KOLOTEX AND LABELCRAFT SITES

Peer Review

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Cardno
Shaping the Future

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1 Introduction

1.1 Background

Cardno has been engaged by the NSW Department of Planning & Infrastructure (DoPI) to undertake a peer review of the traffic and parking assessment that was undertaken in support of the proposed rezoning of the existing Kolotex and Labelcraft sites at 22 and 30-40 George Street, Leichhardt. The site location is shown in **Figure 1.1** below.

This report provides a traffic engineering peer review of the work that has already been undertaken as part of the Traffic and Parking Impact Assessment (T&PIA) produced by McLaren Traffic Engineering in October 2012 with particular attention to traffic generation and impact. The review also considers the issues raised by DoPI in a meeting that was held on Thursday 21 February, 2013.

Figure 1-1 Site Location

Source: www.nearmap.com

2 Background & Existing Conditions

2.1 Background

McLaren Traffic Engineering was commissioned by Catylis Properties Pty Ltd on behalf of KGS (Vic) Pty Ltd to undertake a Traffic and Parking Impact Assessment (T&PIA) for the proposed redevelopment of the existing Kolotex and Labelcraft sites at 22 and 30-40 George Street, Leichhardt. The T&PIA was produced by McLaren Traffic Engineering in October 2012.

The site is currently occupied by factory / warehouse uses. The proposed development mix assumed as part of the assessment was as follows:

- 334 mixed residential apartments
- Commercial office space (approximately 1,900m2)
- Car parking provision for approximately 280-360 spaces (at ground and basement level)

The main conclusions of the T&PIA produced by McLaren Traffic Engineering are as follows:

- *The development will give rise to substantially improved traffic and parking conditions compared to the existing site operation and DA approved industrial consent options for the site.*
- *The proposed development has sufficient car parking supply to cater for the proposed scale of development. Additionally, the quantum of bicycle parking will aid in promoting a greater mode share.*
- *The location of the loading dock access off Upward Street is acceptable as it is separate from the traffic generating driveways in George Street, therefore reducing conflict and congestion.*
- *The main ingress/egress points in George Street for residents and visitors are acceptable in terms of traffic flow, road safety and residential amenity.*
- *The assessed traffic generation has been accommodated by the surrounding intersections with no significant adjustments to LoS performances. The proposed site ingress and egress arrangements aid in protecting residential amenity.*
- *The recommended seagull/channelised intersection option and possible one way pair of Treadgold Street are viable options and provide improved road safety for all road users. The loss of on street parking due to the intersection upgrade is offset by parking gains provided by redundant vehicle crossovers around the site boundary. Additionally, the precinct is under parking capacity and the loss off parking will not have adverse effects.*
- *The site provides good internal pedestrian access and will accommodate the level of pedestrian activity through the site with due consideration given to the future light rail extension.*
- *The location of the site and density of development proposed is appropriate given the availability and choice of public transport services located close to the site, which will naturally lower the number of private vehicle movements generated by the development.*
- *Accordingly, the proposed development scale is supportable in terms of its traffic and parking impact provided the recommendations outlined in this report are adopted.*

2.2 Traffic Volumes

As part of the T&PIA produced by McLaren Traffic Engineering, traffic surveys were commissioned on Thursday 13 September 2012 for the following junctions between the 7:00am to 10:00am and 4:00pm to 7:00pm periods (as identified in **Figure 2.1** below):

1. Tebbutt Street / Parramatta Road (priority junction)
2. Upward Street / Parramatta Road (priority junction)
3. George Street / Parramatta Road (priority junctions)
4. West Street / Flood Street / Parramatta Road (signalised junction)
5. Marion Street / Flood Street (signalised junction)
6. Lords Road / Flood Street (roundabout)
7. Treadgold Street (south) / Flood Street (priority junction)
8. Lords Road / Tebbutt Street / Foster Street (signalised junction)
9. Marion Street / Foster Street (signalised junction)
10. Upward Street / Lords Road (priority junction)

Figure 2-1 Junction Survey Locations

Source: www.nearmap.com

The 2012 traffic survey data files was obtained by Cardno and analysed. The findings of this analysis revealed the following:

