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THOMPSON STANBURY ASSOCIATES

ABN: 79 943 737 368

19 May 2015

Penrith City Council
PO Box 60
PENRITH
NSW 2751

Attention: Gavin Cherry

Dear Sir,

ASSESSMENT OF PARKING & TRAFFIC IMPACTS ASSOCIATED WITH SECTION 96 APPLICATION
SERVICE STATION DEVELOPMENT
1 – 21 CRANEBROOK ROAD, CRANEBROOK

This Practice has been engaged by Service Station Developments Pty. Ltd. to undertake an assessment of the parking and traffic impacts associated with a Section 96 Application for alterations to an approved service station development at 1 – 21 Cranebrook Road, Cranebrook.

APPROVED DEVELOPMENT

The approved development involves the demolition of the following existing site structures:

- Five refuelling bowsers;
- A convenience store providing a floor area of 122.5m^2;
- An ancillary food and drink premises providing a floor area of 63m^2 and a seating capacity of 10;
- A mechanical workshop providing a floor area of 157.25m^2 (containing a single work bay); and
- A manager's residence providing an approximate gross floor area of 70m^2.

In place of the existing structures to be demolished, a new service station is approved comprising the following primary components:

- 10 refuelling bowsers;
- A convenience store providing a gross floor area of 448m^2;
- An ancillary food and drink premises providing a gross floor area of approximately 180m^2, comprising a seating area of 98m^2 and a seating capacity of 36 people;
- A workshop providing a floor area of approximately 250m^2 (containing three work bays); and
- A first floor manager's residence providing a gross floor area of 389m^2.

The development was approved to be serviced by a total of 45 car parking spaces provided immediately adjoining the central convenience store building and around the site periphery.

Vehicular access was approved to be separated, widened and relocated further away from the adjoining intersection of The Northern, Cranebrook and Londonderry Roads in order to provide for more efficient site operation. Pavement widening works were approved to be undertaken within Cranebrook Road to facilitate the provision of a formalised exclusive right turn lane servicing the subject development.

A Traffic Impact Assessment Report was prepared by this Practice in September 2010 to accompany the original development application.

PROPOSED ALTERATION & SCOPE OF ASSESSMENT

The subject Section 96 Application involves the following alterations to the approved service station development:

- The provision of two additional refuelling bowsers;
- The expansion of the convenience store to provide a gross floor area of 1,182.5m^2
- The expansion of the fast food outlet to provide a gross floor area of 534.5m^2, comprising a seating area of 186m^2, a seating capacity of 108 people (72 internal seats and 36 external seats) and a drive through facility;
- The reconfiguration of the approved workshop to the north-western corner of the site and the reduction in the number of work bays from three to two; and
- The modification of the internal vehicular parking areas to provide 98 car spaces and altered heavy vehicle servicing arrangements.

Table 1 overleaf provides a summary of the existing, approved and proposed development yield.

TABLE 1
SUMMARY OF EXISTING, APPROVED AND PROPOSED DEVELOPMENT YIELD

	Existing	Approved	Proposed
Refuelling Bowsers	5	10	12
Convenience Store GFA	122.5m²	448m²	1,182.5m²
Food & Drink Premises			
GFA	63m²	180m²	534.5m²
Seating Area	40m²	98m²	186m²
Number of Seats	10	36	108
Workshop			
GFA	157.25m²	250m²	250m²
Number of Bays	1	3	2
Manager's Residence GFA	70m²	389m²	389m²
Car Parking Spaces	0*	45	98

* No formalised (marked) parking spaces are provided however there is capacity to accommodate vehicle parking in an informal arrangement.

No alterations to the originally approved first floor manager's residence and the site access arrangements (including the provision of an exclusive right turn lane within Cranebrook Road) are proposed.

The purpose of this correspondence is to assess and document likely parking and traffic impacts resulting from the Section 96 Application, with reference to the relevant Australian Standards and Penrith City Council's Development Control Plan 2014 (DCP 2014).

This report makes reference to and should be read in conjunction with amended architectural plans prepared by CKDS Architecture, submitted under separate cover. In this regard, the parking and circulation arrangements have been designed in consultation with this Practice so as to mitigate any impacts and ensure compliance with the relevant Australian Standards and DCP 2014.

ACCESS ARRANGEMENTS

The approved site access arrangements are not proposed to be altered. Assessment of the compliance of the access arrangements with the relevant Australian Standard and DCP 2014 considerations is therefore not required.

