DoPI 2011/117 Review of Traffic and Transport Planning Assessments - Major Project Proposals for Mixed Used Developments at Lewisham and Summer Hill

Assessment Report

12 January 2012

FINAL

Prepared for

Department of Planning and Infrastructure

Halcrow

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This report has been issued and amended as follows:

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1 Introduction

The NSW Department of Planning and Infrastructure (DoPI) has received two separate Major Project applications concerning the redevelopment of two adjoining industrial sites. The development sites are known as the Lewisham Estate and Summer Hill Flour Mill (also known as the Allied Mill site). DoPI is in the process of assessing the merits of the submissions including a review of the traffic and transport implications of proposed developments.

To this end, Halcrow has been commissioned to:

- conduct a review of the two accompanying Traffic Management and Accessibility Plan (TMAP) reports prepared by the respective proponents' traffic consultants; and
- undertake an independent assessment of the cumulative traffic impacts of the proposed developments on the subject sites as well as a separate but related site known as the McGill Street Precinct.

This report has been prepared to document the findings from the review and the cumulative traffic assessment results.

The report is set out as follows:

- Chapter 2 describes the development sites and traffic conditions on the surrounding road network;
- Chapter 3 describes the proposed developments;
- Chapter 4 reviews the TMAP assessment reports;
- Chapter 5 reviews the proposed parking and compares it with Council's requirements;
- Chapter 6 reviews the applicant's site generated traffic;
- Chapter 7 presents a summary of submissions received from Council and various government authorities;
- Chapter 8 presents a summary of the comments raised by the two Councils in two separate meetings conducted as per of the consultation process;

- Chapter 9 presents the results of the cumulative traffic impacts; and
- Chapter 10 provides the summary, conclusions and recommendations of the findings.

2 Existing Conditions

2.1 Development Sites

The locations of the development sites are shown in **Figure 1**.

