

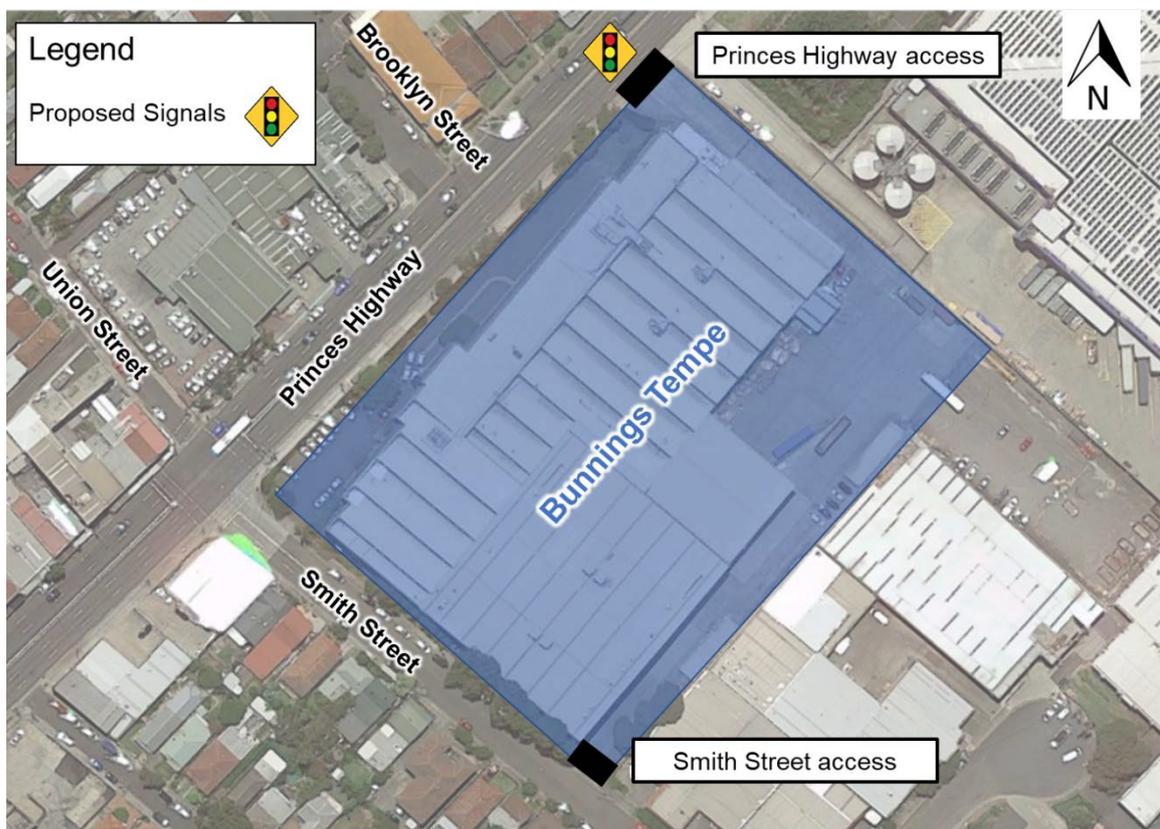
File Name	Prepared	Reviewed	Issued by	Date	Issued to
P4533.001T Tempe South LATM Study – Bunnings Signal Feasibility Study Technical Note	C. Mak / G. Yin	A. Finlay	C. Mak	06/05/2021	Sunny Jo (Inner West Council) sunny@innerwest.nsw.gov.au

Tempe South LATM Study

Bunnings Signals Feasibility Study

1. Background

As part of the Local Area Traffic Management (LATM) study for Tempe related to the proposed Bunnings Warehouse at 728-750 Princes Highway, Inner West Council passed a Notice of Motion in December 2020 to investigate the feasibility of introducing traffic signals at the Bunnings Warehouse driveway on Princes Highway. This signalised access is to provide an alternative access point onto Princes Highway. The location of the proposed signals is shown in Figure 1.1.



Map Source: Google Maps

Figure 1.1: Proposed Location of Traffic Signals

During the public exhibition stage of the Tempe LATM study, residents have expressed concerns over the proposed Bunnings access on Smith Street and believe resulting traffic will be detrimental to the local environment of the area.