PARKING PROVISION

Penrith City Council provides locally sensitive parking requirements for various land-uses within DCP 2014. Council provides the following parking requirement relevant to the proposal:

> *Service Stations*
> *6 spaces per work bay plus*
> *4 spaces per 100m² of gross floor area of convenience store*

Restaurants
1 space per 5.5m^2 of seating area;
Plus 1 space per employee

Dwelling House
2 spaces per dwelling

Application of these rates to the proposed development yield results in the following parking requirements (assuming the food and drink premises will accommodate up to 8 employees at any one time):

Service Station
(6 x 2) + 4(1,182.5m^2 / 100m^2) = 59.3 (adopt 60) spaces

Food and Drink Premises
(186m^2 / 6m^2) + 8 = 39 spaces

Manager's Residence
(2 x 1) = 2 spaces

The proposed amended development yield is therefore calculated to require 101 spaces in accordance with DCP 2014.

The proposed parking provision of 98 spaces therefore represents a minor two space shortfall with respect to DCP 2014.

Notwithstanding the above, this Practice notes that the Roads & Maritime Services provide more appropriate parking requirements for food and drink premises such as that proposed, whereby different rates are provided for facilities providing drive through facilities, within the *Guide to Traffic Generating Developments*. This publication provides the following rates for drive in take away food outlets with on-site seating and drive through facilities:

1 space per 2 internal seats, or
1 space per 3 internal and external seats, whichever is greater

Application of these rates to the food and drink premises component of the subject proposal results in the following calculations:

(72 / 2) = 36 spaces
OR
(108 / 3) = 36 spaces

The food and drink premises is therefore projected to generate a parking demand of 36 spaces, being 3 spaces less than that required by DCP 2014 under the restaurant definition.

The following provides a summary of the required parking provision based on a combination of DCP 2010 and Roads & Maritime Services' requirements:

Service Station	= 60 spaces
Food and Drink Premises	= 36 spaces
Manager's Residence	= 2 spaces
TOTAL	= 98 spaces

The proposed parking provision of 98 spaces is therefore considered to be satisfactory.

PASSENGER VEHICLE CIRCULATION

The proposed internal circulation areas have been reconfigured to facilitate the provision of additional parking spaces. Passenger vehicle parking spaces are provided throughout the site in a standard 90 degree arrangement to the south of the convenience store, the east of the food and drink premises and adjacent to the northern and western walls of the site building. The internal parking and manoeuvring areas have been designed in accordance with AS2890.1-2004 and AS2890.6-2009 providing the following minimum parking area dimensions:

- Normal 90 degree parking space width = 2.6m;
- Disabled 90 degree parking space width = 2.4m plus adjoining 2.4m wide shared zone;
- 90 degree parking space length = 5.4m;
- Parking aisle width = 7.0m; and
- One-way drive through roadway = 3.0m.

Having regard to the proposed parking area dimensions, this Practice is satisfied that vehicles will be able to enter and vacate parking spaces with suitable levels of manoeuvring.

Further to the above, the Roads & Maritime Services specify that KFC and McDonalds drive in take away food outlets are to provide drive through lanes with a capacity to accommodate 8 and 12 vehicles respectively, within its *Guide to Traffic Generating Developments*. The proposed drive through circulation lane is proposed to adjoin the northern and eastern building walls, providing a total length of approximately 72m, thereby being capable of accommodating up to 12 vehicles. The capacity of the drive through facility is therefore considered to be satisfactory.

HEAVY VEHICLE CIRCULATION

The subject site is proposed to be serviced by vehicles up to the size of 19m long semi-trailer tankers associated with refuelling of the service station. The service vehicles are proposed to enter the site in a forward direction, manoeuvre to the refuelling point prior to exiting the site in a forward direction.

The unloading procedures are proposed to occur within the wide internal roadway located in the south-eastern corner of the site. The wide nature of the internal roadway and the separation of the ingress and egress driveways will allow the service vehicles to stop and undertake the required refuelling activities without having any unreasonable impact on the circulation of customer passenger vehicle movements to / from the bowser forecourt and or the convenience store component. Swept paths of tanker servicing of the site have been provided on the architectural plans. In addition, swept paths of semi trailer vehicle movements between the refuelling bowsers and the site access driveways have also been provided on the plans.

