JUNCTION CALCULATION

		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2016 EXISTING TRAFFIC (PM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Caroline Hill Road
[6]   (ARM B)
44

[4]   48
[3]   80

Caroline Hill Road
(ARM A)

Cotton Path
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W =	7.50	(metres)
W cr =	0	(metres)
q a-b =	48	(pcu/hr)
q a-c =	80	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	0.00	(metres)
Vr c-b =	0	(metres)
q c-a =	0	(pcu/hr)
q c-b =	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	5.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	30	(metres)
Vr b-a =	30	(metres)
Vr b-c =	30	(metres)
q b-a =	0	(pcu/hr)
q b-c =	44	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) =   1

THE CAPACITY OF MOVEMENT :

Q b-a =	577			
Q b-c =	620	Q b-c (O) =	620	
Q c-b =	416			
Q b-ac =	620			

TOTAL FLOW = 172 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.0710
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.0710

CRITICAL DFC   =   0.07

PRIORITY JUNCTION CALCULATION			INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.:	2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2019 FORECAST TRAFFIC (AM)		CHECKED BY:	AL	Nov-16
			REVIEWED BY:	CW	Nov-16

Caroline Hill Road

[6]   (ARM B)

72

[4] 18

[3] 71

Caroline Hill Road   Cotton Path
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	18	(pcu/hr)
q a-c	=	71	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	72	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) = 1

THE CAPACITY OF MOVEMENT :

Q b-a	=	582			
Q b-c	=	625	Q b-c (O) =	625
Q c-b	=	422			
Q b-ac	=	625			

TOTAL FLOW = 161 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1152
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1152

CRITICAL DFC   =   0.12

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Caroline Hill Road
[6]   (ARM B)
105

[4]   41
[3]   63

Caroline Hill Road   Cotton Path
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	41	(pcu/hr)
q a-c	=	63	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	105	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) = 1

THE CAPACITY OF MOVEMENT :

Q b-a	=	582			
Q b-c	=	624	Q b-c (O) =	624
Q c-b	=	420			
Q b-ac	=	624			

TOTAL FLOW   =   209   (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1683
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1683

CRITICAL DFC   =   0.17

PRIORITY JUNCTION CALCULATION	INITIALS	DATE

Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.:	2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Reference Flow - 2019 FORECAST TRAFFIC (PM)		CHECKED BY:	AL	Nov-16
			REVIEWED BY:	CW	Nov-16

Caroline Hill Road
[6]   (ARM B)
45

[4] 49
[3] 81

Caroline Hill Road
(ARM A)

Cotton Path
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

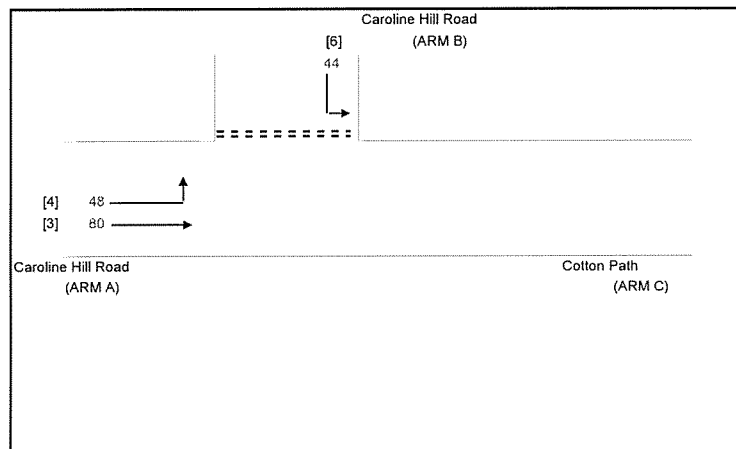|		
W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W =	7.50	(metres)
W cr =	0	(metres)
q a-b =	49	(pcu/hr)
q a-c =	81	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b =	0.00	(metres)
Vr c-b =	0	(metres)
q c-a =	0	(pcu/hr)
q c-b =	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a =	5.00	(metres)
W b-c =	3.00	(metres)
Vl b-a =	30	(metres)
Vr b-a =	30	(metres)
Vr b-c =	30	(metres)
q b-a =	0	(pcu/hr)
q b-c =	45	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) =   1

THE CAPACITY OF MOVEMENT :

Q b-a =	577		
Q b-c =	619	Q b-c (O) =	619
Q c-b =	416		
Q b-ac =	619		

TOTAL FLOW   =   175   (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.0727
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.0727

CRITICAL DFC   =   0.07

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Design Flow (Construction) - 2019 FORECAST TRAFFIC (AM)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Caroline Hill Road

[6] (ARM B)

72

[4] 18

[3] 80

Caroline Hill Road
(ARM A)

Cotton Path
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	18	(pcu/hr)
q a-c	=	80	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	72	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) = 1

THE CAPACITY OF MOVEMENT :

Q b-a	=	580	
Q b-c	=	623	Q b-c (O) = 623
Q c-b	=	421	
Q b-ac	=	623	

TOTAL FLOW = 170 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1156
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1156

CRITICAL DFC = 0.12

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY:	KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Design Flow (Construction) - 2019 FORECAST TRAFFIC (Noon)	CHECKED BY:	AL	Nov-16
		REVIEWED BY:	CW	Nov-16

Caroline Hill Road

[6]   (ARM B)
105

[4]   41
[3]   72

Caroline Hill Road   Cotton Path
(ARM A)   (ARM C)

NOTES : (GEOMETRIC INPUT DATA)