- The AM peak hour for the overall study network occurred between 7:30am and 8:30am.
- The PM peak hour for the overall study network occurred between 4:30pm and 5:30pm.
- The AM peak hour traffic on Parramatta Road at its intersection with West Street and Flood Street was 3,119 vehicles eastbound and 1,649 vehicles westbound which is a 65% and 35% split respectively.
- The PM peak hour traffic on Parramatta Road at its intersection with West Street and Flood Street was 2,488 vehicles eastbound and 2,322 vehicles westbound which is a 52% and 48% split respectively.
- The West Street / Flood Street / Parramatta Road junction experienced its peak hour periods between 7:30am to 8:30am and 4:30pm to 5:30pm. It is noted that the T&PIA produced by McLaren Traffic Engineering assumed the PM peak to occur between 4:15pm to 5:15pm which survey results indicated to have lower volumes of traffic (by approximately 187 vehicles).
- The Tebbutt Street / Parramatta Road junction experienced its peak hour periods between 7:30am to 8:30am and 4:30pm to 5:30pm. It is noted that the T&PIA produced by McLaren Traffic Engineering assumed the PM peak to occur between 4:45pm to 5:45pm which survey results indicated to have lower volumes of traffic (by approximately 285 vehicles).
- The Upward Street and George Street junctions with Parramatta Road experienced their peak hour periods between 7:30am to 8:30am and 4:30pm to 5:30pm. This is consistent with the assumptions made in the T&PIA.
- The Marion Street / Flood Street junction experienced its peak hour periods between 8:00am to 9:00am and 4:45pm to 5:45pm. It is noted that the T&PIA produced by McLaren Traffic Engineering assumed the PM peak to occur between 5:00pm to 6:00pm which survey results indicated to have lower volumes of traffic (by approximately 19 vehicles). This difference in vehicle numbers is considered to be negligible as modelling and observations of the junction show that it operates well within capacity.
- The Lords Road / Flood Street junction experienced its peak hour periods between 8:45am to 9:45am and 4:45pm to 5:45pm. This is consistent with the T&PIA assumptions.
- The Treadgold Street (south) / Flood Street junction experienced its peak hour periods between 8:00am to 9:00am and 5:00pm to 6:00pm. This is consistent with the T&PIA assumptions.
- The Lords Road / Tebbutt Street / Foster Street junction experienced its peak hour periods between 8:30am to 9:30am and 4:15pm to 5:15pm. This is consistent with the T&PIA assumptions.
- The Marion Street / Tebbutt Street junction experienced its peak hour periods between 7:15am to 8:15am and 5:00pm to 6:00pm. This is consistent with the T&PIA assumptions.
- The Upward Street / Lords Road junction experienced its peak hour periods between 8:30am to 9:30am and 4:30pm to 5:30pm. It is noted that the T&PIA produced by McLaren Traffic Engineering assumed the peaks to occur between 8:15am to 9:15am and 4:45pm to 5:45pm which survey results indicated to have lower volumes of traffic by approximately 68 and 8 vehicles respectively. This difference in vehicle numbers is considered to be negligible as modelling and observations of the junction show that it operates well within capacity.

The differences in volumes between modelled flows and the surveyed peak network flows particularly for the Tebbutt Street / Parramatta Road and the West Street / Flood Street / Parramatta Road junctions is considered to be significant and should be taken into account in relation to the junction assessments for the existing scenarios.

2.3 Existing Traffic Conditions

2.3.1 On-Site Observations

On-site observations in relation to the operation of the road network surrounding the site was undertaken on 27 February 2013 during both the 7:00am to 9:00am and 4:00pm to 6:00pm peak periods. The findings of the on-site observations are discussed below.

Parramatta Road and its junctions with Tebbutt Street, Upward Street, George Street, Flood Street and West Street

The Parramatta Road corridor experiences heavy congestion during both the AM and PM weekday peak periods.

The saturation flow of discharged traffic from the stop lines on both the eastbound and westbound approaches of Parramatta Road are not free flowing due to downstream congestion.

Queuing on the western approach of Parramatta Road was observed to be too large to measure and went past its adjoining upstream junctions. However, during the PM peak period the queuing on the westbound approach was observed to be approximately 14 vehicles (84 metres) in length in each lane.

Queuing on the right turn lane on Parramatta Road at its junction with West Street was observed to extend past the storage capacity provided and into the straight through lanes.

During the AM peak period the queuing on West Street at its junction with Parramatta Road was observed to be too large to measure extending past the bend. During the PM peak the queuing on West Street reduced significantly to approximately 9 vehicles (54 metres) in length in each lane.

During the AM peak, at the Flood Street / West Street / Parramatta Road junction, the upstream saturation flow of discharged traffic was not free flowing due to downstream congestion experienced on both Parramatta Road and West Street.

During the AM and PM peak periods the queuing on Flood Street at its junction with Parramatta Road was observed to be approximately 18 vehicles (108 metres) and 11 vehicles (66 metres) respectively in each lane.

The Flood Street / West Street / Parramatta Road signalised intersection was observed to operate under a three stage control with cycle times of approximately 145 seconds and 150 seconds during the AM and PM peaks respectively.

No significant queuing was observed to occur on Tebbutt Street, Upward Street and George Street at its approach to Parramatta Road.