The purpose of this technical note is to investigate the option of providing traffic signals to the Bunnings access on Princes Highway, and in turn converting the Smith Street access as an entry only).

2. Proposed Signal Arrangement

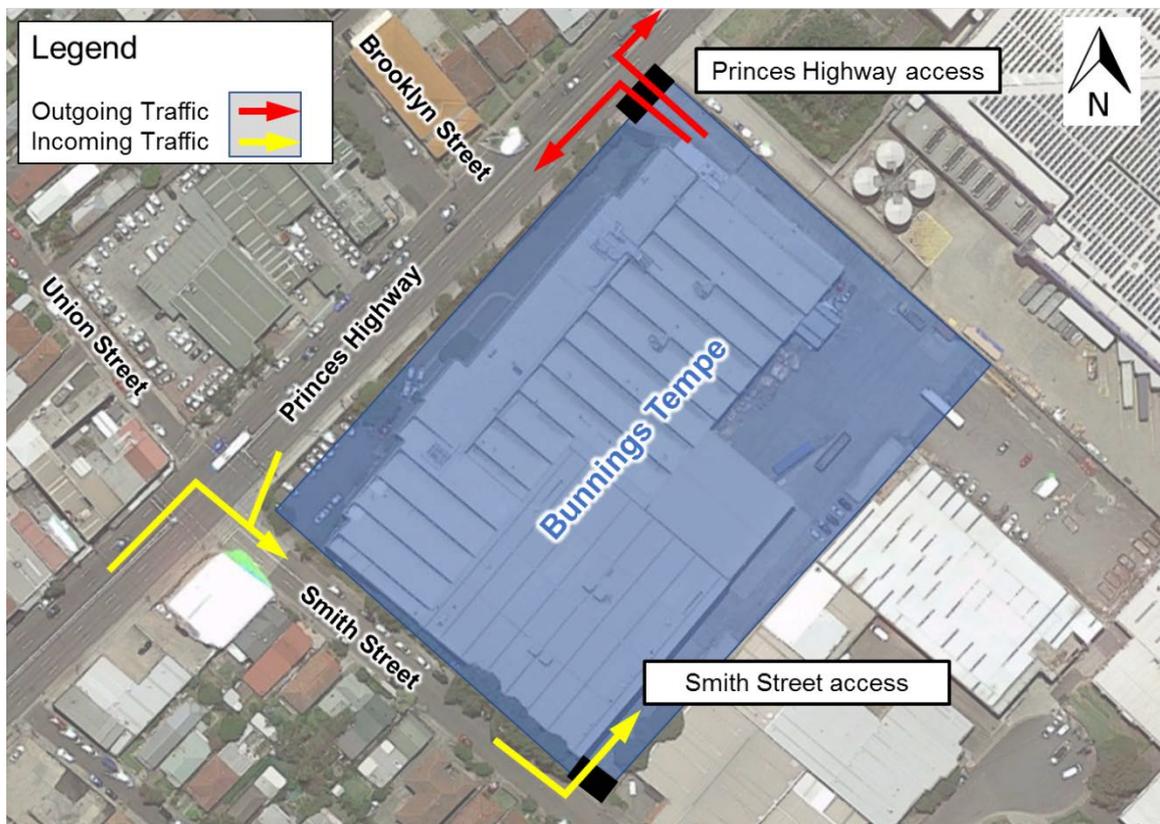
2.1 Option 1 – Exit Only

Council has proposed that the signal arrangement allow exit only at the access at Princes Highway, with left and right turns permitted into Princes Highway. The access on Smith Street will then be an entry only.

The implications of this signals arrangement include:

- All Bunnings traffic on Princes Highway northbound will turn right into Smith Street
- As left turns are not permitted from Princes Highway into the Bunnings access as part of the approved plans, the removal of the entry at Princes Highway will have no impact to southbound traffic.
- All Bunnings traffic will exit via Princes Highway. This will decrease traffic volumes at the Smith Street approach at the intersection with Princes Highway.

The likely lane arrangement at the access will be one left turn lane and one right turn lane, shown in Figure 2.1.