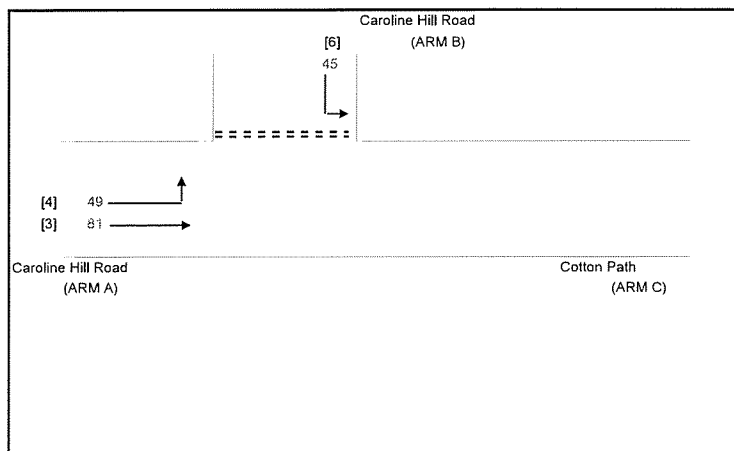|		
W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	41	(pcu/hr)
q a-c	=	72	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	105	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125

F for (Qb-ac) = 1

THE CAPACITY OF MOVEMENT :

Q b-a	=	580		
Q b-c	=	622	Q b-c (O) =	622
Q c-b	=	419		
Q b-ac	=	622		

TOTAL FLOW   =   218   (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1688
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.1688

CRITICAL DFC   =   0.17

PRIORITY JUNCTION CALCULATION		INITIALS	DATE
Demolition of Existing Superstructure at Caroline Hill Road Site - Traffic Impact Assesment	PROJECT NO.: 2531052A	PREPARED BY: KM	Nov-16
J7 - Caroline Hill Road / Cotton Path	Design Flow (Construction) - 2019 FORECAST TRAFFIC (PM)	CHECKED BY: AL	Nov-16
		REVIEWED BY: CW	Nov-16

Caroline Hill Road
[6] (ARM B)
45

[4] 49
[3] 90

Caroline Hill Road
(ARM A)

Cotton Path
(ARM C)

NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.50	(metres)
W cr	=	0	(metres)
q a-b	=	49	(pcu/hr)
q a-c	=	90	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.00	(metres)
W b-c	=	3.00	(metres)
Vl b-a	=	30	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	30	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	45	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.9610564
E	=	0.8628491
F	=	0.5859548
Y	=	0.74125
F for (Qb-ac)	=	1

THE CAPACITY OF MOVEMENT :

Q b-a	=	574		
Q b-c	=	617	Q b-c (O) =	617
Q c-b	=	415		
Q b-ac	=	617		
TOTAL FLOW	=	184	(PCU/HR)	

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.0729
DFC c-b	=	0.0000
DFC b-c (share lane)	=	0.0729

CRITICAL DFC   =   0.07

J8
CAUSEWAY ROAD / MORETON TERRACE

WSP | PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS	DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)

J8 - Causeway Road / Moreton Terrace

Reference Flow - 2017 EXISTING TRAFFIC (AM)

Project No.:	2531052A			
		Prepared By:	CC	Dec-17
		Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

N ↑

Causeway Road (West)   [2] 1403 →

Causeway Road (Easst)

↓1114 [1]

400   468
[3]   [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.609
Loss time		L =	10 sec
Total Flow		=	3384 pcu
Co	= (1.5*L+5)/(1-Y)	=	51.2 sec
Cm	= L/(1-Y)	=	25.6 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	35.4 %
Cp	= 0.9*L/(0.9-Y)	=	31.0 sec
Ymax	= 1-L/C	=	0.889
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	31.3 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	45	OK

Stage 1	Stage 2	Stage 3	Stage 4
P1			

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		1114		1114	0.00	4190			4190	0.266	0.343		35	45	0.532		
2	1	3.60		2			N	4090		1403		1403	0.00	4090			4090	0.343			45	45	0.686		
1	2	3.60		2	6		N	4090	400			400	1.00	3272			3272	0.122	0.267		16	35	0.314		
1	2	3.60		1	12		N	1975			468	468	1.00	1756			1756	0.267			35	35	0.686		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.:	2531052A	Prepared By:	CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Reference Flow - 2017 EXISTING TRAFFIC (Noon)		Checked By:	VN	Dec-17
			Reviewed By:	CW	Dec-17

N ↑

[2] 1383 →

Causeway Road (West)

Causeway Road (Easst)

1013 [1] ←

309   291
[3]   [4]

Moreton Terrace

No. of stages per cycle		N =	2	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 1	I =	5	sec
Cycle time		C =	90	sec
Sum(y)		Y =	0.504	
Loss time		L =	10	sec
Total Flow		=	2996	pcu
Co	= (1.5*L+5)/(1-Y)	=	40.3	sec
Cm	= L/(1-Y)	=	20.2	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	63.7	%
Cp	= 0.9*L/(0.9-Y)	=	22.7	sec
Ymax	= 1-L/C	=	0.889	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	58.7	%

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	54	OK

→			
←	← ┌		
<⋯⋯>			
P1			
Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		1013		1013	0.00	4190			4190	0.242	0.338		38	54	0.405		
2	1	3.60		2			N	4090		1383		1383	0.00	4090			4090	0.338			54	54	0.567		
1	2	3.60		2	6		N	4090	309			309	1.00	3272			3272	0.094	0.166		15	26	0.323		
1	2	3.60		1	12		N	1975			291	291	1.00	1756			1756	0.166			26	26	0.567		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Reference Flow - 2017 EXISTING TRAFFIC (PM)	Checked By: VN	Dec-17
		Reviewed By: CW	Dec-17

