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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

14th October 2020 Reference: 200379.02FB

Lane Cove Council
48 Longueville Road
Lane Cove

LETTER OF RESPONSE REGARDING
MIXED USE DEVELOPMENT
AT 4 - 18 NORTHWOOD ROAD & 274 - 274A LONGUEVILLE ROAD, LANE COVE

Greg

Reference is made to your request to provide supplementary information to assist Council in determining the development application for DA113/2020. The comments made by Council relevant to traffic and parking are outlined within Council's Traffic Engineers *Memorandum – Referral Request and Response* dated 23rd September 2020 and in an email dated 23rd September 2020 and 12th October 2020. A response has been provided to each of the comments made by Council (shown *italicised*), with the amended plans shown in **Annexure A** for reference.

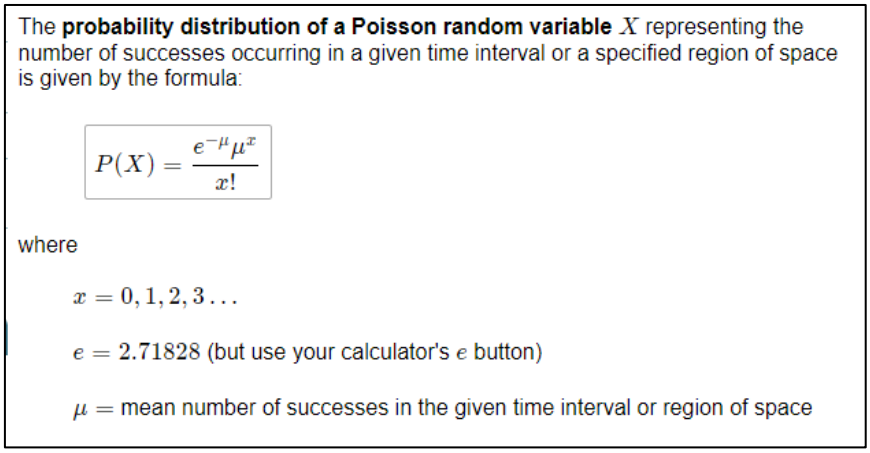
> *A safety and functionality report for the traffic signals for the one-way ramp has been asked for*

MTE Response: A queuing assessment has been undertaken to determine the queue impacts as a result of the single lane ramp. The following are relevant to note:

- The basement serving the single lane ramp will be restricted to staff parking only;
- It will be assumed to be conservative that all spaces will generate 1 vehicle trip in a single peak hour (highly conservative) resulting in a traffic generation of 44 vehicle trips
- The inbound and outbound distribution from the car park will follow that of typical office development being the following:
    - AM peak hour period – 90% inbound (40), 10% outbound (4);
    - PM peak hour period – 10% inbound (4), 90% outbound (40).

As noted above, staff development traffic is highly tidal as such to determine any sort of queuing that may occur due to the single lane ramp, the probability of a vehicle exiting the Level 1 Basement and entering the Level 1 Basement needs to be determined. Outside this conflict there is no conflict between opposing vehicle streams, such that there would be no vehicle queues.

To determine the conflict of opposing vehicle streams, reference is made to the Poisson Distribution as shown in **Figure 1** below. Which allows the determination of an event occurring over a given time interval or a specified region of space, which in our case is the time it would take a vehicle to travel along the one-way section of ramp.



The **probability distribution of a Poisson random variable** X representing the number of successes occurring in a given time interval or a specified region of space is given by the formula:

$$P(X) = \frac{e^{-\mu}\mu^x}{x!}$$

where

$x = 0, 1, 2, 3 \ldots$

$e = 2.71828$ (but use your calculator's e button)

$\mu =$ mean number of successes in the given time interval or region of space

FIGURE 1: POISSON DISTRIBUTION

The above determination of conflict between opposing vehicle streams has been undertaken based upon the following considerations:

- A distance of 50m between passing opportunities (i.e. the distance where access is restricted to one vehicle);
- Based upon the 50m and a travel speed of 5km/h (highly conservative), the resulting time it takes to travel the 50m distance is 36 seconds;
- Adopting an addition factor of safety of 4 seconds for the light to turn from red to green or vice versa results in a travel time of 40 seconds;
- Inbound traffic of 40 vehicle trips;
- Outbound traffic of 4 vehicle trips.