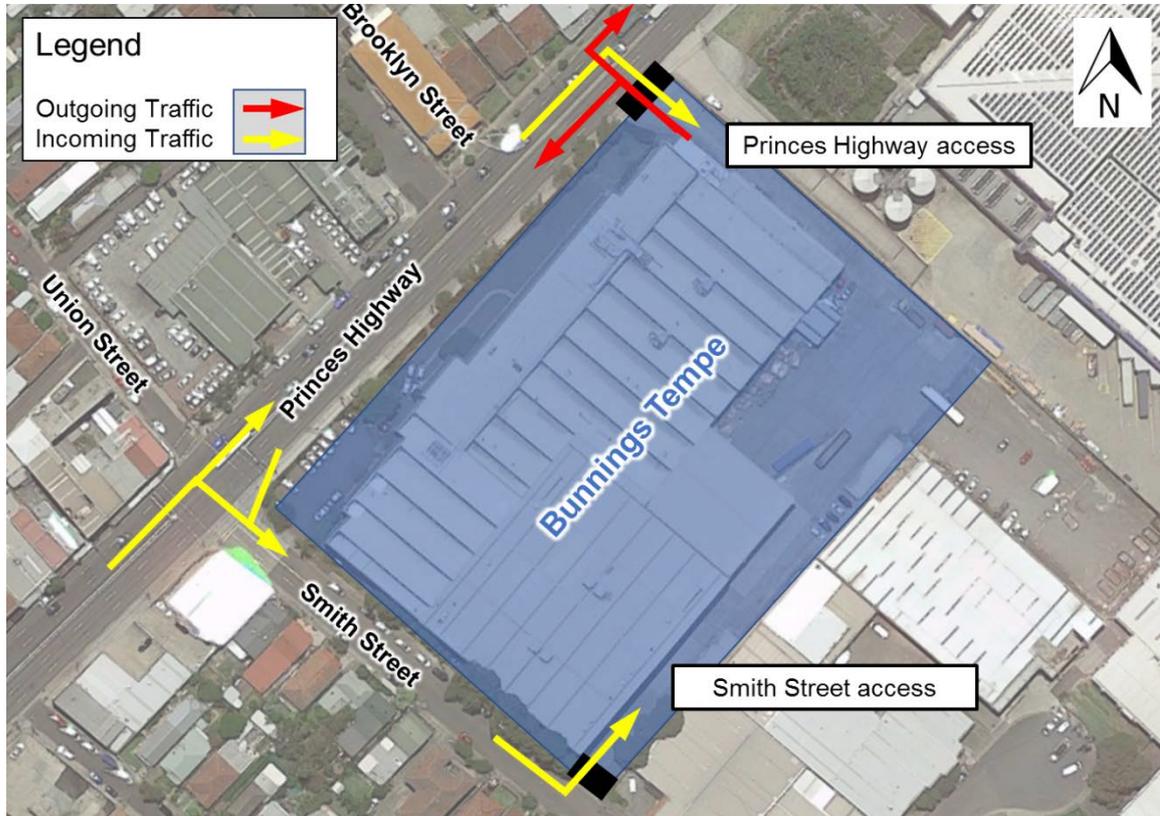


Map Source: Google Maps

Figure 2.1: Proposed Bunnings Access Arrangement – Option 1

2.2 Option 2 – Entry and Exit

An alternative signal arrangement is to allow entry into Bunnings from Princes Highway northbound as per the approved plans, with the addition of traffic signals. This will include one entry lane and one exit lane from Bunnings. Traffic modelling will be required to assess the intersection with the addition of the right turn entry from Princes Highway. This arrangement is shown in Figure 2.2.