Marion Street / Flood Street junction

The signalised intersection of Marion Street and Flood Street was observed to operate within capacity with sufficient levels of service.

Queuing on both the eastern and western approaches of Marion Street was observed to be approximately 15 vehicles (90 metres) and 2 vehicles (12 metres) respectively in each lane during the AM peak period. During the PM peak period the observed queuing on the eastern and western approaches of Marion Street were approximately 6 vehicles (36 metres) and 5 vehicles (30 metres) respectively in each lane.

Queuing on both the northern and southern approaches of Flood Street was observed to be approximately 8 vehicles (48 metres) and 1 vehicle (6 metres) respectively during the AM peak period. During the PM peak period the observed queuing on the northern and southern approaches of Flood Street were approximately 2 vehicles (12 metres) and 15 vehicles (90 metres) respectively in each lane.

The Marion Street / Flood Street signalised intersection was observed to operate under a two stage control with a cycle time of approximately 100 seconds during both the AM and PM peak periods.

Lords Road / Tebbutt Street / Foster Street junction

The signalised intersection of Lords Road, Tebbutt Street and Foster Street was observed to operate within capacity with sufficient levels of service.

Queuing on both the eastern and western approaches of Lords Street was observed to be approximately 2 vehicles (12 metres) and 1 vehicle (6 metres) respectively during the AM peak period. During the PM peak

period the observed queuing on the eastern and western approaches of Lords Street were approximately 7 vehicles (42 metres) and 1 vehicle (6 metres) respectively.

Queuing on both the Foster Street and Tebbutt Street approaches was observed to be approximately 5 vehicles (30 metres) and 10 vehicles (60 metres) respectively during the AM peak period. During the PM peak period the observed queuing on the Foster Street and Tebbutt Street approaches were approximately 20 vehicles (120 metres) and 5 vehicles (30 metres) respectively in each lane.

The signalised intersection was observed to operate under a three stage control with a cycle time of approximately 110 seconds during both the AM and PM peak periods.

Marion Street / Foster Street junction

The signalised intersection of Marion Street and Foster Street was observed to experience some levels of congestion during both the AM and PM peak periods.

During the AM peak period queuing on the eastern approaches of Marion Street was observed to be approximately 6 vehicles (36 metres) whilst on the western approach the queuing was too large to be measured and went past its adjoining upstream junction. However, during the PM peak period the queuing on both the eastern and western approaches was observed to be approximately 12 vehicles (72 metres) in length in each lane.

During the AM peak period queuing on the northern approach of Foster Street was observed to be approximately 12 vehicles (72 metres) whilst on the southern approach the queuing was too large to be measured and went past its adjoining upstream junction. During the PM peak period queuing on the southern approach was observed to be approximately 15 vehicles (90 metres) whilst on the northern arm the queue was too large to be measured and went past its adjoining upstream junction.

The signalised intersection was observed to operate under a four stage and three stage control during the AM and PM peak periods respectively. The cycle times observed were approximately 100 seconds in both peak periods.

Upward Street / Lords Road, Lords Road / Flood Street and Treadgold Street (south) / Flood Street junctions

The priority controlled junctions of Upward Street / Lords Road and Treadgold Street (south) / Flood Street as well as the roundabout junction of Lords Road / Flood Street were observed to operate within capacity with sufficient levels of service and minimal queuing.

2.3.2 SIDRA Assessment

McLaren Traffic Engineering utilised SIDRA modelling software which is designed to calculate intersection operational capacity. The SIDRA models that were developed as part of the assessment have been obtained and interrogated by Cardno with the findings detailed below:

Tebbutt Street / Parramatta Road (priority junction)

The AM period assessed did not take account of the surveyed peak hour network flow volumes which would have resulted in an additional 285 vehicles passing through the junction.

The structure of the SIDRA model is incorrect as Parramatta Road is modelled as having only 1 straight through lane and not 2 through lanes. As a result of the structure used only half the straight through volumes on Parramatta Road was input into the model. The provision of the two through lane model structure would impact on the performance of the Tebbutt Street approach particularly during the PM peak period.

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions and should be addressed in order to better reflect existing conditions.

Upward Street / Parramatta Road (priority junction)

The structure of the SIDRA model is incorrect as Parramatta Road is modelled as having only 1 straight through lane and not 2 through lanes and 1 right turn lane.

The values of the eastbound flow that was input into the model for Parramatta Road is low and is not consistent with the survey data for both the AM and PM peak periods. A revision of the traffic flows and model structure to better reflect the existing layout would impact on the performance of the Upward Street approach.

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions and should be addressed in order to better reflect existing conditions.

George Street / Parramatta Road (priority junctions)

The structure of the model is incorrect as Parramatta Road is modelled as having only 1 straight through lane and not 2 through lanes and 1 right turn lane.