In addition to servicing of the site associated with refuelling, the convenience store and food and drink premises are proposed to be provided with designated loading areas the west and north of the building. Consultation with the subject applicant has indicated that the largest vehicle expected to service these site components are 8.8m long medium rigid trucks. These vehicles are proposed to access the site via Cranebrook Road then accessing the loading areas. Following the undertaking of the required unloading of goods, the service vehicles are proposed to travel in a forward direction to exit the site via Londonderry Road.

As the site has been designed to accommodate the turning requirements of semi-trailers, the delivery vehicles associated with the convenience store and the food and drink premises are not anticipated to result in any unreasonable internal or external conflicts. In consideration of this and the abovementioned discussion, the proposed altered internal circulation arrangements are therefore considered to be satisfactory in relation to heavy vehicle servicing of the site.

EXTERNAL CONSIDERATIONS

Traffic Generation

The September 2010 Traffic Impact Assessment Report which accompanied the original Development Application projected that the approved development would generate in the order of 334 peak hour vehicle trips to and from the site, based on average traffic generation rates specified by the Roads & Maritime Services' *Guide to Traffic Generating Developments*, as follows:

Service Stations
Evening peak hour trips $= 0.04\ A(S) + 0.3\ A(F)$
OR
$= 0.66\ A(F)$

Where:
A(S) = area of the site (m^2)
A(F) = gross floor area of convenience store (m^2)

Drive In Take Away Food Outlets
100 vehicle trips per hour (based on a KFC tenancy)

The manager's residence was not projected to generate any additional traffic over and above that generated by the service station and food and drink premises as no journeys to and from work trips are envisaged.

The 2010 assessment indicated that trade associated with service stations with ancillary food and drink premises tends to significantly comprise passing trade, thereby being vehicle movements already on the adjoining road network. The Roads & Maritime Services suggest that up to 50% of traffic associated with service stations and attached food and drink premises comprises passing trade.

For the purposes of this assessment, it is considered reasonable that the service station traffic generation rate be based solely on the public floor area of the convenience store (862.5m^2), given the generous proportions of the site. In consideration of this, the proposed development yield results in the following traffic generation calculations:

Service Station
(0.66 x 862.5) = 570 trips

Food and Drink Premises
(1 x 100) = 100 trips

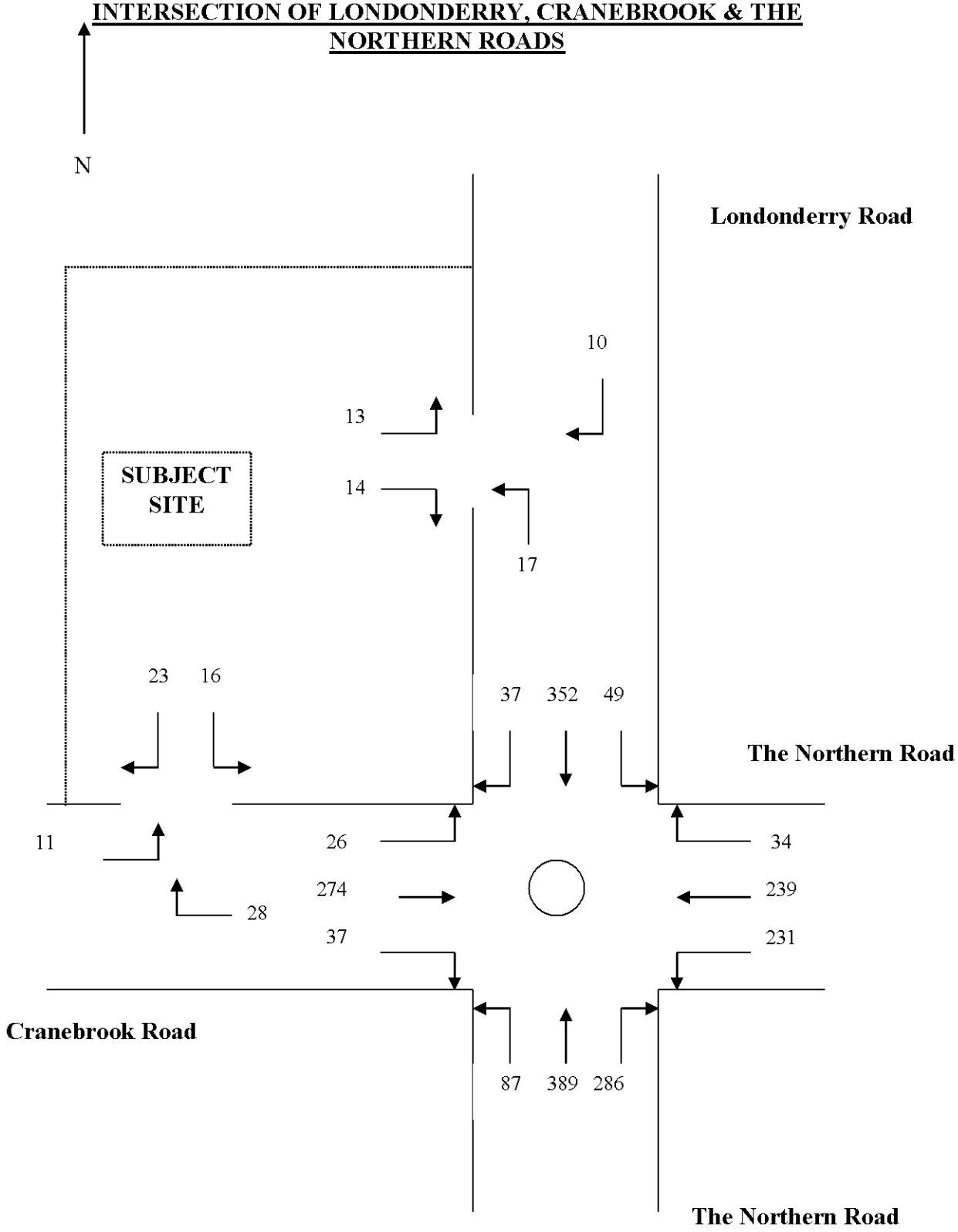
The subject proposal is therefore projected to generate in the order of 670 peak hour trips to and from the site. This represents an approximate doubling of the traffic generating capability of the approved development. As discussed above, 50% of this generation is projected to comprise existing vehicle movements. Whilst these movements will physically access and vacate the site, they are not expected to form 'new' trips on the surrounding road network.