Map Source: Google Maps

Figure 2.2: Proposed Bunnings Access Arrangement – Option 2

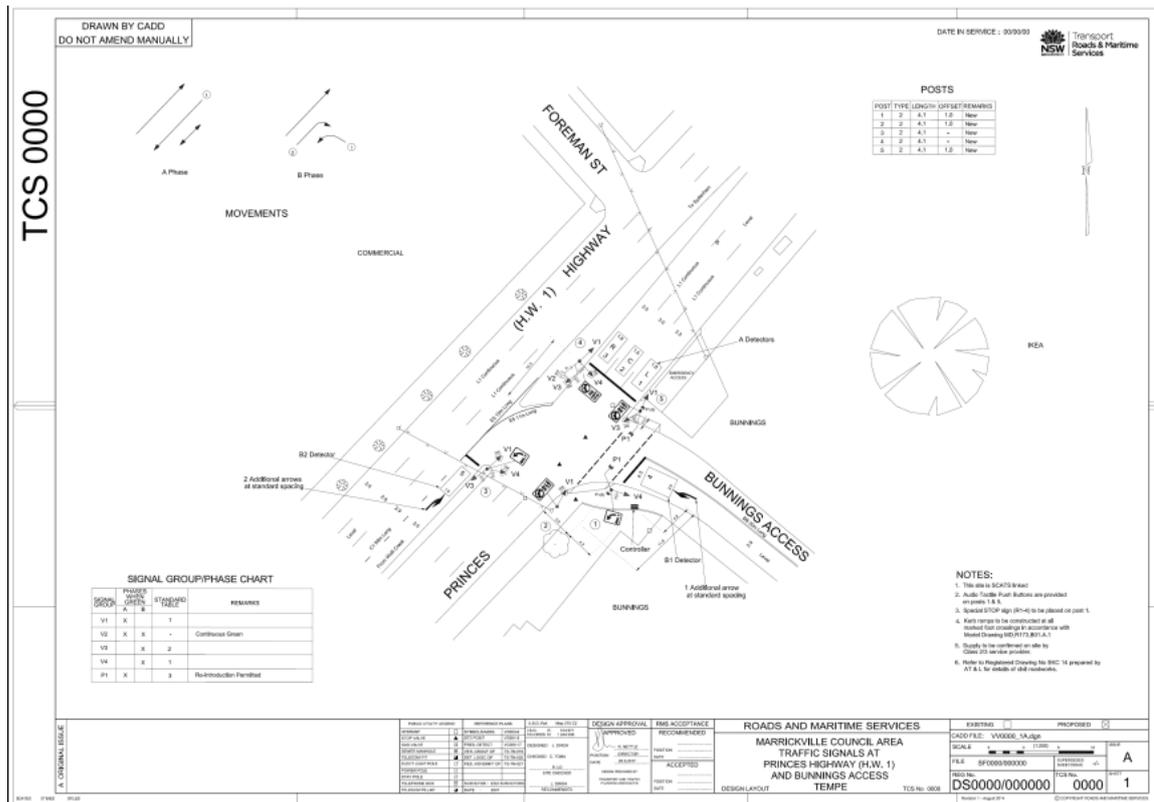
3. Previous Traffic Signal Proposals

3.1 Arrangement

Previous plans of the DA prior to 2017 showed traffic signals at the Bunnings access on Princes Highway, shown in Figure 3.1, with an additional exit via Smith Street.

The previous traffic signal arrangement included:

- Northbound through traffic flow will be uninterrupted and will not be controlled by signals
- A dedicated right turn bay for northbound vehicles entering Bunnings from Princes Highway
- All southbound traffic on Princes Highway controlled by traffic signals
- No left turn permitted from Princes Highway southbound into Bunnings
- No right turn from Bunnings into Princes Highway northbound
- Left turn only onto Princes Highway (southbound).



Source: Inner West Council Local Traffic Committee Agenda (5 October 2017), obtained via <https://innerwest.infocouncil.biz/>

Figure 3.1: Previously Proposed Traffic Signals Plan

3.2 Non-Support

Roads and Maritime Services (RMS) expressed non-support for the proposed traffic signals. In correspondence between RMS and Council on 29 August 2017, traffic signals were not supported due to:

- The assessment did not meet the warrant requirements.
 - Traffic volumes from the proponent’s traffic assessment indicated 16 (AM) and 47 (PM) vehicles would be entering the site during peak times and 117 movements during weekday at midday.
- Expected “detrimental impact this would have on the network operations of southbound traffic on Princes Highway”, and that “additional traffic signals would increase travel times and delays”. RMS has previously agreed on unsignalised right turns into Bunnings and continued to express support for the unsignalised arrangement.

As a result of RMS’s non-support, traffic signals were replaced with an unsignalised right turn with a right turn bay into Bunnings via Princes Highway.

The full correspondence between RMS and Council is provided in **Attachment A**.