The values of the eastbound flow that was input into the model for Parramatta Road is low and is not consistent with the survey data for both the AM and PM peak periods. A revision of the traffic flows and model structure to better reflect the existing layout would impact on the performance of the Upward Street approach.

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

Flood Street / West Street / Parramatta Road (signalised junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

The 'gap acceptance' factors (i.e. critical gap and follow-up headway) used for right turn traffic on West Street is below the minimum times contained within the AUSTROADS Guide (2010).

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

The junction was modelled to operate under a four stage signal control with a 130 and 150 second cycle time during the AM and PM peak hour periods respectively. This is different to the signal stages and cycle times that were observed on site.

A comparison of the observed queue lengths to the results of the McLaren Traffic Engineering assessment is summarised in **Table 2.1** below.

Table 2-1 Queue Length Comparison – Flood Street / Parramatta Road / West Street

Approach	AM Peak		PM Peak	
	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)
West Street (south) (2 lane approach)	11.9	Long[1]	18.5	9
Parramatta Road (east) (3 lane approach)	33.0	Long[1]	68.9	14
Flood Street (north) (2 lane approach)	8.4	18	15.2	11
Parramatta Road (west) (3 lane approach)	65.6	Long[1]	49.7	Long[1]

Notes:
1. Queue length was too large to be measured and went past its adjoining upstream junction.

As can be seen from the table above there are some large discrepancies between the model and observed queue lengths. This particularly applies to the Parramatta Road and West Street approaches where the 95th percentile queues estimated by the model were significantly lower than what was observed on site.

Marion Street / Flood Street (signalised junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

The junction was modelled to operate under a five stage control with a 130 and 150 second cycle time during the AM and PM peak hour periods respectively. This is different to the staging and cycle times of what was observed for both the AM and PM peak periods (although the PM cycle time of 150 seconds was consistent with what was observed).

Table 2-2 Queue Length Comparison – Marion Street / Flood Street

Approach	AM Peak		PM Peak	
	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)
Flood Street (south) (2 lane approach)	14.7	1	24.2	15
Marion Street (east) (2 lane approach)	7.7	15	18.5	6
Flood Street (north) (2 lane approach)	5.3	8	6.9	2

Marion Street (west) (2 lane approach)	48.3	2	17.4	5

A comparison of the observed queue lengths to the results of the McLaren Traffic Engineering assessment is summarised in **Table 2.2** above. As can be seen there are discrepancies between the modelled and observed queue lengths, with the model mainly estimating longer queues than what was observed.

Lords Road / Flood Street (roundabout)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

Treadgold Street (south) / Flood Street (priority junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

Lords Road / Tebbutt Street / Foster Street (signalised junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

The junction was modelled to operate as a three stage control with a 110 and 70 second cycle time during the AM and PM peak hour periods respectively. The modelled signal staging and phasing match the observed operation. However, the cycle time for the PM peak period was observed to be approximately 110 seconds.

A comparison of the observed queue lengths to the results of the McLaren Traffic Engineering assessment is summarised in **Table 2.3** below. As can be seen there are discrepancies between the modelled and observed queue lengths, with the model mainly estimating longer queues than were observed.

Table 2-3 Queue Length Comparison – Tebbutt Street / Lords Street / Foster Street

Approach	AM Peak		PM Peak	
	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)
Tebbutt Street (south) (2 lane approach)	28.7	10	7.5	5
Lords Road (east) (2 lane approach)	6.0	2	8.2	7
Tebbutt Street (north) (2 lane approach)	19.5	5	18.3	20
Lords Road (west) (2 lane approach)	2.3	1	0.8	1

Marion Street / Foster Street (signalised junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

The 'gap acceptance' factors (i.e. critical gap and follow-up headway) used for right turn traffic on West Street are below the minimum times contain within the AUSTROADS Guide (2010).

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

The junction was modelled to operate as a three stage control with a 100 and 65 second cycle time during the AM and PM peak hour periods respectively. This is different to the observed operation under a four and three stage control during the AM and PM peak periods respectively where the cycle time was noted to be approximately 100 seconds in both the peak periods.

A comparison of the observed queue lengths to the results of the McLaren Traffic Engineering assessment is summarised in **Table 2.4** below.

Table 2-4 Queue Length Comparison – Marion Street / Foster Street

Approach	AM Peak		PM Peak	
	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)	McLaren Traffic Modelled Queue Length (vehicles)	Observed Queue Length (vehicles)
Tebbutt Street (south) (2 lane approach)	193.7	Long[1]	26.4	15
Marion Street (east) (2 lane approach)	19.1	6	44.7	12
Foster Street (north) (2 lane approach)	11.5	12	45.9	Long[1]
Marion Street (west) (2 lane approach)	392.3	Long[1]	37.8	12

Notes:
1. Queue length was too large to be measured and went past its adjoining upstream junction.