Adopting the above time of conflict, vehicle trips and direction, the probability of conflict along the 50m length of assessed area is 3.52%. As shown, this is a low chance of conflict between vehicle streams, resulting in one conflict occurring every 28 AM peak hour period. When that conflict does occur, 92% of the time there would only be one vehicle waiting or 8% of the time there would be more than one vehicle waiting for the inbound traffic stream (40 vehicle trips). It should be noted that the 99th percentile queue is two (2) vehicles.

The above would also be the same during the PM peak hour period, but in the reverse direction, i.e. 4 inbound vehicle trips and 40 outbound (98th percentile queue of 2 vehicles when event occurs) vehicle trips.

Overall, the probability of the event occurring is low and the likelihood that there would be two (2) vehicles waiting due to the event would also be extremely rare. Considering this, the operation of the signals is deemed safe which will not have an adverse impact to other users of the car park.

It is recommended that *AGD Systems* be approached to provide a functionality report, which is in the process of occurring which will be provided to Council when available. It is expected that priority to entering vehicles will occur, that is the signal will show a green light on parking Level 2 and a red

light on parking Level 1 and will only change once a vehicle is waiting within the loading bay on parking Level 1.

> *The upgrade to the River Road / Longueville Road intersection needs to be reflected in their traffic model.*

MTE Response: Modifications have been undertaken to the SIDRA model to reflect the upgraded conditions, specifically the following:

- Removal of the left turn left (high angle) slip lane from River Road West into Longueville Road;
- Addition of a right turn lane from Longueville Road into River Road West;
- Pedestrian signal control over the full length of the approach to the signalised intersection from Longueville Road.

It is relevant to note that the right turn volume from Longueville Road has been left as a single vehicle (1), as this is a new vehicle movement from existing conditions and it is not known the displaced traffic volume that will use this movement compared to existing observed traffic.

The updated SIDRA model is shown in **Table 1** below, with detailed SIDRA outputs reproduced in **Annexure B** for reference. The implemented TCS plan has also been modified to reflect that as shown in **Annexure C** for reference.

It should be noted that both existing and future scenarios have the upgraded road geometry.

TABLE 1: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
EXISTING PERFORMANCE – WITH FUTURE ROAD GEOMETRY						
Longueville Road / Northwood Road / River Road West	AM	0.73	17.4	**B**	Signals	RT from Longueville Road
	PM	0.60	8.6	**A**		RT from Longueville Road
Kenneth Street / Northwood Road	AM	0.45	9.4	**A**	Signals	RT from Kenneth Street
	PM	0.64	13.2	**A**		RT from Kenneth Street
FUTURE PERFORMANCE – WITH FUTURE ROAD GEOMETRY						
Longueville Road / Northwood Road / River Road West	AM	0.73	17.4	**B**	Signals	RT from Longueville Road
	PM	0.62	8.7	**A**		RT from Longueville Road
Kenneth Street / Northwood Road	AM	0.44	9.5	**A**	Signals	RT from Kenneth Street
	PM	0.65	13.7	**B**		RT from Kenneth Street

NOTES:
(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown above, the assessed signalised intersections of Kenneth Street / Northwood Road and Longueville Road / Northwood Road / River Road West retain an existing Level of Service of “A” or “B” during the both AM and PM peak hour periods. This indicates acceptable delays and additional spare capacity maintained. As such it can be concluded that the proposed development will not have an adverse impact upon the operation of the assessed signalised intersection under future road geometry conditions.

The development provides two accessible parking spaces where one space is not in accordance with the standard. The development is required to provide a total of 86 parking spaces including 3 accessible parking spaces. The accessible parking spaces are to be in accordance with AS2890.6.

The accessible parking spaces are required to be located as close to the lift as possible;

MTE Response: The disabled car parking provision has been provided based upon the requirements within the Building Code of Australia over Council's DCP requirements. In any event the plans have been amended to reflect the provision of three (3) disabled car parking spaces for the development, which have been relocated close to the lifts.

Access in/out of spaces 18 and 19 require vehicles to reverse onto the circular ramp with limited visibility. As such, these spaces are to be deleted.

MTE Response: The circular portion on Level 2 is flat, as the ramp ends further to the south, such that there are unrestricted sight lines to both of these spaces for vehicles travelling along the ramp. If still preferred by Council these spaces can be removed.