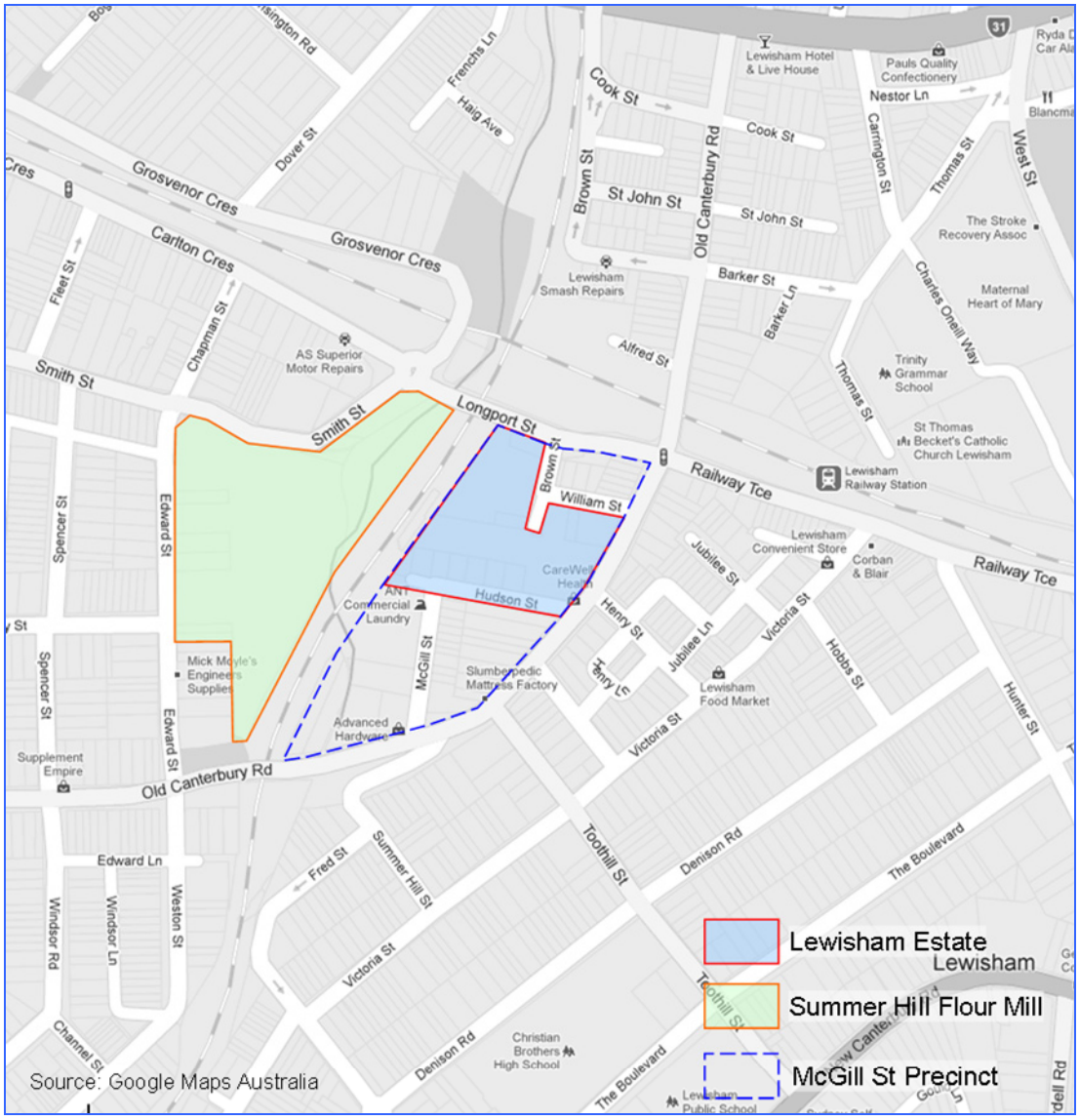

Figure 1 Site Location

The Lewisham Estate site is located at 78-90 Old Canterbury Road, Lewisham. It is approximately 6.5km south west of Sydney CBD area and is located within the local government area of Marrickville Council. It is a former industrial site within an established residential area. Being a former industrial site, the site contains a number of derelict warehouse buildings with some still in use, albeit at a reduced scale.

The site is bounded by Old Canterbury Road to the east, Hudson Street to the south, a disused goods railway line to the west and Longport Street and William Street to the north.

Nearby is the McGill Street Precinct, which is an urban renewal area identified by Marrickville Council. The Lewisham Estate site forms the northern half of the McGill Street Precinct. The McGill Street Precinct extends the site boundary further south to be adjacent to Old Canterbury Road. Marrickville Council has formulated a masterplan for the redevelopment of the entire site (including the Lewisham Estate). The McGill Street Precinct Masterplan was adopted by Council in November 2009.

The Summer Hill Flour Mill site is located at 2-32 Smith Street, Summer Hill, and is located within the local government area of Ashfield Municipal Council. It is immediately adjacent to the McGill Street Precinct site, but across the disused goods railway line.

The Summer Hill Flour Mill site is also a former industrial site although industrial activities on the site have all but ceased.

It is bounded by the disused goods railway line to the east, Old Canterbury Road to the south, Edward Street to west and Smith Street and Longport Street to the north.

The sites are located between two CityRail railway stations, namely Lewisham and Summer Hill Stations. The McGill Street Precinct site is within 400m walking distance to the Lewisham Railway Station, and approximately 735m walking distance to Summer Hill Railway Station. While the Summer Hill Flour Mill site is located approximately 750m and 650m walking distance from Lewisham and Summer Hill Railway Stations respectively.

Sydney Buses operates a number of bus services in the vicinity of the sites including Route 413 from Campsie to City along Old Canterbury Road. There are additional bus services along Parramatta Road and New Canterbury Road which are approximately 650m and 770m walking distance respectively from the centre of the sites.

2.2 Existing Road Network

The existing road network in the vicinity of the sites includes:

- Parramatta Road;
- Old Canterbury Road;
- Carlton Crescent/Longport Street/Railway Terrace;
- Toothill Street; and
- West Street.

These roads are described further below.