As can be seen from the table above there are discrepancies between the modelled and observed queue lengths. However, there seems to be some comparison on the approaches that were observed to experience queue lengths that were too large to be measured as they went past the adjoining upstream junctions.

Upward Street / Lords Road (priority junction)

During the peak hour periods the 'peak flow factor' applied was 100%. The application of this factor has not been justified with calculations not provided.

A heavy vehicle composition of 0% has been assumed for all the approaches. This does not reflect current conditions.

3 Proposal

3.1 Proposed Development

The proposed development that was assumed as part of the assessment by McLaren Traffic Engineering is as follows:

- 334 mixed residential apartments (204 x1 bedroom units, 102 x2 bedroom units, 28 x3 bedroom units).
- Commercial office space (approximately 1,900m^2).
- Car parking provision for approximately 280-360 spaces (at ground and basement level) of which 33 shall be accessible resident spaces and 1 shall be an accessible commercial space.
- Approximately 149 bicycle spaces and associated storage facilities.
- Ground level parking access via separate entry and exit driveways on George Street and a single exit driveway on Upward Street on the northwest corner of the site.
- Basement car park access via a dual entry and exit driveway off George Street.
- Loading area access off Upward Street with separated ingress and egress points.

3.2 Neighbouring Site

It is reported that although not part of the proposed application the proposed rezoning of the neighbouring land at 10-12 George Street was considered in the assessment due to a request by DoPI. For the purposes of the assessment a development consisting of 44 residential units and commercial office space of approximately 1,250m^2 was assumed for the neighbouring site.

4 Traffic Assessment

4.1 Traffic Generation

The Roads and Maritime (RMS) 'Guide to Traffic Generating Development' sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses and is generally regarded as the standard for metropolitan development characteristics.

Traffic generation rates for the residential and commercial office uses proposed are contained in the RMS Guide and is summarised **Table 4.1** below.

A reduction factor based on Census Journey to Work data for Leichhardt LGA was applied to the commercial office trip rates adopted in the TIA by McLaren Traffic Engineering. A significant proportion of employees would be living outside of the Leichhardt LGA and therefore a reduction of the traffic generation rates based on Census Journey to Work for the Leichhardt LGA is not considered to be appropriate.

Table 4-1: Traffic Generation Rates

USE	SCALE	PEAK HOUR GENERATION RATE (AM and PM)	PEAK HOUR TRAFFIC GENERATION (ARRIVALS and DPARTURES)
Residential	334 dwelling	0.29 per dwelling	97
Commercial Office	1,900m2	2 per 100m^2 GFA	38
		Total	135

As can be seen from **Table 4.1** above the application of the RMS traffic generation rates to the proposed development would result in a total of 135 peak hour trips (arrivals and departures). The McLaren assessment assumed a total of 129 peak hour trips. The McLaren Traffic Engineering assessment of 6 fewer vehicle trips generated during the peak hour periods is considered negligible and would not materially impact upon the outcome of the assessment.

It is noted that a reduction factor was also applied to the proposed rezoning of 10-12 George Street resulting in 4 fewer vehicles when compared against the application of full RMS rates. However, similar to above the assessment of 4 fewer vehicle trips generated during the peak hour is considered negligible for the outcome of the assessment.

For the existing uses on the Kolotex and Lablecraft sites the McLaren Traffic Engineering assessment assumed industrial uses of 20,000m^2 and 4,550m^2 respectively. The application of 1 peak hour vehicle trip per 100m^2 is consistent with RMS Guidelines. However, the assumption of a 50/50 split for arrival and departures is questioned. This split is queried as a 90% arrival and 10% departure split during the AM (and vice versa during the PM) is considered to be a more appropriate assumption for industrial uses.

4.2 Traffic Assignment

Traffic assignment to/from the site has been based on Census Journey to Work (2006) data. A review of the Census data has been undertaken and it is found that the proportions for each destination are broadly consistent with our findings.

The McLaren Traffic Engineering assessment notes that the *'traffic generation loaded onto the surrounding road network has generally followed the Journey to Work data.'* However, a review of the assumed traffic assignment on the surrounding road network as a result of the proposed development indicates a lower than anticipated proportion of traffic has been assigned onto Parramatta Road. Therefore, there would be reduced confidence that the assessment would accurately reflect forecast conditions.

4.3 Growth

The traffic assessment by McLaren Traffic Engineering did not discuss or take into account growth in background traffic volumes for the future development opening year and opening plus 10 year periods. Background growth in traffic volumes on the surrounding road network should be fully considered as part of the network assessment.