4. Traffic Signal Warrants

4.1 Traffic Volumes

4.1.1 Bunnings Traffic Volumes

Updated traffic volumes were developed as part of the LATM study report as the calculated traffic volumes in the proponent's traffic impact assessment (TIA) (October 2017 Rev E) were determined to be underestimated. The TIA volumes are shown in Table 4.2.

Table 4.1: TIA Traffic Generation Volumes

Peak	Volumes (veh / hour)	
	In	Out
AM	15	15
PM	54	79
Weekend	320	320

Traffic generation rates were sourced from *Trip Generation and Parking Generation Surveys - Bulky Goods / Hardware Stores Analysis Report (2009)*, which investigated traffic volumes at a number of Bunnings and other hardware stores across NSW.

The recalculated volumes expected to be generated by Bunnings Tempe are shown in Table 4.2.

Table 4.2: Recalculated Traffic Generation Volumes

Peak	Traffic Generation Rate (veh/100m ² GFA)	Total Trip	Directional Split		Volumes (veh / hour)	
			In	Out	In	Out
AM	1.36	194	50%	50%	97	97
PM	2.40	347			173	173
Weekend	6.33	903			452	452

The outgoing traffic volumes will be used for assessing the traffic signal warrants as all traffic will exit onto Princes Highway under both proposed options.

4.1.2 Princes Highway Traffic Volumes (Existing)

Permanent traffic counting stations located on Princes Highway east and west of the Bunnings site indicate hourly traffic volumes in the order of 2200vph in the south bound direction and 1200vph northbound on the weekend.

The weekend traffic data for both counters for February 2021 is presented in Table 4.3.

The traffic volumes on the Princes Highway are not expected to decrease when the Bunnings development becomes operational.

Table 4.3: Princes Highway Weekend Volumes (Weekend)

Time Period	Northbound (Counter 18011)	Southbound (Counter 23001)
10:00 to 11:00 AM	1212	1632
11:00 AM to 12:00 PM	1239	1899
12:00 to 1:00 PM	1228	2096
1:00 to 2:00 PM	832	2126
2:00 to 3:00 PM	1132	2280
3:00 to 4:00 PM	1088	2262
4:00 to 5:00 PM	1062	2227

Source: Transport for NSW Traffic Volume Viewer

4.2 Warrant Assessment

Traffic signal warrants are outlined in Transport for NSW's *Traffic Signal Design – Section 2 Warrants*.

The most relevant warrant to the subject intersection outlines:

- For each of four one-hour periods of an average day:
 - (i) The major road flow exceeds 900 vehicles/hour in each direction
 - (ii) The minor road exceeds 100 vehicles/hour in one direction
 - (iii) The speed of traffic on the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles; and
 - (iv) There is no other nearby traffic signal site easily accessible to the minor road vehicles.

4.2.1 Major Road Flow

Based on volumes presented in Table 4.3, the major road flow (Princes Highway) exceeds 900 vehicles/hour in each direction and therefore meets the warrant.

4.2.2 Minor Road Flow

Table 4.4 assesses the minor road flow (Bunnings volumes), using both the TIA volumes and updated traffic volumes. It is assumed that the peak hour volumes from Bunnings will be roughly consistent for at least four one-hour periods.

Table 4.4: Traffic Signal Warrants Assessment

Peak Hour	Requirements	TIA Volumes				Recalculated Volumes			
		Weekday		Weekend		Weekday		Weekend	
		Vol (veh/h)	Criteria Met?	Vol (veh/h)	Criteria Met?	Vol (veh/h)	Criteria Met?	Vol (veh/h)	Criteria Met?
AM	> 100	15	N	-	-	97	N	-	-
PM		79	N	-	-	173	Y	-	-
Midday		-	-	320	Y	-	-	452	Y

The assessment shows that for PM and weekends, the recalculated traffic volumes satisfy the requirements for minor road flow. The AM volumes almost satisfy the requirements. As for the TIA volumes, the weekend volume also satisfies the requirements, but not the AM and PM volumes.

4.2.3 Speed and Safety

Princes Highway has a posted speed limit of 60km/h and has three lanes in each direction. It will be unsafe for right-turning traffic from Bunnings to cross at least three lanes of 60km/h traffic. This satisfies the third requirement of the warrant.

With the removal of Smith Street as an exit, there will also be no other nearby traffic signal site accessible for exiting Bunnings traffic. This satisfies the fourth requirement of the warrant.