Parramatta Road is a State Road forming a critical arterial road link in the east-west direction within the State road network. It has the principal function of carrying through traffic between major regional areas within Sydney metropolitan area. It provides access into Sydney CDB in the east, and to Parramatta in the west. In the vicinity of the sites, it is a six-lane divided road with a sign posted speed limit of 60km/hr.

Old Canterbury Road is also a declared State Road. It runs in a north-south direction connecting to Parramatta Road in the north and Canterbury Road in the south. It is generally a four-lane road with a 60km/hr speed limit. But, north of Railway Terrace, together with Brown Street, Barker Street, Cook Street and Hathern Street, they form a one-lane, one-way loop connecting to Parramatta Road to provide access to Sydney CBD.

Railway Terrace is another declared State Road running in an east-west direction connecting to Sydenham Road via Livingstone Road in the east. It runs along the southern side of the railway line. The railway embankment and existing buildings on the

southern side of Railway Terrace result in a very narrow carriageway. As such, it only has one traffic lane in each direction. It has a 60km/hr speed limit.

Carlton Crescent and its continuation in the east Longport Street is a regional road (a secondary road with a sub-arterial road function) running in the east-west direction connecting to the Hume Highway in the west, and Railway Terrace in the east. It also has a posted speed limit of 60km/hr with one traffic lane and one parking lane in each direction.

Toothill Street is a regional road connecting Old Canterbury Road in the north to New Canterbury Road in the south. It generally has one traffic lane and one parking lane in each direction with a posted speed limit of 60km/hr.

West Street is another regional road connecting Parramatta Road with Railway Terrace. Near Railway Terrace, it is configured as a four-lane, two-way road with kerbside parking prohibited. Past Brighton Street, it has one traffic and one parking lane in each direction.

In addition to the above, the sites are also served by other local streets which include Smith Street, Edward Street, McGill Street, Hudson Street, William Street and Brown Street. With the exception of Smith Street and Edward Street, these are industrial access roads serving the two sites. Smith Street and Edward Street are local residential streets.

The intersection of Old Canterbury Road and Railway Terrace is controlled by traffic signals. Right turn bans on all approaches at this intersection are in place. The northbound and eastbound traffic flows are constrained immediately downstream of the intersection where the available traffic lanes are reduced from two to one.

The Toothill Street intersection with Old Canterbury Road is also controlled by traffic signals as is the intersection at Railway Terrace with West Street. At these two intersections, the right turn movement on the through approach shares a traffic lane with the adjacent through traffic movement. Due to the heavy right turn traffic flows, the shared lane becomes a de facto right turn lane reducing the capacity of the through movement.

At the Longport Street intersection with Smith Street, a single lane roundabout has been provided to regulate traffic at this intersection. All other intersections are provided as priority controlled intersections.

2.3 Existing Traffic Conditions

Site inspections were undertaken to observe traffic operating conditions in the vicinity of the sites during peak periods. The inspections were conducted on 3 and 4 November 2011 during the morning and evening peak periods.

2.3.1 Morning Peak Conditions

Figure 2 below shows the observed morning peak queues in the vicinity of the sites.