4.4 Traffic Impact

The traffic impact assessment undertaken by McLaren Traffic Engineering using SIDRA modelling software indicates that the majority of the surrounding intersections would maintain their existing levels of performance once the proposed development is in operation. However, it is considered that the impact of the proposed development should be further considered once the assessment takes into account the issues that have been raised in this report such as:

- The use of baseline traffic volumes based on surveyed peak flows for the intersections being assessed.
- The accounting of heavy vehicle compositions in baseline flows.
- Calibration and validation of base SIDRA models as well the correct application of modelling factors such as peak flow factor.
- Taking account of the importance of Parramatta Road when assessing the proposed development traffic assignment onto the surrounding road network.
- Application of suitable background growth for the forecast scenarios.

McLaren Traffic Engineering makes reference to the level of traffic which has already been approved for the existing site being significantly greater than what is anticipated to be generated as part of the current proposal. Details of this approval have not been provided. However, it is understood that the reference is being made to a development consent from 1970. If this is the case, it is likely that any planning consent would have lapsed some time ago. In any event, a planning application which was submitted in 1970 may not be acceptable by current standards if it were to be assessed today. The planning application for the proposed development should be based on current policies and guidelines and be assessed against both current and forecast network conditions.

5 Car Parking Assessment

5.1 Leichhardt Council Development Control Plan (DCP)

The application of the parking standards set out within Leichhardt Council's Development Control Plan (DCP) to the proposed development yields a minimum requirement of 274 spaces and a maximum of 548 spaces. The DCP car parking standards are summarised in **Table 5.1** below.

Table 5-1: Leichhardt Council DCP Parking Standards

USE	SCALE	Minimum Parking Rate	Maximum Parking Rate
Residential	204 x1 bedroom dwellings	0.5 per dwelling	1 per dwelling
	102 x2 bedroom dwellings	0.8 per dwelling	1.6 per dwelling
	28 x3 bedroom dwellings	1 per dwelling	2 per dwelling
	Visitors	0.1 per dwelling	0.2 per dwelling
Commercial Office	1,900m2	1.5 per 100m^2 GFA	3 per 100m^2 GFA

5.2 Roads and Maritime Services (RMS) Guidelines

The application of the parking standards set out within the RMS Guidelines to the proposed development yields a parking requirement of between 283 to 368 spaces. The parking standards set out with the RMS Guide are summarised in **Table 5.2** below.

Table 5-2: RMS Guidelines - Parking Standards

USE	SCALE	Regional Parking Rate	Sub Regional Parking Rate
Residential	204 x1 bedroom dwellings	0.4 per dwelling	0.6 per dwelling
	102 x2 bedroom dwellings	0.7 per dwelling	0.9 per dwelling
	28 x3 bedroom dwellings	1.2 per dwelling	1.4 per dwelling
	Visitors	1 per 7 dwellings	1 per 5 dwellings
Commercial Office	1,900m2	1 per 40m^2 GFA	1 per 40m^2 GFA

5.3 118-124 Terry Street, Rozelle

Reference has been made to the adopted site specific controls (July 2012) contained in the Leichhardt DCP for a predominantly residential development with small retail / commercial and light industrial elements located at 118-124 Terry Street in Rozelle.

One of the objectives set out within the DCP is that *'the development minimises the use of private motor vehicles and the traffic generated by the development does not have an unacceptable impact on traffic.'* This is supported by an objective *'to encourage the use of active transport including public transport, cycling and walking.'*

The parking rates set out within the site specific Terry Street DCP is summarised **Table 5.3** below. It can be seen that these site specific parking rates fall within the range contained in Leichhardt Council's DCP (summarised in **Table 5.1** above).

Table 5-3: Terry Street Site - Leichhardt Council DCP Parking Standards

USE	SCALE	Parking Rate[1]
Residential	Studio / 1 bedroom dwellings	1 per dwelling
	2 bedroom dwellings	1 per dwelling
	3 bedroom dwellings	1.5 per dwelling
	Visitors	1 per 10 dwellings
Non-Residential	-	1 per 65m^2 GFA

Notes:
1. Parking up to a maximum of 250 spaces.

5.4 Balmain Leagues Club Precinct

Reference has also been made to the adopted site specific controls (June 2008) contained in the Leichhardt DCP for a mixed use development at the Balmain Leagues Club Precinct. The range of uses include commercial, retail, restaurant and cafes, residential, car parking, leagues club and plaza.

One of the objectives set out within the DCP is *'to provide parking on site that reflects the site's proximity to public transport and promote choice in available transport modes and reduce dependency on cars.'* It is noted that the site is located along a strategic bus corridor and that the parking rates aim to discourage vehicles and encourage alternative transport forms and does not require each dwelling to be provided with a parking space.