Traffic Volumes

In order to obtain an indication of the existing operation of the local road network in the vicinity of the site, reference is made to evening peak hour traffic surveys undertaken by staff of this Practice. Traffic surveys were undertaken of the intersection of Londonderry, Cranebrook and The Northern Roads between 4.00pm – 6.00pm on the 25th of February 2015. In addition to the junction movement profile, the surveys also included the vehicle movements accessing and vacating the existing service station within the subject site

The peak hour volumes obtained from the surveys are represented overleaf diagrammatically as **Figure 1** overleaf whilst full details are available upon request.

FIGURE 1
FEBRUARY 2015 AFTERNOON PEAK HOUR VOLUMES
INTERSECTION OF LONDONDERRY, CRANEBROOK & THE NORTHERN ROADS



* The left turn movements from the eastern The Northern Road approach to the southern The Northern Road approach is provided with an exclusive slip lane and therefore is not required to negotiate the roundabout.

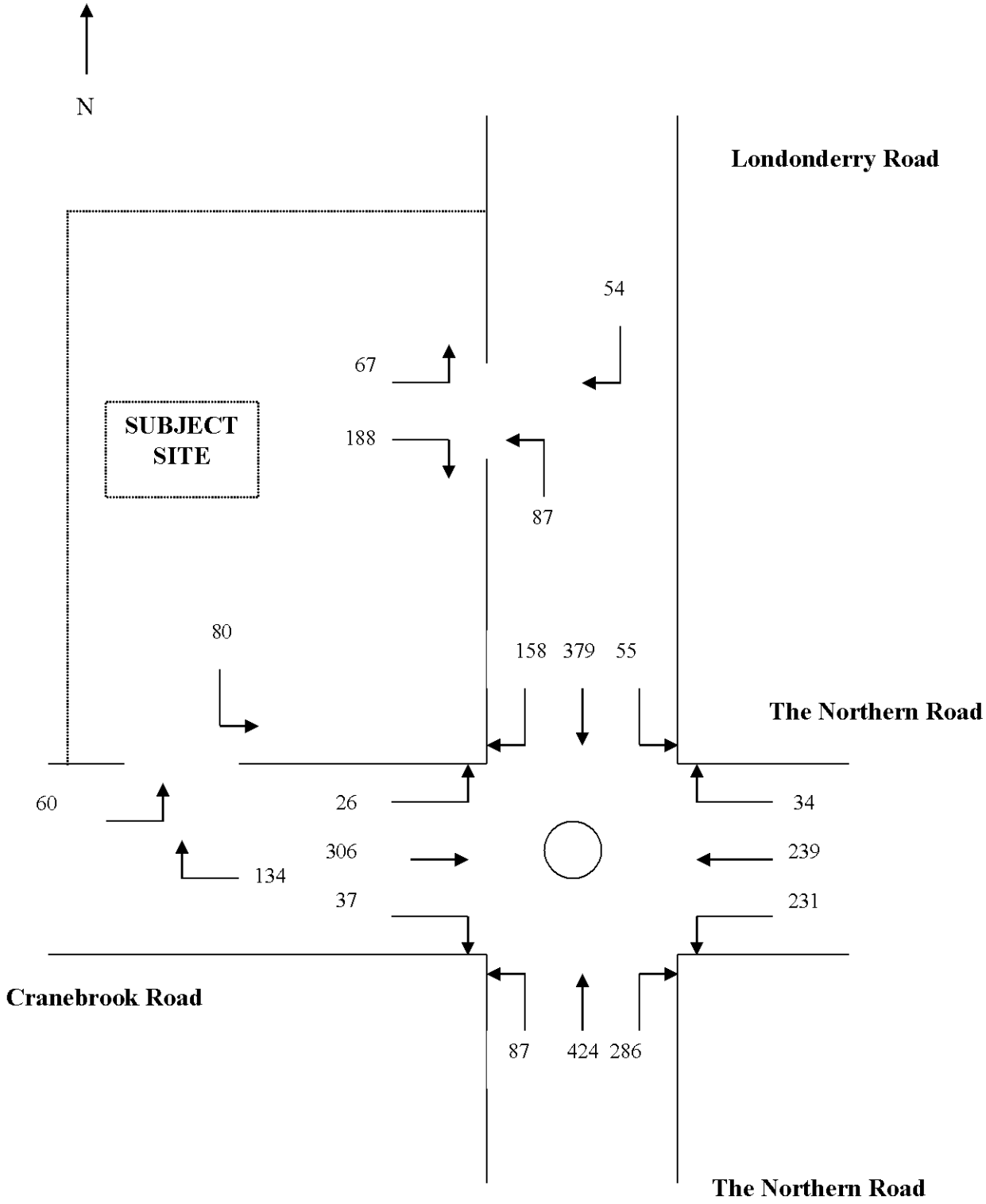
In order to gauge the impact of the traffic projected to be generated by the proposed development on the local road network, it is necessary to assign the projected vehicular movements to particular routes to determine the impact on surrounding intersection efficiency. The objective of this section is to distribute the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network.

The trip assignment has been formulated based on the existing directional split of vehicle movements within the vicinity of the site, derived from the manual traffic surveys undertaken by this Practice presented within **Figure 1**. **Figure 2** overleaf provides a graphical representation of the projected trip assignment and adjoining public intersection traffic volumes resulting from the subject proposal.