All parking spaces are to be line marked according to their relevant component.

MTE Response: Car parking spaces will be linemarked and constructed in accordance with the relevant Australian Standard requirements. To ensure this occurs it is recommended that it be conditioned. The allocation of car parking will be the following:

- 3 x set down / pick-up spaces on Level 3 – Allocated to no one and can be used by emergency facilities;
- 10 x residential aged care facility visitor spaces on Level 3;
- 4 x residential aged care facility visitor spaces on Level 2;
- 28 x commercial visitor spaces on Level 2;
- 20 x residential staff aged care facility on Level 1;
- 24 x commercial staff aged care facility on Level 1.

The above provision complies with Council's DCP and the SEPP (Affordable Rental Housing)

Driveway to be designed as left in and left out only. The design should prevent right turn movements by installing a triangular median Island at the entry/exit of the driveway. Detail of the driveway showing this restriction is to be provided;

MTE Response: This type of design can be accommodated, but in the first instance the preference would be to restrict vehicle movements into and out of the site via a raised median located within Northwood Road, subject to approval by Council's Local Traffic Committee.

AutoCAD files of the ground clearance test is to be provided for a B99 and MRV as the plan provided is unclear;

MTE Response: Autocad files will be provided showing ground clearance testing.

It is noted that the height clearance provided is not in accordance with AS2890.2. Ramp sections are to be provided indicating the height clearance for the largest design vehicles accessing the development;

MTE Response: Long sections are provided within **Annexure A**, indicating a headroom of 3.6m for the entry driveway ramp, 2.6m headroom for the ramp between Level 3 and Level 2 and a headroom of 2.2m for the ramp between Level 2 and Level 1.

> *The traffic report must consider the following future upgrade projects:*
>
> *River Road/Longueville Road upgrade – Modelling is required to be updated as per the TCS provided;*
>
> *Northwood Roundabout – Council is the process of gaining approval for a roundabout at the Northwood Road/River Road intersection. Given the development is restricted to left in/left out access, the proposed roundabout will facilitate westbound movements from the development which will potentially reduce rat-running through local streets. As such, the developer is required to contribute funding towards the construction of the proposed roundabout.*

MTE Response: The modelling has been amended and is reflected in a previous response. In regard to contributing funds, this is for others to address.

> *The use of traffic counts to determine the traffic generation of the existing development (as oppose to rates from the RMS Guide) would be an accurate representation of existing conditions and therefore the net increase in traffic volumes. Passing trade of 80% should be applied to the service station and convenience store component of the existing development*

MTE Response: The RMS Guide to Traffic Generating Developments is an accepted methodology to determine traffic generation of various land uses and is an appropriate method to estimate the existing and future traffic generation of the site.

At the time the traffic report was prepared, some of the shops at the existing site were not occupied. Hence, it was not possible to accurately capture existing traffic generation of the site through the use of surveys. If further investigation is required into existing development traffic generation, it is recommended that the traffic reports for the existing sites be reviewed to determine the approved traffic generation of the existing sites.

Further, the car parking layouts of the existing sites and access arrangements would likely play a role in development traffic associated with the development, such that the use of surveys to capture existing development traffic is not an appropriate method. That is there is potential that the traffic generation of the existing sites do not all occur at the existing site driveways, but also within the surrounding road network, i.e. visitors to the existing sites may park elsewhere and not solely restricted to on-site.

The traffic assessment and modelling undertaken to date does not remove any existing traffic generated from the existing development, but rather adds the full proposed development traffic generation of the site. This provides a conservative assessment. In regards to passing trade, there is no evidence to suggest that passing trade for service stations is 80%.

Please contact the undersigned on 8355 2440 should you require further information or assistance.

Yours faithfully,

McLaren Traffic Engineering

Matthew McCarthy
Senior Traffic Engineer
BE Civil Engineering
Masters of Engineering Science
RMS Accredited Level 1 Road Safety Auditor

ANNEXURE A: AMENDED PLANS

(Sheet 1 of 5)