N ↑

Causeway Road (West)   [2] 1304 →   Causeway Road (Easst)

←
922 [1]

439   390
[3]   [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 1	I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.541
Loss time		L =	10 sec
Total Flow		=	3054 pcu
Co	= (1.5*L+5)/(1-Y)	=	43.5 sec
Cm	= L/(1-Y)	=	21.8 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	52.6 %
Cp	= 0.9*L/(0.9-Y)	=	25.0 sec
Ymax	= 1-L/C	=	0.889
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	48.0 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	47	OK

Stage 1 (P1) | **Stage 2** | **Stage 3** | **Stage 4**

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	m Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		922		922	0.00	4190			4190	0.220	0.319		33	47	0.420		1
2	1	3.60		2			N	4090		1304		1304	0.00	4090			4090	0.319			47	47	0.608		
1	2	3.60		2	6		N	4090	439			439	1.00	3272			3272	0.134	0.222		20	33	0.368		1
1	2	3.60		1	12		N	1975			390	390	1.00	1756			1756	0.222			33	33	0.608		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN   FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

				INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)			Project No.: 2531052A	Prepared By:	CC	Dec-17
J8 - Causeway Road / Moreton Terrace		Reference Flow -2019 FORECAST TRAFFIC (AM)		Checked By:	VN	Dec-17
				Reviewed By:	CW	Dec-17

No. of stages per cycle		N =	2	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 1	I =	5	sec
Cycle time		C =	90	sec
Sum(y)		Y =	0.623	
Loss time		L =	10	sec
Total Flow		=	3458.86	pcu
Co	= (1.5*L+5)/(1-Y)	=	53.0	sec
Cm	= L/(1-Y)	=	26.5	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	32.4	%
Cp	= 0.9*L/(0.9-Y)	=	32.5	sec
Ymax	= 1-L/C	=	0.889	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	28.4	%

Causeway Road (West) [2] 1434 → Causeway Road (Easst)

← 1139 [1]

408 478
[3] [4]

Moreton Terrace

N ↑

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	45	OK

Stage 1 Stage 2 Stage 3 Stage 4

P1

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		1139		1139	0.00	4190			4190	0.272	0.350		35	45	0.543		1
2	1	3.60		2			N	4090		1434		1434	0.00	4090			4090	0.350			45	45	0.701		
1	2	3.60		2	6		N	4090	408			408	1.00	3272			3272	0.125	0.272		16	35	0.321		1
1	2	3.60		1	12		N	1975			478	478	1.00	1756			1756	0.272			35	35	0.701		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP | PARSONS BRINCKERHOFF

INITIALS	
DATE	

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By:	CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Reference Flow -2019 FORECAST TRAFFIC (Noon)	Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

N ↑

Causeway Road (West)

[2] 1414 →

Causeway Road (Easst)

← 1035 [1]

316 297
[3] [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 1	I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.515
Loss time		L =	10 sec
Total Flow		=	3062.27 pcu
Co	= (1.5*L+5)/(1-Y)	=	41.2 sec
Cm	= L/(1-Y)	=	20.6 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	60.2 %
Cp	= 0.9*L/(0.9-Y)	=	23.4 sec
Ymax	= 1-L/C	=	0.889
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	55.3 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	54	OK

Stage 1	Stage 2	Stage 3	Stage 4
→ ← P1	⌐ ⌐		

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		1035		1035	0.00	4190			4190	0.247	0.346		38	54	0.414		1
2	1	3.60		2			N	4090		1414		1414	0.00	4090			4090	0.346			54	54	0.579		
1	2	3.60		2	6		N	4090	316			316	1.00	3272			3272	0.097	0.169		15	26	0.330		1
1	2	3.60		1	12		N	1975			297	297	1.00	1756			1756	0.169			26	26	0.579		

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP | **PARSONS BRINCKERHOFF**

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Reference Flow -2019 FORECAST TRAFFIC (PM)	Checked By: VN	Dec-17
		Reviewed By: CW	Dec-17

N ↑

[2] 1332 →
Causeway Road (West)   Causeway Road (Easst)

← 942 [1]

449 398
[3] [4]
Moreton Terrace

No. of stages per cycle		N =	2	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 1	I =	5	sec

Cycle time		C =	90	sec
Sum(y)		Y =	0.553	
Loss time		L =	10	sec
Total Flow		=	3121.56	pcu
Co	= (1.5*L+5)/(1-Y)	=	44.7	sec
Cm	= L/(1-Y)	=	22.4	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	49.3	%
Cp	= 0.9*L/(0.9-Y)	=	25.9	sec
Ymax	= 1-L/C	=	0.889	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	44.8	%

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	47	OK

Stage 1	Stage 2	Stage 3	Stage 4
P1			

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		942		942	0.00	4190			4190	0.225	0.326		33	47	0.429		
2	1	3.60		2			N	4090		1332		1332	0.00	4090			4090	0.326			47	47	0.622		
1	2	3.60		2	6		N	4090	449			449	1.00	3272			3272	0.137	0.227		20	33	0.376		
1	2	3.60		1	12		N	1975			398	398	1.00	1756			1756	0.227			33	33	0.622		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS	DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (AM)	Checked By: VN	Dec-17
		Reviewed By: CW	Dec-17