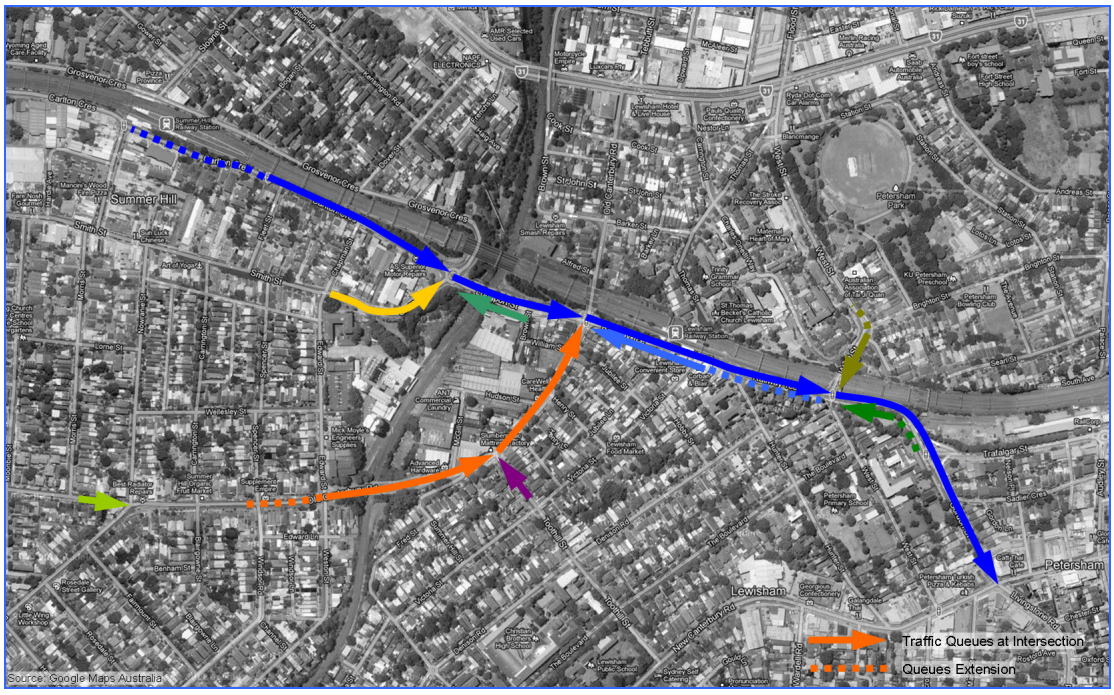

Figure 2 Morning Peak Queues

In the morning peak period, extensive traffic queues were observed along Old Canterbury Road and Longport Street/Railway Terrace.

During the morning peak period, an extensive queue was observed in the northbound direction on Old Canterbury Road extending from Railway Terrace to Edward Street (approximately 500m long). On some extreme occasions, this queue was observed to extend past Spencer Street (an additional 100m).

This extensive queue is mainly due to the northbound traffic lanes reducing from two lanes to one lane at the intersection of Old Canterbury Road with Railway Terrace. From the on-site observations, it was clear that northbound through traffic on Old Canterbury Road was using both traffic lanes upstream of the intersection, and then traffic would slow down approaching the intersection to merge within the intersection into a single lane downstream of the intersection. Extensive queues were also observed along Longport Street/Railway Terrace in both directions which further aggravates traffic congestion at this intersection.

Furthermore, although all right turn movements at this intersection are prohibited during the peak periods although buses are permitted to turn right at the intersection. On some occasions, buses were observed turning right into Railway Terrace, further exacerbating the situation.

The intersection is controlled by traffic signals. The banning of all right turn movements enables the intersection to operate with a simple two-phase arrangement. As such, the intersection is finely tuned by the Roads and Maritime Services, RMS (formerly Roads and Traffic Authority, RTA) to operate as efficiently as possible.

The Toothill Street intersection with Old Canterbury Road was observed to operate satisfactorily. Apart from the northbound queue on Old Canterbury Road extending past this intersection, no extensive queues were observed at this intersection. Queue lengths of about ten vehicles were observed on Toothill Street (mostly from vehicles wanting to turn right into Old Canterbury Road) and along Old Canterbury Road in the southbound direction. It does not appear that the extensive queue on Old Canterbury Road adversely affected the operation of this intersection.

The Edward Street intersection operates under a stop control with traffic on Old Canterbury Road having priority over traffic on Edward Street (and Weston Street on the other side of Old Canterbury Road). No queue was observed on either Edward Street or Weston Street. However, it is noted that traffic entering Old Canterbury Road from Edward Street (and from Weston Street to a lesser extent) has sub-standard sight distance due to the crest on the bridge over the goods railway line to the east and restrictive horizontal geometry to the west of Edward Street. Sub standard sight distance results in vehicles not being able to accurately predict gaps in the main road traffic flow resulting in conservative driver behaviour which, in turn, has the knock on effect of reducing traffic flows when compared to similar intersections which have adequate sight distance. A bus stopping at a bus stop located within the western sight line to Edward Street would further reduce the sight distance. Traffic turning right into Old Canterbury Road would experience delays of up to five minutes partly due to the limited sight distance and partly due to the high traffic volume on Old Canterbury Road.