The relevant parking rates set out within the Balmain Leagues Club Precinct DCP is summarised **Table 5.4** below.

Table 5-4: Balmain Leagues Club Precinct - Leichhardt Council DCP Parking Standards

USE	SCALE	Maximum Parking Rate
Residential	Bed-sit	Nil
	1 bedroom dwellings	0.5 per dwelling
	2 bedroom dwellings	0.8 per dwelling
	3+ bedroom dwellings	1 per dwelling
	Visitors (1 bedroom)	0.6 per dwelling
	Visitors (2 bedroom)	0.9 per dwelling
	Visitors (3+ bedroom)	1.1 per dwelling
Commercial	-	1.5 per 100m^2 GFA

5.5 Recommendations

The proposed development at the Kolotex and Labelcraft sites is to provide a total of 280 to 360 spaces of which 218-298 are residential spaces, 33 are residential visitor spaces and 29 are commercial spaces. Therefore, the McLaren assessment concludes that the proposed level of parking is within an acceptable range when compared with both the Council's and RMS requirements.

It is noted that the Leichhardt DCP states the following when referring to its car parking rates:

'The rates in the following table are intended as a generic guide and may need to be adjusted for local circumstances, employee densities, public transport accessibility and reduced car mode share targets, where appropriate.'

In line with the DCP advice above it is considered that factors that are more specific to the proposed application site should be taken into account in the determination of suitable car parking provision such as those listed below:

- The surrounding road network has limited capacity to accommodate future increases in traffic levels generated by new development due to current congestion levels experienced during peak hour periods on the surrounding road network (particularly Parramatta Road).
- The development provides a good opportunity to reduce reliance of private vehicle usage due to its high levels of public transport accessibility and its proximity to regular bus services, rail stations and the proposed new Taverns Hill light rail stop which is to be provided as part of the light rail extension.
- Provision of pedestrian and cycle linkage through the site providing improved connectivity to the external network and public transport facilities.

Taking note of the site specific factors listed above and the precedents that have been set by the site specific DCP's it is considered that the proposed levels of car parking provision should be significantly reduced with an increased level of car fee development. The reduced parking levels would need to be supported by improving on-street car parking restrictions and the provision of a green travel plan strategy ensuring that adequate measures would be in place for the sustainability of the proposed development.

It is noted that the public transport accessibility levels at the Kolotex and Labelcraft sites would be higher than that for the Balmain Leagues Club Precinct whose DCP parking rates do not require each dwelling to be provided with a parking space.

In order to provide preliminary advice at this stage it is considered that subject to further refinement the suggested range for parking provision at the subject site be between car free development (i.e. parking for only disabled persons and key operational requirements for commercial / residential uses) and up to the maximum rates as suggested in **Table 5.5** below. The findings of the revised traffic impact assessment taking account of the points raised in this review would better inform the determination of suitable levels of car parking provision.

Table 5-5: Preliminary Suggested Parking Rates

USE	SCALE	Minimum Parking Rate	Maximum Parking Rate
Residential	Studio dwellings	Nil	Nil
	1 bedroom dwellings	Meet requirements for disabled parking provision	0.5 per dwelling
	2 bedroom dwellings	Meet requirements for disabled parking provision	0.8 per dwelling
	3+ bedroom dwellings	Meet requirements for disabled parking provision	1 per dwelling
	Visitors	Nil	0.1 per dwelling
Commercial Office		Meet requirements for disabled parking provision and key operational requirements	1.5 per 100m^2 GFA

6 Site Access and Proposed Network Options

6.1 Site Access

The proposed access strategy is to minimise truck and private vehicle conflict by containing servicing vehicles to the south west sector of the site via Parramatta Road and Upward Street whilst the majority of the traffic generated by the development will travel via George Street and Flood Street. The principles of the access strategy are generally supported.

6.2 Proposed Network Options

McLaren Traffic Engineering has considered several options in order to improve traffic flow efficiency which include the following:

- Signalisation of Treadgold Street / Flood Street intersection.
- Implementation of one-way circulation on Treadgold Street.
- Implementation of 'No Parking' restrictions during peak periods on the short segment of Treadgold Street (south) between Flood Street and George Street.
- Conversion of the Treadgold Street (south) / Flood Street intersection to a channelised or seagull type intersection.
- Introduction of a 'No Left Turn' restriction from George Street to Parramatta Road during the morning peak hour period.

Taking account of traffic engineering warrants, flow efficiency and safety the recommendation by McLaren Traffic Engineering to provide a seagull / channelised intersection at Treadgold Street / Flood Street is supported in addition to the implementation of 'No Parking restrictions' on the short segment of Treadgold Street (south) between Flood Street and George Street provided that any loss of on-street parking spaces can be minimised by the rationalisation of crossovers along the site boundary.