ANNEXURE A: AMENDED PLANS

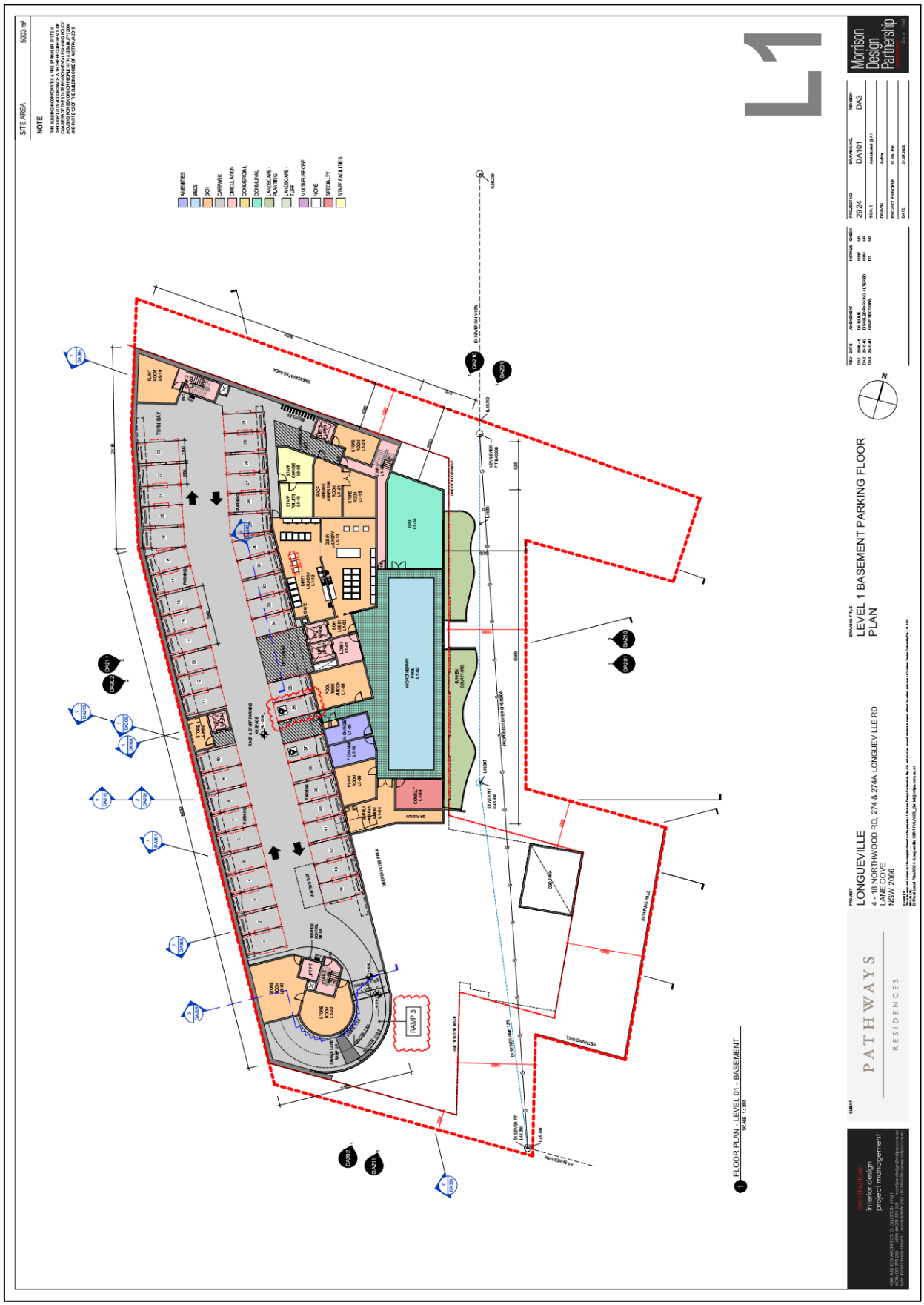
(Sheet 2 of 5)

ANNEXURE A: AMENDED PLANS

(Sheet 3 of 5)