The Nowranie Street intersection, which operates under traffic signal control, was observed to operate satisfactorily. A significant proportion of the green time is devoted to the Old Canterbury Road traffic.

Traffic along Longport Street and Railway Terrace was also observed to experience extensive queuing in both directions. However, westbound queue was not as extensive as the eastbound queue.

The eastbound queue along Longport Street/Railway Terrace was observed to extend from New Canterbury Road for approximately 1.2km past Old Canterbury Road and Smith Street to Fleet Street. On some occasions, this queue was observed to extend back to near Lackey Street at Summer Hill Railway Station which is an additional 300m.

Travel times along Carlton Crescent/Longport Street/Railway Terrace in the eastbound direction from Lackey Street were measured to be about six minutes to Old Canterbury Road (a distance of about 750m) and more than eight minutes to West Street (a distance of about 1.1km). This represents an average speed of less than 10km/hr.

The eastbound queue originated outside of the development sites local road network, but it is not clear as to what caused this extensive queue. However, the eastbound queue along Railway Terrace is further exacerbated by buses stopping at the bus stop on Railway Terrace outside of Lewisham Railway Station where the stopped bus would block the entire eastbound traffic as there is only one lane available for traffic. There are about four to five scheduled bus services per hour during the morning peak period. In addition, it was also observed that there were a number of large semi-trailers travelling eastbound along Railway Terrace from Old Canterbury Road. When a semi-trailer turns left into Railway Terrace, the truck would occupy both lanes on Old Canterbury Road and the turn is undertaken slowly to avoid clashing with the railway embankment at the intersection and the bridge structure supporting the rail tracks above. This also slows down the traffic behind it.

The westbound queue on Railway Terrace was also observed extending back from Old Canterbury Road to just past Victoria Street, and sometimes as far as West Street.

At the Smith Street roundabout with Longport Street, a queue was observed on the Smith Street approach extending from Longport Street to Edward Street. The westbound traffic along Longport Street was observed to queue back from Smith Street to Brown Street, while the queue on Grosvenor Crescent at this intersection was observed to be about four to five vehicles long. The Smith Street and westbound Longport Street queues appeared to be related to the eastbound queue on Longport Street extended back from Canterbury Road. In addition, the westbound queue could also be attributed to the westbound traffic slowing down approaching the roundabout due to restrictive sight distance to Grosvenor Crescent.

At the West Street signalised intersection, the queue on West Street was observed to extend back from Railway Terrace to approximately 60m north of Brighton Street. This queue comprised mainly of right turning traffic. The right turn queue from Railway Terrace into West Street was observed to be about 15 vehicles in length. Occasionally, this queue was observed to extend past Trafalgar Crescent. Queues at this intersection were observed to clear within the same traffic signal cycle.

The other nearby intersections were observed to operate satisfactorily during the morning peak period.

The queues along Carlton Crescent/Longport Street/Railway Terrace did not dissipate until well after 10:00am on the Thursday morning the site visit was undertaken, but on the Friday morning site visit, although the queues had the same intensity, it was observed that the queues dissipated more quickly (i.e. by about 8:50am).

2.3.2 *Evening Peak Conditions*

Figure 3 below shows the observed evening peak queues in the vicinity of the sites.