N ↑

[2] 1434 →

Causeway Road (West) ———————————————— Causeway Road (Easst)

←————1148 [1]

408 487
[3] [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period Stage 1 - 2		I =	5 sec
Stage 2 - 1		I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.628
Loss time		L =	10 sec
Total Flow		=	3476.86 pcu
Co	$= (1.5 \cdot L + 5)/(1-Y)$	=	53.8 sec
Cm	$= L/(1-Y)$	=	26.9 sec
Yult		=	0.825
R.C.ult	$= (Yult-Y)/Y \cdot 100\%$	=	31.3 %
Cp	$= 0.9 \cdot L/(0.9-Y)$	=	33.1 sec
Ymax	$= 1-L/C$	=	0.889
R.C.(C)	$= (0.9 \cdot Ymax-Y)/Y \cdot 100\%$	=	27.4 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	45	OK

Stage 1 (P1) | Stage 2 | Stage 3 | Stage 4

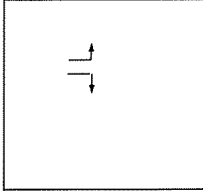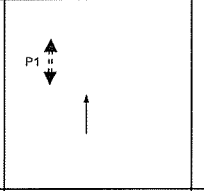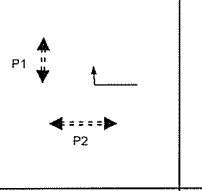| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		1148		1148	0.00	4190			4190	0.274	0.350		35	45	0.552		
2	1	3.60		2			N	4090		1434		1434	0.00	4090			4090	0.350			45	45	0.707		
1	2	3.60		2	6		N	4090	408			408	1.00	3272			3272	0.125	0.278		16	35	0.318		
1	2	3.60		1	12		N	1975			487	487	1.00	1756			1756	0.278			35	35	0.707		

NOTE: O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.:	2531052A	Prepared By:	CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (Noon)		Checked By:	VN	Dec-17
			Reviewed By:	CW	Dec-17

N ↑

[2] 1414 →

Causeway Road (West)

Causeway Road (Easst)

← 1044 [1]

316 306
[3] [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 1	I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.520
Loss time		L =	10 sec
Total Flow		=	3080.27 pcu
Co	= (1.5*L+5)/(1-Y)	=	41.7 sec
Cm	= L/(1-Y)	=	20.8 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	58.6 %
Cp	= 0.9*L/(0.9-Y)	=	23.7 sec
Ymax	= 1-L/C	=	0.889
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	53.8 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	53	OK

→
←
<----->
P1

Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																					10					
1	1	4.10		2			N	4190		1044		1044	0.00	4190			4190	0.249	0.346		38	53	0.422		
2	1	3.60		2			N	4090		1414		1414	0.00	4090			4090	0.346			53	53	0.585		
1	2	3.60		2	6		N	4090	316			316	1.00	3272			3272	0.097	0.175		15	27	0.324		
1	2	3.60		1	12		N	1975			306	306	1.00	1756			1756	0.175			27	27	0.585		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By:	CC	Dec-17
J8 - Causeway Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (PM)	Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

N ↑

[2] 1332 →

Causeway Road (West)

Causeway Road (Easst)

← 951 [1]

449 407
[3] [4]

Moreton Terrace

No. of stages per cycle		N =	2
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 1	I =	5 sec
Cycle time		C =	90 sec
Sum(y)		Y =	0.558
Loss time		L =	10 sec
Total Flow		=	3139.56 pcu
Co	= (1.5*L+5)/(1-Y)	=	45.2 sec
Cm	= L/(1-Y)	=	22.6 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	47.9 %
Cp	= 0.9*L/(0.9-Y)	=	26.3 sec
Ymax	= 1-L/C	=	0.889
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	43.4 %
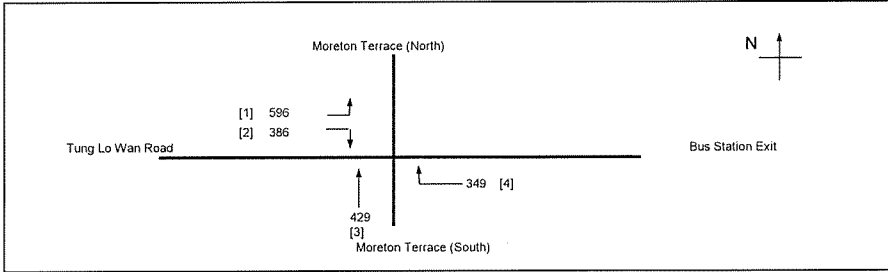
Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	11	1	10	47	OK

Stage 1	Stage 2	Stage 3	Stage 4
P1			

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				10					
1	1	4.10		2			N	4190		951		951	0.00	4190			4190	0.227	0.326		33	47	0.437		
2	1	3.60		2			N	4090		1332		1332	0.00	4090			4090	0.326			47	47	0.628		
1	2	3.60		2	6		N	4090	449			449	1.00	3272			3272	0.137	0.232		20	33	0.371		
1	2	3.60		1	12		N	1975			407	407	1.00	1756			1756	0.232			33	33	0.628		

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

J9
TUNG LO WAN ROAD / MORETON TERRACE

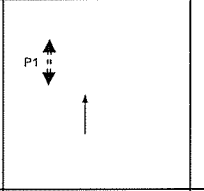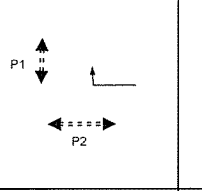|		
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC — Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow - 2017 EXISTING TRAFFIC (AM)	Checked By: VN — Dec-17
		Reviewed By: CW — Dec-17