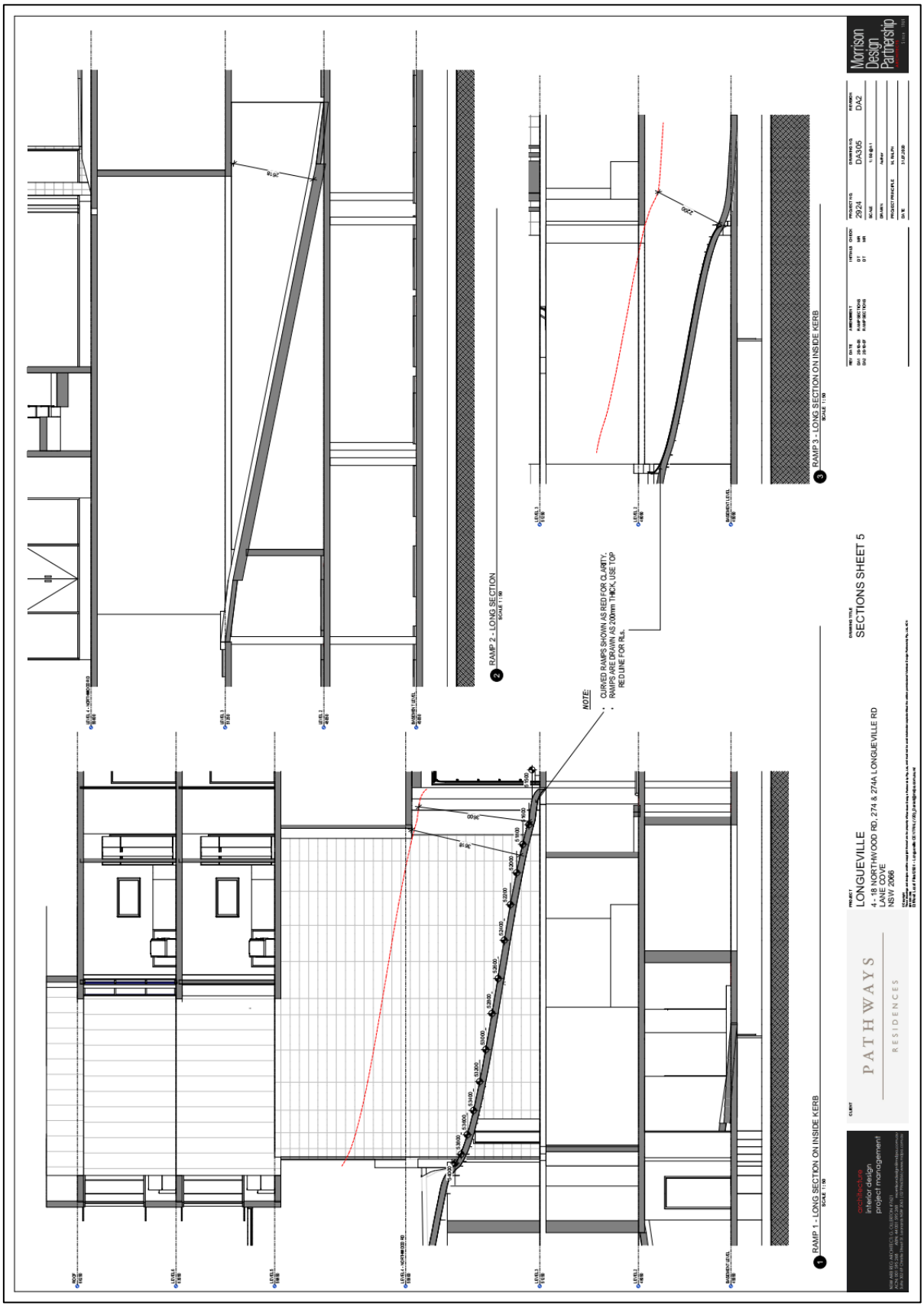
ANNEXURE A: AMENDED PLANS

(Sheet 4 of 5)



ANNEXURE A: AMENDED PLANS

(Sheet 5 of 5)



CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [1]