Therefore, the Bunnings access at Princes Highway is determined to satisfy all four requirements of the traffic signal warrant based on updated traffic volumes.

5. Impacts of Traffic Signals

5.1 Impacts to Local Roads

The main objective of the proposed traffic signals at Princes Highway access is to reduce the cumulative traffic impact to Smith Street and the surrounding local traffic network, including Union Street.

5.1.1 Outgoing Traffic

Table 5.1 compares the amount of additional traffic (based on updated volumes) on both Smith Street and Union Street as a result of implementing the proposed signal arrangement.

Under the 'without signals' scenario, it is assumed 65% of traffic exit via Smith Street towards Princes Highway with 30% continuing onto Union Street.

Table 5.1: Outgoing Bunnings Traffic Volumes on Smith and Union Streets

Vehicles per hour via Smith Street (approaching Princes Highway)		Vehicles per hour via Union Street	
Without Signals	With Signals	Without Signals	With Signals
+ 271	0	+ 136	0*

**Right turn from Princes Highway into Union Street is not permitted, and therefore Bunnings outgoing traffic will be unable to travel via Union Street*

Therefore, traffic signals at the Bunnings access will eliminate any additional Bunnings related traffic on Smith Street approaching Princes Highway and on Union Street. This will significantly reduce the number of vehicles using Smith Street and reduce demand on the associated signalised intersection.

5.1.2 Incoming Traffic

Under each scenario, all or most incoming traffic will be using Smith Street to enter the Bunnings Site, increasing Bunnings related traffic along the local road and at the signalised intersection with Princes Highway.

Table 5.2 shows the incoming traffic volumes on Smith Street approaching the Bunnings access from Princes Highway under the scenarios of:

- No traffic signals
 - It is assumed 75% of incoming traffic will arrive via Smith Street, comprising some traffic from Princes Highway northbound, and all traffic from Princes Highway southbound
- Traffic signals - entry via Smith Street only (Option 1)
 - 100% of incoming traffic will arrive via Smith Street

- Traffic signals - entry via Smith Street and Princes Highway (Option 2)
 - Similar to the 'no traffic signals' scenario

Table 5.2: Incoming Bunnings Traffic Volumes on Smith Street

Vehicles per hour via Smith Street (approaching Bunnings access)		
Without Signals	With Signals	
	Entry via Smith Street only	Entry via Smith Street and Princes Highway
+339	+452	+339

5.1.3 Impacts to Local Residents

Union Street is a narrow residential road with vehicles parked on both sides of the road, while Smith Street is residential on the southern side (opposite Bunnings), with parked vehicles and driveways. It will then be more desirable to increase traffic via Smith Street towards Bunnings rather than allowing non-local Bunnings traffic on Smith Street approaching Princes Highway and Union Street.

5.2 Impacts to Princes Highway Traffic

Queues from adjacent signalised intersections, such as IKEA and Smith Street, are likely to extend up to or past the Bunnings access.

RMS's reasoning that there will be an increase in travel times and delays for southbound traffic still applies to this new signals arrangement. Furthermore, the traffic signals will also now control northbound through traffic to allow traffic to turn right out of Bunnings. This means the increase in travel times and delays will also apply to northbound traffic.

6. Summary

The following summarises the feasibility assessment of traffic signals at the Bunnings access at Princes Highway:

- Traffic signals were previously proposed but not supported by RMS at the time
- The intersection meets the traffic signal warrants using updated Bunnings traffic volumes
- The traffic signals will eliminate Bunnings traffic on Smith Street approaching Princes Highway and on Union Street, but will create additional traffic along Smith Street approaching the Bunnings access.
- The traffic signals will, however, cause an increase in travel times and delays for both directions of Princes Highway. Queues from adjacent signalised intersections may also extend up to or past the Bunnings access due to intersection spacing.

Attachment A: Past Correspondence between RMS and Council



29 August 2017

Our Reference: SYD17/00630/03
Council Ref: DA2017/00185

The General Manager
Inner West Council
2-14 Fisher Street
Petersham NSW 2049

Dear Sir/Madam

**PROPOSED BUNNINGS DEVELOPMENT
750 PRINCES HIGHWAY, TEMPE**

Reference is made to Council's email dated 15 August 2017, regarding the abovementioned Application which was referred to Roads and Maritime Services (Roads and Maritime) which requires consent for the provision of traffic control lights under Section 87 of the *Roads Act, 1993* and for concurrence in accordance with Section 138 of the *Roads Act, 1993*.