Moreton Terrace (North)

N ↑

[1] 596 ↑
[2] 386 →↓

Tung Lo Wan Road

Bus Station Exit

349 [4]

429
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	105 sec
Sum(y)		Y =	0.468
Loss time		L =	15 sec
Total Flow		=	1758.5 pcu
Co	= (1.5*L+5)/(1-Y)	=	51.7 sec
Cm	= L/(1-Y)	=	28.2 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	68.3 %
Cp	= 0.9*L/(0.9-Y)	=	31.2 sec
Ymax	= 1-L/C	=	0.857
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	64.9 %
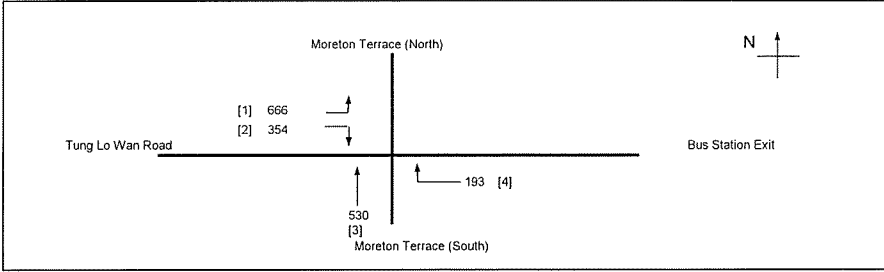
Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	38	OK
P2	11	3	10	17	OK

Stage 1 | P1 ‖ | P1 ‖ | Stage 4
Stage 2 | P2
Stage 3
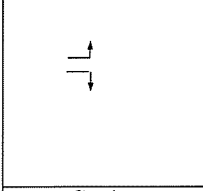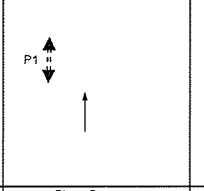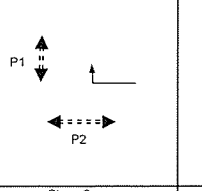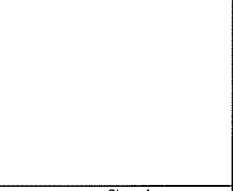
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	472			472	1.00	1742			1742	0.271	0.271		52	52	0.546		
2	1	3.60		1	31		N	1975	123		386	509	1.00	1884			1884	0.270			52	52	0.544		
3	2	3.20		2			N	4010		429		429	0.00	4010			4010	0.107	0.107		21	21	0.546		
4	3	3.50		2	31		N	4070			349	349	1.00	3882			3882	0.090	0.090		17	17	0.546		

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF

TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.:	2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow - 2017 EXISTING TRAFFIC (Noon)		Checked By:	VN	Dec-17
			Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N

[1] 666
[2] 354

Tung Lo Wan Road

Bus Station Exit

193 [4]

530
[3]
Moreton Terrace (South)

No. of stages per cycle			$N =$	3
Intergreen Period	Stage 1 - 2		$I =$	5 sec
	Stage 2 - 3		$I =$	5 sec
	Stage 3 - 1		$I =$	5 sec
Cycle time			$C =$	105 sec
Sum(y)			$Y =$	0.463
Loss time			$L =$	15 sec
Total Flow			$=$	1743 pcu
Co	$= (1.5 \cdot L + 5)/(1-Y)$		$=$	51.2 sec
Cm	$= L/(1-Y)$		$=$	27.9 sec
Yult			$=$	0.788
R.C.ult	$= (Yult-Y)/Y \cdot 100\%$		$=$	70.0 %
Cp	$= 0.9 \cdot L/(0.9-Y)$		$=$	30.9 sec
Ymax	$= 1-L/C$		$=$	0.857
R.C.(C)	$= (0.9 \cdot Ymax-Y)/Y \cdot 100\%$		$=$	66.5 %
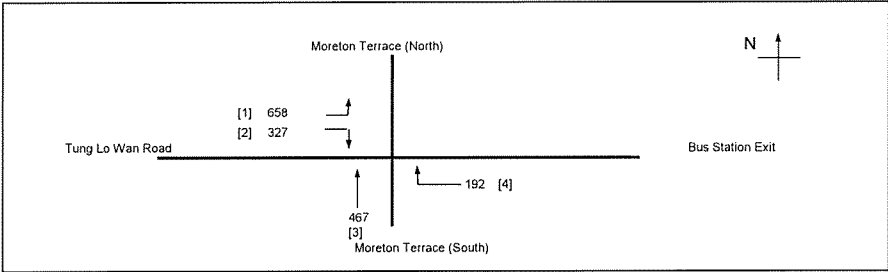
Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	35	OK
P2	11	3	10	10	Not OK!