Network: N101 [EX AM Signals (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (CCG Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 101 [AM - EX - Longueville / Northwood / River Road West]														
South: Northwood Road														
1a	L1	519	0.0	519	0.0	0.388	4.7	LOS A	3.4	23.6	0.21	0.58	0.21	50.0
2	T1	254	0.0	254	0.0	* 0.609	24.0	LOS B	8.2	57.1	1.00	0.90	1.00	34.7
Approach		773	0.0	773	0.0	0.609	11.0	LOS A	8.2	57.1	0.47	0.69	0.47	43.7
North: Longueville Road														
8	T1	183	0.0	183	0.0	0.438	19.8	LOS B	5.0	35.1	0.82	0.69	0.82	36.4
9b	R3	1	0.0	1	0.0	0.005	35.3	LOS C	0.0	0.2	0.89	0.60	0.89	37.2
Approach		184	0.0	184	0.0	0.438	19.9	LOS B	5.0	35.1	0.82	0.69	0.82	36.5
NorthWest: River Road West														
27b	L3	163	0.0	163	0.0	0.731	23.5	LOS B	13.1	91.6	0.82	0.86	0.88	43.3
29a	R1	977	0.0	977	0.0	* 0.731	20.9	LOS B	18.9	132.5	0.85	0.86	0.88	35.6
Approach		1140	0.0	1140	0.0	0.731	21.3	LOS B	18.9	132.5	0.84	0.86	0.88	37.2
All Vehicles		2097	0.0	2097	0.0	0.731	17.4	LOS B	18.9	132.5	0.70	0.78	0.72	39.2
Site: 101 [AM - EX - Northwood / Kenneth]														
SouthEast: Northwood Road														
21	L2	16	0.0	16	0.0	0.445	18.5	LOS B	9.5	66.2	0.70	0.62	0.70	48.4
22	T1	616	0.0	616	0.0	0.445	12.9	LOS A	9.5	66.2	0.70	0.61	0.70	42.2
Approach		632	0.0	632	0.0	0.445	13.0	LOS A	9.5	66.2	0.70	0.61	0.70	42.5
NorthEast: Petrol Station Access														
24	L2	17	0.0	17	0.0	0.029	7.6	LOS A	0.1	1.0	0.32	0.62	0.32	52.0
26	R2	1	0.0	1	0.0	0.029	7.7	LOS A	0.1	1.0	0.32	0.62	0.32	48.0
Approach		18	0.0	18	0.0	0.029	7.6	LOS A	0.1	1.0	0.32	0.62	0.32	51.8
NorthWest: Northwood Road														
27	L2	15	0.0	15	0.0	0.381	8.1	LOS A	7.1	49.9	0.44	0.40	0.44	50.0
28	T1	1024	0.0	1024	0.0	0.381	3.0	LOS A	7.1	49.9	0.28	0.25	0.28	54.9
29	R2	117	0.0	117	0.0	* 0.208	6.0	LOS A	0.7	4.7	0.29	0.61	0.29	48.6
Approach		1156	0.0	1156	0.0	0.381	3.4	LOS A	7.1	49.9	0.28	0.29	0.28	54.1
SouthWest: Kenneth Street														
30	L2	158	0.0	158	0.0	0.248	23.5	LOS B	3.9	27.4	0.76	0.76	0.76	34.1
32	R2	87	0.0	87	0.0	0.366	37.2	LOS C	2.9	20.2	0.95	0.76	0.95	36.6
Approach		245	0.0	245	0.0	0.366	28.4	LOS B	3.9	27.4	0.83	0.76	0.83	35.3
All Vehicles		2051	0.0	2051	0.0	0.445	9.4	LOS A	9.5	66.2	0.48	0.45	0.48	46.8