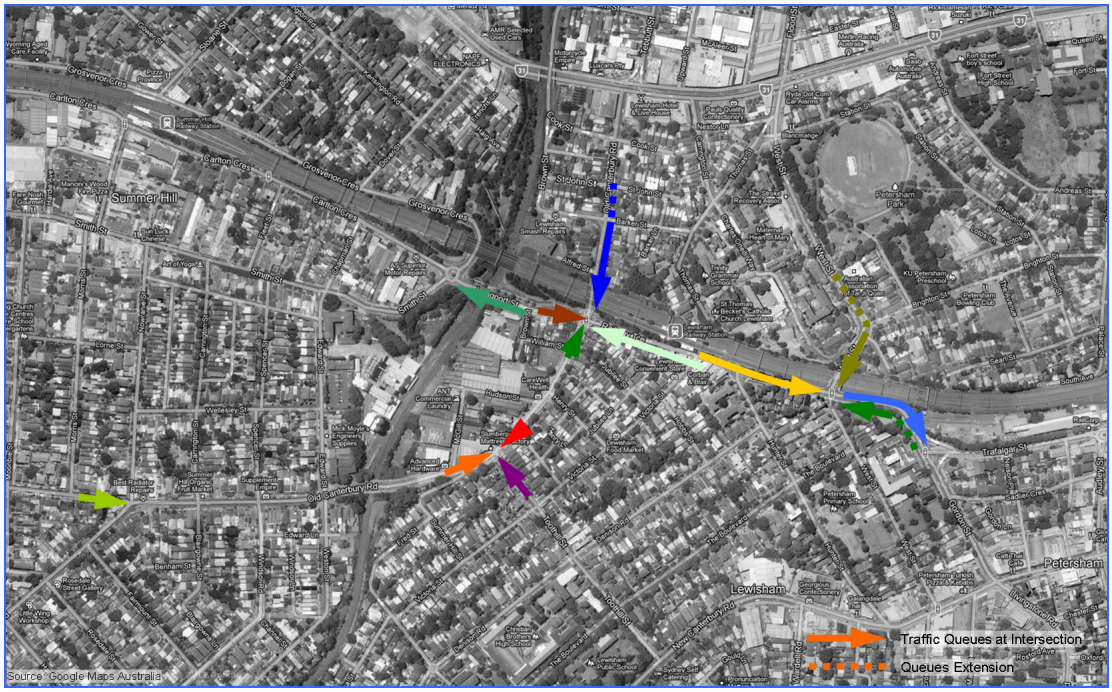

Figure 3 Evening Peak Queues

In the evening peak period, queues were observed along Old Canterbury Road and Railway Terrace. However, the queues on both Old Canterbury Road and Railway Terrace were not as extensive as those observed during the morning peak periods.

At the intersection of Old Canterbury Road with Railway Terrace, the eastbound queue along Longport Street was observed to be around 10 vehicles in length. The southbound traffic queue along Old Canterbury Road generally extended to Barker Street (approximately 120 metres), and in some extreme occasions the queue extended back to St John Street (an additional 60m).

The westbound traffic along Railway terrace fluctuated over the observed period. The westbound queue length varied from 15 vehicles to 30 vehicles long, on some occasions extending back to Victoria Street. No significant queue was observed for the northbound traffic (the queue observed was about 10 vehicles long).

Generally, the queues at this intersection were observed to clear within the same signal cycle. From site observations, this intersection is generally operating satisfactorily during the evening peak period.

The Old Canterbury Road-Toothill Street intersection was observed to operate satisfactorily as well. No significant queue was observed along Old Canterbury Road for both the north and southbound traffic. The northbound queue was observed to be about five vehicles long, while for southbound traffic it was about three vehicles long. Queues on Toothill Street varied from two vehicles up to 10 vehicles in length. However, it was observed all queued vehicles cleared the intersection within one signal cycle.

No traffic queue was observed at the Old Canterbury Road intersection with Edward Street. However, it was difficult for traffic to turn right from Edward Street to Old Canterbury Road due to the high traffic volumes on Old Canterbury Road (in both directions) and the limited sight distance noted previously.

Similarly, no significant traffic queue was observed at the Old Canterbury Road intersection with Nowranie Street and Junction Road.

At the Longport Street intersection with Smith Street, it was observed that the westbound queue extended back past Brown Street, but the other approaches each had about two to three vehicles queued. Generally, this intersection was observed to operate satisfactorily.

At the Railway Terrace intersection with West Street, the traffic queue on West Street gradually increased during the later phase of the evening peak period. The traffic on West Street is mainly comprised of left turning traffic towards New Canterbury Road. Early in the evening peak period, the queue on West Street was about five vehicles long which extended to about 15 vehicles long (near Brighton Street) later in the evening peak period. In some extreme occasions, the queue extended to about 20 vehicles long thereby extending past Brighton Street. The queue length of eastbound traffic on Railway Terrace varies from seven vehicles to 25 vehicles which meant queues extended near Victoria Street.