P1 || P1 ||

P2

Stage 1	Stage 2	Stage 3	Stage 4
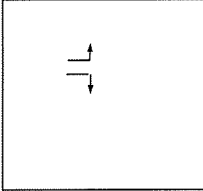
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	490			490	1.00	1742			1742	0.281	0.281		55	55	0.540		1
2	1	3.60		1	31		N	1975	176		354	530	1.00	1884			1884	0.281			55	55	0.540		
3	2	3.20		2			N	4010		530		530	0.00	4010			4010	0.132	0.132		26	26	0.540		1
4	3	3.50		2	31		N	4070			193	193	1.00	3882			3882	0.050	0.050		10	10	0.540		1

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRIAN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.:	2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow - 2017 EXISTING TRAFFIC (PM)		Checked By:	VN	Dec-17
			Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N ↑

[1] 658 ↑
[2] 327 ↓

Tung Lo Wan Road

Bus Station Exit

192 [4]

467
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	105 sec
Sum(y)		Y =	0.437
Loss time		L =	15 sec
Total Flow		=	1643 pcu
Co	$= (1.5 \cdot L + 5)/(1-Y)$	=	48.9 sec
Cm	$= L/(1-Y)$	=	26.7 sec
Yult		=	0.788
R.C.ult	$= (Yult-Y)/Y \cdot 100\%$	=	80.1 %
Cp	$= 0.9 \cdot L/(0.9-Y)$	=	29.2 sec
Ymax	$= 1-L/C$	=	0.857
R.C.(C)	$= (0.9 \cdot Ymax-Y)/Y \cdot 100\%$	=	76.4 %
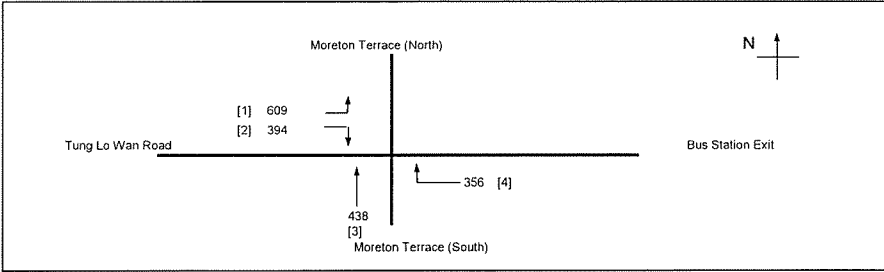
Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	34	OK
P2	11	3	10	10	OK

Stage 1 | Stage 2 (P1) | Stage 3 (P1, P2) | Stage 4
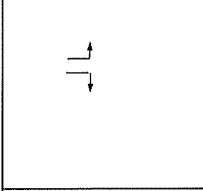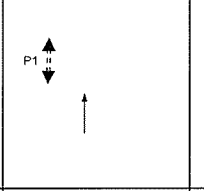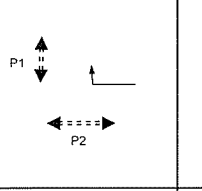
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	473			473	1.00	1742			1742	0.272	0.272		56	56	0.510		1
2	1	3.60		1	31		N	1975	185		327	512	1.00	1884			1884	0.272			56	56	0.510		1
3	2	3.20		2			N	4010		467		467	0.00	4010			4010	0.116	0.116		24	24	0.510		1
4	3	3.50		2	31		N	4070			192	192	1.00	3882			3882	0.049	0.049		10	10	0.510		1

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

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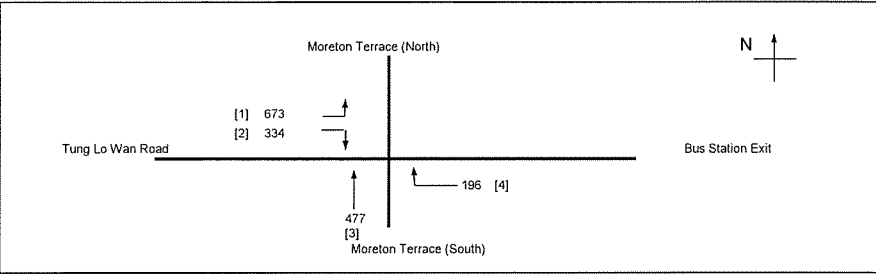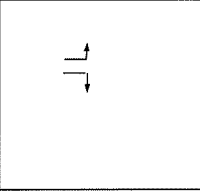|		INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow -2019 FORECAST TRAFFIC (AM)	Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N

[1] 609
[2] 394

Tung Lo Wan Road

Bus Station Exit

356 [4]

438
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	105	sec
Sum(y)		Y =	0.478	
Loss time		L =	15	sec
Total Flow		=	1798.24	pcu
Co	= (1.5*L+5)/(1-Y)	=	52.7	sec
Cm	= L/(1-Y)	=	28.7	sec
Yult		=	0.788	
R.C.ult	= (Yult-Y)/Y*100%	=	64.8	%
Cp	= 0.9*L/(0.9-Y)	=	32.0	sec
Ymax	= 1-L/C	=	0.857	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	61.4	%
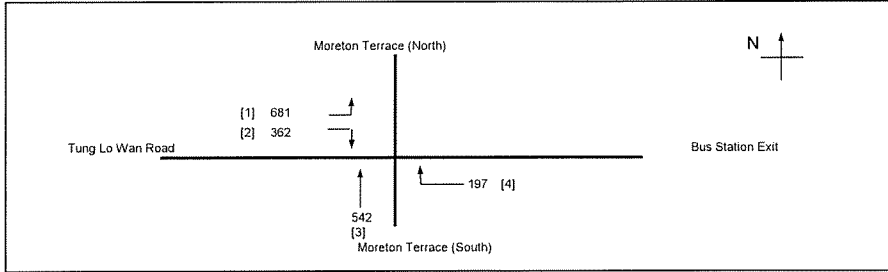
	Stage 1	Stage 2	Stage 3	Stage 4
		P1	P1	
			P2	