It is noted that the proposed introduction of a one-way circulation on Treadgold Street does not seem to be warranted with minimal benefits.

7 Conclusions

Having reviewed the Traffic and Parking Impact Assessment undertaken by McLaren Traffic Engineering, observed the surrounding road network and perused relevant documents and plans, we are of the opinion that further traffic analysis shall need to be undertaken at the Development Application (DA) stage particularly in relation to traffic network impact and parking provision. The following issues should be fully considered at the more detailed DA stage:

- The Traffic and Parking Impact Assessment undertaken by McLaren Traffic Engineering should be revised in order to assess the impact of the proposed development in the surrounding road network.
- The difference in volumes between modelled flows and the surveyed peak network flows particularly for the Tebbutt Street / Parramatta Road and the West Street / Flood Street / Parramatta Road junctions is considered to be significant and should be taken into account in relation to the junction assessments for the existing scenarios.
- The base SIDRA models need to be appropriately calibrated and validated along with the correct application of modelling factors such as peak flow factor and gap acceptance factors.
- There are some large discrepancies between the modelled and observed queue lengths. This particularly applies to Parramatta Road where the queues estimated by the model were significantly lower than what was observed on site.
- The Parramatta Road corridor experiences heavy congestion during both the AM and PM weekday peak periods. The saturation flow of discharged traffic from the stop lines on both the eastbound and westbound approaches of Parramatta Road are not free flowing due to downstream congestion. Queuing at some intersections particularly on Parramatta Road were observed to be too large to measure.
- A heavy vehicle composition of 0% has been assumed for all intersection approaches that were modelled. This does not reflect current conditions.
- The assumed development traffic assignment on the surrounding road network indicates a lower than anticipated proportion of traffic being assigned onto Parramatta Road.
- The traffic assessment did not discuss or take into account growth in background traffic volumes for the future development opening year and opening plus 10 years period. Background growth in traffic volumes on the surrounding road network should be fully considered as part of the network assessment.
- McLaren Traffic Engineering makes reference to the level of traffic which has already been approved for the existing site being significantly greater than what is anticipated to be generated as part of the current proposal. Details of this approval have not been provided. However, it is understood that the reference is being made to a development consent from 1970. If this is the case, it is likely that any planning consent would have lapsed some time ago. In any event, a planning application which was submitted in 1970 may not be acceptable by current standards if it were to be assessed today. The planning application for the proposed development should be based on current policies and guidelines and be assessed against both current and forecast network conditions.
- In line with the DCP advice it is considered that factors that are more specific to the proposed application site should be taken into account in the determination of suitable car parking provision such as those listed below:

  1) The surrounding road network has limited capacity to accommodate future increases in traffic levels generated by new development due to current congestion levels experienced during peak hour periods on the surrounding road network (particularly Parramatta Road).

  2) The development provides a good opportunity to reduce reliance of private vehicle usage due to its high levels of public transport accessibility and its proximity to regular bus services, rail stations and the proposed new Taverns Hill light rail stop which is to be provided as part of the light rail extension.

3) Provision of pedestrian and cycle linkage through the site providing improved connectivity to the external network and public transport facilities.

- Taking note of the site specific factors listed above and the precedents that have been set by the site specific DCP's (such as 118-124 Terry Street and Balmain Leagues Club Precinct) it is considered that the proposed levels of car parking provision should be significantly reduced with an increased level of car fee development. The reduced parking levels would need to be supported by improving on-street car parking restrictions and the provision of a green travel plan strategy ensuring that adequate measures would be in place for the sustainability of the proposed development.
- The findings of the revised traffic impact assessment taking account of the points raised in this review would better inform the determination of suitable levels of car parking provision. However, in order to provide preliminary advice at this stage it is considered that subject to further refinement the suggested range for parking provision at the subject site be between car free development (i.e. parking for only disabled persons and key operational requirements for commercial / residential uses) and up to the maximum rates as suggested in **Table 5.5**.
- The proposed access strategy is to minimise truck and private vehicle conflict by containing servicing vehicles to the south west sector of the site via Parramatta Road and Upward Street whilst the majority of the traffic generated by the development will travel via George Street and Flood Street. The principles of the access strategy are generally supported.
- Taking account of traffic engineering warrants, flow efficiency and safety the recommendation by McLaren Traffic Engineering to provide a seagull / channelised intersection at Treadgold Street / Flood Street is supported in addition to the implementation of 'No Parking restrictions' on the short segment of Treadgold Street (south) between Flood Street and George Street provided that any loss of on-street parking spaces can be minimised by the rationalisation of crossovers along the site boundary. It is noted that the proposed introduction of a one-way circulation on Treadgold Street does not seem to be warranted with minimal benefits.