The fluctuation of the traffic queues at this intersection was observed to be caused by the blocking back effect from both Trafalgar Street and New Canterbury Road intersections along Railway Terrace/Gordon Street.

For the westbound traffic on Railway Terrace at the West Street intersection, the observed queue length varied from 15 to 25 vehicles long which relates to right turn traffic into West Street. The through movement was observed to have a queue of about 10 vehicles.

Overall, the West Street signalised intersection was observed to operate satisfactorily, but the residual queue formed was observed to be caused by downstream traffic conditions at Gordon Street intersections with Trafalgar Street and New Canterbury Road.

In general, extensive queues occurred in both peak periods with the eastbound queue along Longport Street/Railway Terrace caused by traffic congestion outside of the local road network. It is also noted that the queues along Longport Street/Railway Terrace and Old Canterbury Road were observed to be more intensive in the morning peak period than the evening peak period.

3 Development Descriptions

The Major Project applications relate to two separate proposals for the redevelopment of two former industrial sites – Lewisham Estate and Summer Hill Flour Mill. The Lewisham Estate site is part of the McGill Street Precinct which Marrickville Council has formulated and adopted a masterplan for the redevelopment of the entire site. The sites are all proposed to be developed as mixed use developments.

Initially the Concept Plan for the Lewisham Estate site included a substantial retail use. However, in response to a number of submissions, the scheme was revised as follows:

- a maximum of 430 residential units, including 19 SOHO units; and
- 739m^2 of retail floor area.

The retail component has reduced significantly in the revised scheme, while the supermarket and commercial uses proposed in the original Concept Plan have been removed altogether from the revised scheme.

For the McGill Street Precinct (which included the Lewisham Estate site), Marrickville Council envisaged that it would be redeveloped to accommodate:

- 500 residential units;
- 2,942m^2 of retail use; and
- 6,409m^2 of commercial use.

However, the traffic report supporting the revised scheme on the Lewisham Estate site suggested that the remainder of the McGill Street Precinct (i.e. excluding the Lewisham Estate site) would comprise an additional 220 residential units, that is, a total redevelopment on the entire McGill Street Precinct according to the traffic report would have 650 residential units and 739m^2 of retail use with no commercial use.

For traffic analytical purposes (see Section 6.4), it is assumed the McGill Street Precinct would be developed as envisaged in Council's adopted Masterplan less the Lewisham Estate site as follow:

- 280 residential units;
- 2,040m^2 of retail use; and
- 4,900m^2 commercial.

The Summer Hill Flour Mill site is proposed to accommodate:

- 290 residential units;
- 2,500 to 2,800m^2 of retail use; and
- 3,500 to 4,000m^2 of commercial use.

Reference should be made to Sections 6.3 and 9 for discussions about how the above floor space areas have been converted into traffic generation estimates for the cumulative traffic assessment.

4 Review of Assessment Reports

Traffix, traffic and transport planners, was commissioned by the proponent to prepare the traffic assessment for the Lewisham Estate site. Traffix prepared the TMAP report for the original Concept Plan (dated 9 October 2010) as well as an addendum report for the Preferred Project Report (dated 9 August 2011).

ARUP (engineering consultant) prepared the traffic assessment for the Summer Hill Flour Mill site which was contained in the TMAP report dated 3 May 2011 for the proponent. ARUP also conducted a traffic assessment for the McGill Street Precinct on behalf of Marrickville Council.

In addition, Marrickville Council also commissioned Colston Budd Hunt & Kafes Pty Ltd (CBHK) to conduct a review of the TMAP reports for the Lewisham Estate and Summer Hill Flour Mill sites.

This section of the report documents the review and assessment of the TMAP reports prepared by Traffix and Arup.

The identified issues are summarised below. These were sent to the respective traffic consultants for their review and comment. In addition, separate meetings were held with the respective traffic consultants on Thursday 10 November 2011 to discuss the identified issues. Following the meetings, the traffic consultant provided written responds to the issues raised. These are also presented below. For each identified issue, a status is also provided to indicate whether the identified issue has been resolved.