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	38	OK
P2	11	3	10	17	OK
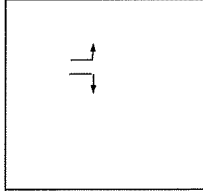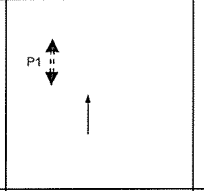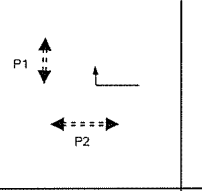
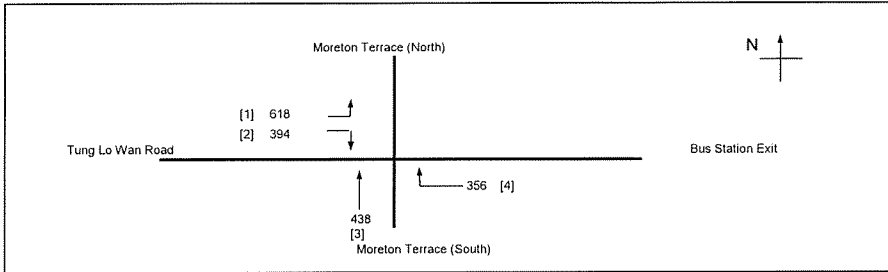| Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	482			482	1.00	1742			1742	0.277	0.277		52	52	0.558		1
2	1	3.60		1	31		N	1975	127		394	521	1.00	1884			1884	0.277	0.277		52	52	0.558		1
3	2	3.20		2			N	4010		438		438	0.00	4010			4010	0.109	0.109		21	21	0.558		1
4	3	3.50		2	31		N	4070			356	356	1.00	3882			3882	0.092	0.092		17	17	0.558		1

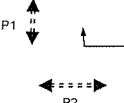NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow -2019 FORECAST TRAFFIC (Noon)	Checked By: VN	Dec-17
		Reviewed By: CW	Dec-17

Moreton Terrace (North)

N ↑

[1] 681
[2] 362

Tung Lo Wan Road

Bus Station Exit

197 [4]

542
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	105 sec
Sum(y)		Y =	0.474
Loss time		L =	15 sec
Total Flow		=	1781.82 pcu
Co	$= (1.5 \cdot L + 5)/(1-Y)$	=	52.2 sec
Cm	$= L/(1-Y)$	=	28.5 sec
Yult		=	0.788
R.C.ult	$= (Yult-Y)/Y \cdot 100\%$	=	66.3 %
Cp	$= 0.9 \cdot L/(0.9-Y)$	=	31.7 sec
Ymax	$= 1-L/C$	=	0.857
R.C.(C)	$= (0.9 \cdot Ymax-Y)/Y \cdot 100\%$	=	62.9 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	35	OK
P2	11	3	10	10	Not OK!

Stage 1	Stage 2	Stage 3	Stage 4
	P1	P1 P2	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	501			501	1.00	1742			1742	0.288	0.288		55	55	0.552		
2	1	3.60		1	31		N	1975	180		362	542	1.00	1884			1884	0.288			55	55	0.552		
3	2	3.20		2			N	4010		542		542	0.00	4010			4010	0.135	0.135		26	26	0.552		
4	3	3.50		2	31		N	4070			197	197	1.00	3882			3882	0.051	0.051		10	10	0.552		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

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TRAFFIC SIGNAL CALCULATION

	INITIALS		DATE

Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.:	2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Reference Flow -2019 FORECAST TRAFFIC (PM)		Checked By:	VN	Dec-17
			Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N

Tung Lo Wan Road

[1] 673
[2] 334

Bus Station Exit

196 [4]

477
[3]
Moreton Terrace (South)

No. of stages per cycle			N =	3	
Intergreen Period	Stage 1 - 2		I =	5	sec
	Stage 2 - 3		I =	5	sec
	Stage 3 - 1		I =	5	sec
Cycle time			C =	105	sec
Sum(y)			Y =	0.447	
Loss time			L =	15	sec
Total Flow			=	1678.79	pcu
Co	= (1.5*L+5)/(1-Y)		=	49.7	sec
Cm	= L/(1-Y)		=	27.1	sec
Yult			=	0.788	
R.C.ult	= (Yult-Y)/Y*100%		=	76.2	%
Cp	= 0.9*L/(0.9-Y)		=	29.8	sec
Ymax	= 1-L/C		=	0.857	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%		=	72.6	%

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	34	OK
P2	11	3	10	10	OK

P1 " P1 "

P2

Stage 1	Stage 2	Stage 3	Stage 4

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	483			483	1.00	1742			1742	0.277	0.277		56	56	0.521		1
2	1	3.60		1	31		N	1975	189		334	523	1.00	1884			1884	0.277			56	56	0.521		
3	2	3.20		2			N	4010		477		477	0.00	4010			4010	0.119	0.119		24	24	0.521		1
4	3	3.50		2	31		N	4070			196	196	1.00	3882			3882	0.050	0.050		10	10	0.521		1

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

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TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (AM)	Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N

Tung Lo Wan Road

[1] 618
[2] 394

Bus Station Exit

356 [4]

438
[3]
Moreton Terrace (South)

No. of stages per cycle	N =	3
Intergreen Period Stage 1 - 2	I =	5 sec
Stage 2 - 3	I =	5 sec
Stage 3 - 1	I =	5 sec
Cycle time	C =	105 sec
Sum(y)	Y =	0.481
Loss time	L =	15 sec
Total Flow	=	1807.24 pcu
Co = (1.5*L+5)/(1-Y)	=	53.0 sec
Cm = L/(1-Y)	=	28.9 sec
Yult	=	0.788
R.C.ult = (Yult-Y)/Y*100%	=	63.8 %
Cp = 0.9*L/(0.9-Y)	=	32.2 sec
Ymax = 1-L/C	=	0.857
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	60.5 %