After meeting with the proponent and Roads and Maritime reviewing the submitted 'Assessment of Roads and Maritime Warrants For Provision of Traffic Signals', Roads and Maritime does not support traffic signals at this location. This is based on the assessment not meeting the Roads and Maritime requirements under the Warrants, in that the assessment indicated that the traffic volumes only indicate 16 (AM) and 47 (PM) vehicles entering the northern access during peak times and 117 movements during weekday at midday, which equates to only two car movements per minute.

Furthermore, traffic signals are not supported at this location due to the detrimental impact this would have on the network operations of southbound traffic on the Princes Highway. Since this section of the Highway is considerably congested and additional traffic signals would increase travel times and delays.

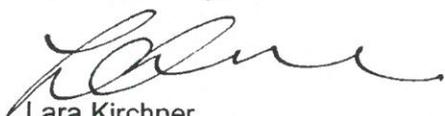
It should be noted that Roads and Maritime previously agreed to priority-controlled (unsignalised) right turns into the site, to support site access, in the previous letter dated 13 October 2016. Roads and Maritime provided further email clarification to these requirements dated 28 February 2017 and by letter dated 30 May 2017.

Therefore amended plans should be submitted demonstrating removal of the proposed traffic signals into the site via the Princes Highway and the incorporation of Road and Maritime previous requirements. Upon receipt of this information, Roads and Maritime will review and provide a response accordingly. It is also requested that the proponent submit a Transport Impact Assessment (TIA) and an independent Road Safety Audit (RSA) to support the application.

Roads and Maritime Services

Should you have any further inquiries in relation to this matter, please do not hesitate to contact our A/Senior Planner Brendan Pegg on 0400 250 950 by email at development.sydney@rms.nsw.gov.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Lara Kirchner', written in a cursive style.

Lara Kirchner

Director

Network South Precinct



30 May 2017

Our Reference: SYD17/00630
Council Ref: DA2017/00185

The General Manager
Inner West Council
2-14 Fisher Street
Petersham NSW 2049

Dear Sir/Madam

**PROPOSED BUNNINGS DEVELOPMENT
750 PRINCES HIGHWAY, TEMPE**

Reference is made to Council's letter dated 1 May 2017, regarding the abovementioned Application which was referred to Roads and Maritime Services (Roads and Maritime) which requires consent for the provision of traffic control lights under Section 87 of the *Roads Act, 1993* and for concurrence in accordance with Section 138 of the *Roads Act, 1993*.

Roads and Maritime has reviewed the submitted development application and notes that a traffic report has not been submitted with the proposed development to allow Roads and Maritime to undertake a comprehensive assessment of the proposed development. Therefore Roads and Maritime does not support the development at this stage due to the previous requirements of Roads and Maritime letter dated 13 October 2016 (ref: SYD14/01364/07 attached) not being incorporated in the current submission.

Roads and Maritime does not support the provision for traffic signals into the site from Princes Highway. Roads and Maritime previously agreed to filtered right turns into the site along with other requirements of its previous letter dated 13 October 2016. Roads and Maritime provided further email clarification to these requirements dated 28 February 2017.

Therefore amended plans should be submitted demonstrating removal of the proposed traffic signals into the site off Princes Highway and the incorporation of Road and Maritime previous requirements. Upon receipt of this information, Roads and Maritime will review and provide a response accordingly.

Should you have any further inquiries in relation to this matter, please do not hesitate to contact Hans Pilly Mootanah on telephone 8849 2076 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely,

Aleks Tancevski
Senior Land Use Planner
Network Sydney South Precinct

Roads and Maritime Services

Ross Nettle

From: PILLY MOOTANAH Hans R <Hans.PILLY.MOOTANAH@rms.nsw.gov.au>
Sent: Thursday, 2 March 2017 1:23 PM
To: Philip Drew; Ross Nettle
Cc: TANCEVSKI Aleksandar; KOCOSKI Nicolas; DEWBERRY Timothy C
Subject: RE: 20170228 - Roads and Maritime Advice: Princes Hwy and Smith St - Tempe Phase Splits for Bunnings (14274)

Hi Phil,

Roads and Maritime provides the following Pre-DA response to your enquiry below:

1. Does RMS recommend removal of the remaining on-street parking on the Highway? We demonstrated that it was minimal and little used and the sites have alternative access .