It is reiterated that whilst 100% of the 670 vehicle trips projected to be generated by the development have been assigned to and from the site access driveways, only 50% of the trips over and above that already generated by the existing site development have been assigned to be 'new' movements which will be required to be accommodated by the surrounding road network.

Further to the above, it is noted that the approved exclusive right turn bay within Cranebrook Road servicing the site ingress driveway will effectively restrict egress movements from the site to left turns only. Vehicles wishing to exit the site and travel to the west along Cranebrook Road have therefore been assigned to exit via Londonderry Road and thence turn right into Cranebrook Road.

FIGURE 2
PROJECTED AFTERNOON PEAK HOUR VOLUMES
INTERSECTION OF LONDONDERRY, CRANEBROOK & THE NORTHERN ROADS



Intersection Performance

In order to estimate the efficiency of the intersection of Londonderry, Cranebrook and The Northern Roads under existing and projected conditions, a SIDRA analysis has been undertaken. **Table 2** below provides a summary of the most pertinent operational characteristics of the subject intersections under both existing and projected conditions whilst full details are available upon request.

TABLE 2
SIDRA OUTPUT – AFTERNOON EFFICIENCY
LONDONDERRY, CRANEBROOK & THE NORTHERN ROADS

	Existing Conditions	**Projected Conditions**
Average Delay (secs)	8.3	12.2
Degree of Saturation	0.68	0.79
Level of Service	A	A

Table 2 indicates that the proposed development will have some impacts on the performance of the intersection of Londonderry, Cranebrook and The Northern Roads with minor increases in average delay and the intersection degree of saturation. Notwithstanding this, the existing junction level of service of 'A', representing good operation with spare capacity, is not anticipated to change thereby indicating that the intersection is expected to continue to operate satisfactorily.