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [1] Network: N101 [EX PM Signals (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 72 seconds (CCG Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 101 [PM - EX - Longueville / Northwood / River Road West]														
South: Northwood Road														
1a	L1	1131	0.0	1131	0.0	0.600	3.4	LOS A	2.9	20.1	0.11	0.50	0.11	52.1
2	T1	209	0.0	209	0.0	* 0.600	0.9	LOS A	1.8	12.8	0.11	0.37	0.11	55.9
Approach		1340	0.0	1340	0.0	0.600	3.0	LOS A	2.9	20.1	0.11	0.48	0.11	52.7
North: Longueville Road														
8	T1	253	0.0	253	0.0	0.463	20.8	LOS B	7.2	50.1	0.84	0.71	0.84	35.8
9b	R3	1	0.0	1	0.0	0.005	36.4	LOS C	0.0	0.2	0.89	0.60	0.89	36.8
Approach		254	0.0	254	0.0	0.463	20.9	LOS B	7.2	50.1	0.84	0.71	0.84	35.8
NorthWest: River Road West														
27b	L3	74	0.0	74	0.0	0.328	18.0	LOS B	5.5	38.3	0.63	0.75	0.63	46.4
29a	R1	503	0.0	503	0.0	0.328	16.1	LOS B	6.6	46.2	0.63	0.75	0.63	39.2
Approach		577	0.0	577	0.0	0.328	16.3	LOS B	6.6	46.2	0.63	0.75	0.63	40.6
All Vehicles		2171	0.0	2171	0.0	0.600	8.6	LOS A	7.2	50.1	0.33	0.57	0.33	46.4
Site: 101 [PM - EX - Northwood / Kenneth]														
SouthEast: Northwood Road														
21	L2	31	0.0	31	0.0	0.635	20.0	LOS B	16.0	111.7	0.79	0.71	0.79	47.4
22	T1	1206	0.0	1206	0.0	* 0.635	14.3	LOS A	16.0	112.0	0.79	0.71	0.79	41.0
Approach		1237	0.0	1237	0.0	0.635	14.4	LOS A	16.0	112.0	0.79	0.71	0.79	41.2
NorthEast: Petrol Station Access														
24	L2	16	0.0	16	0.0	0.025	8.8	LOS A	0.1	0.9	0.42	0.64	0.42	51.2
26	R2	2	0.0	2	0.0	0.025	8.8	LOS A	0.1	0.9	0.42	0.64	0.42	46.7
Approach		18	0.0	18	0.0	0.025	8.8	LOS A	0.1	0.9	0.42	0.64	0.42	50.9
NorthWest: Northwood Road														
27	L2	14	0.0	14	0.0	0.214	9.7	LOS A	5.6	39.5	0.60	0.53	0.60	48.0
28	T1	577	0.0	577	0.0	0.214	4.7	LOS A	5.6	39.5	0.43	0.38	0.43	52.4
29	R2	160	0.0	160	0.0	* 0.392	14.0	LOS A	3.0	20.8	0.90	0.80	0.90	40.6
Approach		751	0.0	751	0.0	0.392	6.8	LOS A	5.6	39.5	0.53	0.47	0.53	49.3
SouthWest: Kenneth Street														
30	L2	133	0.0	133	0.0	0.214	24.3	LOS B	3.4	23.7	0.76	0.75	0.76	33.6
32	R2	75	0.0	75	0.0	0.322	38.1	LOS C	2.5	17.7	0.95	0.76	0.95	36.3
Approach		207	0.0	207	0.0	0.322	29.3	LOS C	3.4	23.7	0.83	0.75	0.83	35.0
All Vehicles		2213	0.0	2213	0.0	0.635	13.2	LOS A	16.0	112.0	0.70	0.63	0.70	42.8

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [1]

Network: N101 [FU AM Signals (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 72 seconds (CCG Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 101 [AM - FU - Longueville / Northwood / River Road West]														
South: Northwood Road														
1a	L1	527	0.0	527	0.0	0.389	4.6	LOS A	3.4	24.0	0.20	0.58	0.20	50.1
2	T1	258	0.0	258	0.0	* 0.631	25.3	LOS C	8.2	57.1	1.00	0.92	1.01	33.9
Approach		785	0.0	785	0.0	0.631	11.4	LOS B	8.2	57.1	0.46	0.69	0.47	43.3
North: Longueville Road														
8	T1	186	0.0	186	0.0	0.480	21.3	LOS C	5.4	37.8	0.84	0.71	0.84	35.4
9b	R3	1	0.0	1	0.0	0.005	36.4	LOS D	0.0	0.2	0.89	0.60	0.89	36.8
Approach		187	0.0	187	0.0	0.480	21.4	LOS C	5.4	37.8	0.84	0.71	0.84	35.4
NorthWest: River Road West														
27b	L3	163	0.0	163	0.0	0.729	23.2	LOS C	13.1	91.6	0.81	0.86	0.87	43.5
29a	R1	991	0.0	991	0.0	* 0.729	20.4	LOS C	19.5	136.4	0.84	0.85	0.86	35.9
Approach		1154	0.0	1154	0.0	0.729	20.8	LOS C	19.5	136.4	0.83	0.85	0.86	37.5
All Vehicles		2126	0.0	2126	0.0	0.729	17.4	LOS B	19.5	136.4	0.70	0.78	0.71	39.2
Site: 101 [AM - FU - Northwood / Kenneth]														
SouthEast: Northwood Road														
21	L2	16	0.0	16	0.0	0.442	18.2	LOS B	9.7	67.9	0.69	0.61	0.69	48.6
22	T1	629	0.0	629	0.0	0.442	12.6	LOS B	9.7	67.9	0.69	0.60	0.69	42.5
Approach		645	0.0	645	0.0	0.442	12.7	LOS B	9.7	67.9	0.69	0.60	0.69	42.8
NorthWest: Northwood Road														
28	T1	1056	0.0	1056	0.0	0.382	2.9	LOS A	7.4	51.5	0.27	0.24	0.27	55.2
29	R2	117	0.0	117	0.0	* 0.209	7.0	LOS A	0.8	5.3	0.33	0.63	0.33	47.5
Approach		1173	0.0	1173	0.0	0.382	3.3	LOS A	7.4	51.5	0.28	0.28	0.28	54.4
SouthWest: Kenneth Street														
30	L2	158	0.0	158	0.0	0.255	24.6	LOS C	4.1	28.6	0.77	0.76	0.77	33.4
32	R2	98	0.0	98	0.0	0.422	38.7	LOS D	3.4	23.5	0.97	0.77	0.97	36.1
Approach		256	0.0	256	0.0	0.422	30.0	LOS C	4.1	28.6	0.84	0.76	0.84	34.8
All Vehicles		2074	0.0	2074	0.0	0.442	9.5	LOS A	9.7	67.9	0.48	0.44	0.48	46.6