Response: Roads and Maritime position on parking restrictions remains as per our original response which stated that parking on the western side of the Princes Highway shall remain as currently signposted.

2. Does RMS support maintenance of the RT movement at Smith Street?

Response: Roads and Maritime advises that the RT movement into Smith Street shall remain as it is currently operating.

I hope this clarifies your query. Should you have any further questions, please do not hesitate to contact me.

Kind regards,

Hans Pilly Mootanah
Land Use Planner
Network Sydney | South Precinct
T 02 8849 2076
www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 11 27 Argyle Street Parramatta NSW 2150

From: Philip Drew [mailto:PDrew@bunnings.com.au]
Sent: Wednesday, 1 March 2017 11:33 AM
To: PILLY MOOTANAH Hans R; Ross Nettle
Cc: TANCEVSKI Aleksandar; KOCOSKI Nicolas; DEWBERRY Timothy C
Subject: RE: 20170228 - Roads and Maritime Advice: Princes Hwy and Smith St - Tempe Phase Splits for Bunnings (14274)

Good morning Hans,

Thank you for the response. Can you advise RMS' position, on a "pre-DA basis" on two important matters:

1. Does RMS recommend removal of the remaining on-street parking on the Highway? We demonstrated that it was minimal and little used and the sites have alternative access .
2. Does RMS support maintenance of the RT movement at Smith Street?



13 October 2016

Our Reference: SYD14/01364/07
Council Ref: DA201500385

Attention:

Ruba Osman
Marrickville Council
ruba.osman@innerwest.nsw.gov.au

Phil Drew
Bunnings
PDrew@bunnings.com.au

Dear Sir/Madam

**PROPOSED BUNNINGS DEVELOPMENT
750 PRINCES HIGHWAY, TEMPE**

Reference is made to Council's letter dated 23 July 2015, regarding the abovementioned Application which was referred to Roads and Maritime Services (Roads and Maritime) which requires consent for the provision of traffic control lights under Section 87 of the *Roads Act, 1993* and for concurrence in accordance with Section 138 of the *Roads Act, 1993*.

Roads and Maritime has since had on-going discussions with Bunnings with regards to the traffic implications on the surrounding network. Upon receipt of this information, further assessment was undertaken. As a result of these assessments and discussions, Bunnings is revising their access options into the site. Roads and Maritime at its meeting with Bunnings on 17 August 2016 agreed to an access strategy. Therefore Roads and Maritime provides the following comments:

1. Roads and Maritime advises that the subject property is within an area under investigation in relation to the Westconnex project. This proposal may change as no decision has yet been made and accordingly it is not possible at this date to provide any further information as to the likelihood of any part of the subject property being required. In this regard, Westconnex can be contacted for further information – info@westconnex.com.au or by calling 1300 660 246
2. Roads and Maritime would support right in only access from Princes Highway into the site, however the filtered right turns into Smith Street at the traffic signals will need to be banned to meet Roads and Maritime requirements.
3. Council will need to undertake consultation with Smith Street residents as the right turn will be removed from the highway

4. Therefore; Roads and Maritime supports the following works on Princes Highway;
- Proposed right in only access on Princes Highway (in a dedicated right turn bay)
 - Raised concrete median on Princes Highway
 - Left turn slip lane into Smith Street (with road widening into their property)
 - Re-alignment of Princes Highway at this location to accommodate all works.
5. A No U Turn restriction will need to be installed on the proposed raised central median opposite Foreman Street facing north bound traffic. (closure of the median on the highway)

It is emphasised that the comments provided above are informal and of a Pre-DA nature. They are not to be interpreted as binding upon Roads and Maritime and may change following formal assessment of a submitted development application from the appropriate consent authority.

Should you have any further inquiries in relation to this matter, please do not hesitate to contact Hans Pilly Mootanah on telephone 8849 2076 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely,



Pahee Rathan
Senior Land Use Planner
Network and Safety Section