Access Movement Capacity

The above SIDRA analysis indicates that the adjoining intersection of Londonderry, Cranebrook and The Northern Roads is capable of accommodating the additional traffic generated by the subject development in a safe and efficient manner. The trip assignment however indicates that some turning movements to and from the site are expected to be generated by the proposed development which will not pass through the abovementioned intersection or not comprise 'new trips' forming passing trade. These turning movements to and from the site may however have some impact on the through traffic efficiency of Londonderry and Cranebrook Roads notwithstanding the approved provision of an exclusive right turn lane within Cranebrook Road.

In order to assess the ability of Londonderry and Cranebrook Roads to absorb the traffic movements to and from the site, a capacity analysis has been undertaken in accordance with the Roads & Maritime Services' *Road Design Guide*. This publication states that the capacity of traffic flow along two-lane two-way roads is dependent upon the percent of time delayed, average speed, and sight distance. The same publication provides guidelines associated with the crossing and turning capacity of roads, stating that capacity figures for uninterrupted flow at intersections carrying a light crossing are dependant upon critical gap acceptance (T) and follow up headway (T_0). **Table 3** overleaf (adopted from the Road Design Guide, table 4.4.1) provides suitable values of these parameters, according to the subject situation.

TABLE 3 CRITICAL ACCEPTANCE GAPS AND FOLLOW UP HEADWAYS RELEVANT TO THE SUBJECT SITE		
	Critical Acceptance Gap T(sec)	**Follow-up Headway T_0(sec)**
Left Turn In	*	*
Right Turn In	4	2
Left Turn Out	5	2
Right Turn Out	5	3

* Left turn ingress movements are not required to give-way to other movements and therefore the capacity of such a movement can not be calculated utilising this method.

The Roads & Maritime Services provide the following formula based on the existing directional traffic volumes and the gap acceptance criteria provided within **Table 3** to calculate the ability of a roadway to accommodate additional turning movements:

$$C = \frac{Qe^{(-Q\times T)}}{1-e^{(-Q\times T_0)}}$$

Where: C = Turning Capacity
Q = Major Route Through Flow (veh/sec)
T = Critical Gap Acceptance (sec)
T_0 = Follow-up Headway (sec).

Utilising the above presented formula, capacities have been calculated associated with left and right turn movements to / from and adjoining the site based on the projected traffic volumes surveyed and contained within **Figure 2**. **Table 4** below provides a summary of the proposed turning movements to and from the site and their capacities as calculated.

TABLE 5 PROJECTED SITE ACCESS VOLUMES AND PRACTICAL CAPCITIES						
Movement	**Londonderry Road**			**Cranebrook Road**		
	Projected Volume	**Opposed Volume**	**Capacity**	**Projected Volume**	**Opposed Volume**	**Capacity**
Right Turn ingress	54	484	1200	134	349	1350
Left Turn Egress	67	387	1168	80	289	912
Right Turn Egress	188	888	495	-	-	-

Table 4 indicates that the existing Londonderry and Cranebrook Roads through volumes have more than enough capacity to accommodate the projected traffic projected to be generated by the subject development. In consideration of this, this Practice is of the opinion that the surrounding road network is more than capable of accommodating the projected additional traffic likely to be generated by the proposed development.

CONCLUSION

This correspondence provides an assessment of the parking and traffic impacts associated with a Section 96 Application for alterations to an approved service station development at 1 – 21 Cranebrook Road, Cranebrook. Having regard to the assessment contained within this correspondence, the following conclusion is provided:

- The proposed on-site parking provisions are adequate to accommodate the projected demand given the provisions of Council and the Roads & Maritime Services' requirements;

- The proposed internal circulation arrangements will provide for safe and efficient vehicular and pedestrian movements and servicing during peak times;

- The subject application is expected to generate approximately 670 trips to the site during the afternoon peak hour, being approximately double that previously approved; and

- The existing surrounding road network currently operates with a good level of service, and is capable of accommodating the projected traffic generated by the subject proposal.

In consideration of the above, the proposed alterations to the approved development are envisaged to be satisfactory.

It would be appreciated if the information contained within this correspondence could be incorporated in Council's assessment of the subject application.

Submitted for your consideration.

Yours faithfully

[redacted]

David Thompson
Principal
Transport Planner