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	38	OK
P2	11	3	10	17	OK

Stage 1	Stage 2	Stage 3	Stage 4
	P1	P1 P2	

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	487			487	1.00	1742			1742	0.280	0.280		52	52	0.561		
2	1	3.60		1	31		N	1975	131		394	525	1.00	1884			1884	0.279	0.279		52	52	0.559		
3	2	3.20		2			N	4010		438		438	0.00	4010			4010	0.109	0.109		20	20	0.561		
4	3	3.50		2	31		N	4070			356	356	1.00	3882			3882	0.092	0.092		17	17	0.561		

NOTE :   O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

TRAFFIC SIGNAL CALCULATION

WSP | **PARSONS BRINCKERHOFF**

	INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By: CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (Noon)	Checked By: VN	Dec-17
		Reviewed By: CW	Dec-17

Moreton Terrace (North)

N

Tung Lo Wan Road

[1] 690
[2] 362

Bus Station Exit

197 [4]

542
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3	
Intergreen Period	Stage 1 - 2	I =	5	sec
	Stage 2 - 3	I =	5	sec
	Stage 3 - 1	I =	5	sec
Cycle time		C =	105	sec
Sum(y)		Y =	0.476	
Loss time		L =	15	sec
Total Flow		=	1790.82	pcu
Co	= (1.5*L+5)/(1-Y)	=	52.5	sec
Cm	= L/(1-Y)	=	28.6	sec
Yult		=	0.788	
R.C.ult	= (Yult-Y)/Y*100%	=	65.4	%
Cp	= 0.9*L/(0.9-Y)	=	31.9	sec
Ymax	= 1-L/C	=	0.857	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	62.0	%

Stage 1 | Stage 2 (P1) | Stage 3 (P1, P2) | Stage 4

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	35	OK
P2	11	3	10	10	Not OK!

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	505			505	1.00	1742			1742	0.290	0.290		55	55	0.555		1
2	1	3.60		1	31		N	1975	185		362	547	1.00	1884			1884	0.290			55	55	0.556		1
3	2	3.20		2			N	4010		542		542	0.00	4010			4010	0.135	0.135		26	26	0.556		1
4	3	3.50		2	31		N	4070			197	197	1.00	3882			3882	0.051	0.051		10	10	0.556		1

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

WSP | PARSONS BRINCKERHOFF — TRAFFIC SIGNAL CALCULATION

		INITIALS		DATE
Demolition of existing superstructures at Caroline Hill Road site - Traffic Impact Assessment Report (with Supplementary Junction Assessment)	Project No.: 2531052A	Prepared By:	CC	Dec-17
J9 - Tung Lo Wan Road / Moreton Terrace	Design Flow (Construction) -2019 FORECAST TRAFFIC (PM)	Checked By:	VN	Dec-17
		Reviewed By:	CW	Dec-17

Moreton Terrace (North)

N ↑

[1] 682 ↑
[2] 334 ⌐→

Tung Lo Wan Road

Bus Station Exit

─── 196 [4]

477
[3]
Moreton Terrace (South)

No. of stages per cycle		N =	3
Intergreen Period	Stage 1 - 2	I =	5 sec
	Stage 2 - 3	I =	5 sec
	Stage 3 - 1	I =	5 sec
Cycle time		C =	105 sec
Sum(y)		Y =	0.450
Loss time		L =	15 sec
Total Flow		=	1687.79 pcu
Co	= (1.5*L+5)/(1-Y)	=	50.0 sec
Cm	= L/(1-Y)	=	27.3 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	75.2 %
Cp	= 0.9*L/(0.9-Y)	=	30.0 sec
Ymax	= 1-L/C	=	0.857
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	71.6 %

Stage 1 | Stage 2 (P1) | Stage 3 (P1 / P2) | Stage 4

Pedestrian Phase	Width (m)	Stage	Green Time Required	Green Time Provided (s)	Check
P1	8	2,3	7	34	OK
P2	11	3	10	10	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Left pcu/h	Straight pcu/h	Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queue Length (m/lane)	Average Delay (sec)
																				15					
1	1	3.60		1	7			2115	487			487	1.00	1742			1742	0.280	0.280		56	56	0.524		1
2	1	3.60		1	31		N	1975	194		334	528	1.00	1884			1884	0.280			56	56	0.525		
3	2	3.20		2			N	4010		477		477	0.00	4010			4010	0.119	0.119		24	24	0.525		1
4	3	3.50		2	31		N	4070			196	196	1.00	3882			3882	0.050	0.050		10	10	0.525		1

NOTE : O - OPPOSING TRAFFIC   N - NEAR SIDE LANE   SG - STEADY GREEN FG - FLASHING GREEN   PEDESTRAIN WALKING SPEED = 1.2m/s   QUEUING LENGTH = AVERAGE QUEUE * 6m

ABOUT WSP | PARSONS BRINCKERHOFF

WSP and Parsons Brinckerhoff have combined and are now one of the world's leading engineering professional services consulting firms. Together we provide services to transform the built environment and restore the natural environment, and our expertise ranges from environmental remediation to urban planning, from engineering iconic buildings to designing sustainable transport networks, and from developing the energy sources of the future to enabling new ways of extracting essential resources. We have approximately 31,000 employees, including engineers, technicians, scientists, architects, planners, surveyors, program and construction management professionals, and various environmental experts. We are based in more than 500 offices across 39 countries worldwide.

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