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [1] Network: N101 [FU PM Signals (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 72 seconds (CCG Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 101 [PM - FU - Longueville / Northwood / River Road West]														
South: Northwood Road														
1a	L1	1156	0.0	1156	0.0	0.616	3.4	LOS A	3.0	21.0	0.11	0.50	0.11	52.1
2	T1	215	0.0	215	0.0	* 0.616	0.9	LOS A	1.9	13.2	0.12	0.37	0.12	56.0
Approach		1371	0.0	1371	0.0	0.616	3.0	LOS A	3.0	21.0	0.11	0.48	0.11	52.7
North: Longueville Road														
8	T1	259	0.0	259	0.0	0.487	21.1	LOS C	7.4	51.9	0.85	0.71	0.85	35.6
9b	R3	1	0.0	1	0.0	0.005	36.4	LOS D	0.0	0.2	0.89	0.60	0.89	36.8
Approach		260	0.0	260	0.0	0.487	21.1	LOS C	7.4	51.9	0.85	0.71	0.85	35.6
NorthWest: River Road West														
27b	L3	74	0.0	74	0.0	0.339	18.0	LOS B	5.6	39.1	0.63	0.75	0.63	46.4
29a	R1	517	0.0	517	0.0	0.339	16.2	LOS B	6.9	48.0	0.64	0.75	0.64	39.1
Approach		591	0.0	591	0.0	0.339	16.4	LOS B	6.9	48.0	0.64	0.75	0.64	40.5
All Vehicles		2221	0.0	2221	0.0	0.616	8.7	LOS A	7.4	51.9	0.34	0.58	0.34	46.4
Site: 101 [PM - FU - Northwood / Kenneth]														
SouthEast: Northwood Road														
21	L2	31	0.0	31	0.0	0.651	20.2	LOS C	16.6	115.9	0.80	0.72	0.80	47.3
22	T1	1237	0.0	1237	0.0	* 0.651	14.4	LOS B	16.6	116.1	0.80	0.71	0.80	40.8
Approach		1267	0.0	1267	0.0	0.651	14.6	LOS B	16.6	116.1	0.80	0.71	0.80	41.1
NorthWest: Northwood Road														
28	T1	613	0.0	613	0.0	0.222	4.5	LOS A	5.8	40.5	0.42	0.37	0.42	52.8
29	R2	160	0.0	160	0.0	* 0.397	14.5	LOS B	3.1	21.5	0.91	0.80	0.91	40.3
Approach		773	0.0	773	0.0	0.397	6.6	LOS A	5.8	40.5	0.53	0.46	0.53	49.6
SouthWest: Kenneth Street														
30	L2	133	0.0	133	0.0	0.214	24.3	LOS C	3.4	23.7	0.76	0.75	0.76	33.6
32	R2	121	0.0	121	0.0	0.521	39.2	LOS D	4.2	29.5	0.98	0.78	0.98	35.9
Approach		254	0.0	254	0.0	0.521	31.4	LOS C	4.2	29.5	0.86	0.77	0.86	35.1
All Vehicles		2294	0.0	2294	0.0	0.651	13.7	LOS B	16.6	116.1	0.71	0.63	0.71	42.4

ANNEXURE C: TCS PLAN AS PROVIDED BY COUNCIL