4.1 Lewisham Estate TMAP Review

The identified issues/comments provided below relate to the review of both the TMAP report and the PPR traffic report. The issues arising from the TMAP report that have been addressed in the subsequent PPR traffic report are not included below (e.g. the traffic assumptions and effects relating to the retail/supermarket uses discussed in the TMAP).

Non-Car Travel Modes

Issue:

The TMAP has not provided a quantitative assessment of non-car travel modes implications i.e. existing pedestrian movements, additional pedestrian and public transport services demand.

Halcrow's Initial Comment:

This is to be provided by the applicant.

Consultant's Response:

The site is expected to accommodate some 1,800 residents. Of these, about 44% will be full and part time workers (commuters) and this is expected to translate into a maximum of about 500 workers commuting during the morning and afternoon peak periods. Based on 2006 Journey to Work data and assuming that a maximum of 10% of these workers use the light rail that is presently under construction (and not therefore reflected in JTW data), we estimate that there will be a demand for travel during a (worst case) 2 peak hour weekday period as follows:

- 120 car drivers (40%;
- 15 car passengers (5%)
- 105 train passengers (35%)
- 30 light rail passengers (10%); and
- 30 other modes (10% - including walk, bicycle, taxi, pick-up).

It is evident that the 55% non-car commuters is a very good result in favour of public transport and other alternate travel modes. Nevertheless, these additional patron levels represent a moderate demand on bus, rail and light-rail services in absolute terms and are not considered sufficient to require any additional services or augmentation of existing services during peak periods. The additional daily patrons can be estimated by factoring the above hourly levels by x10 and while these may not require additional services, they represent a significant absolute increase in patronage and hence revenue.

Status:
On this basis, Halcrow accepts that the proposed development is unlikely to require embellishment of existing public transport services. However, other broader GDR's requirements have not been addressed. DoPI has indicated that the Department will address these separately. This issue is now closed.

Site Proximity to Public Transport

Issue:
The TMAP report indicated that bus services "*along Parramatta Road are located only 400 metres walking distance from the centroid of the site*", and the site is "*located only 140 metres from Lewisham Railway Station (or 250 metres from the centroid of the site)*".

Halcrow's Initial Comment:
A distance of approximately 550m was measured along the pedestrian path from the mid point of Hudson Street (the approximate centroid of the McGill Street Precinct) to the intersection of Parramatta Road with Old Canterbury Road. The closest bus stop on Parramatta Road was measured to be about 60m from this intersection. Similarly, the walking distance to Lewisham Railway Station was measured at about 400m.

The TMAP report has underestimated walking distances to public transport services. However, it is noted that the distances are unlikely to affect travel by public transport. It is agreed that the extension of the light rail to Dulwich Hill would "*significantly improve accessibility to the site by public transport*".

Consultant's Response:
The original TMAP report incorrectly states the walking distance to public transport services. However, the difference is marginal and is unlikely to impact the use of public transport associated with the proposed development.

Status:
Noted and agree. Issue closed.

Existing Site Generation

Issue:

The TMAP indicated the site currently generates about 50 vph during the peak periods.

Halcrow's Initial Comment:

This should be based on traffic counts of the existing driveways. However, it is noted the traffic impact assessment has not included a discount of this traffic in the estimate of the future site generated traffic.

Consultant's Response:

The traffic generation associated with the existing use of the site (approximately 50 veh/hr) was based on on-site observations regarding the number of vehicles parked within the site. No discount has been applied to the future traffic volumes associated with the subject site so that the modelling undertaken is to be considered a conservative assessment. Any discrepancy between the assumed and practical existing site generation is expected to be minimal and would not have a significant impact on the modelling undertaken. As such, additional traffic surveys of existing driveways are not considered warranted.

Status:

Noted. This issue is now closed.

Intersection Counts

Issue:

The TMAP indicated a number of nearby intersections have been surveyed as part of the traffic assessment, but it did not indicate the date and time when the surveys were conducted. Peak hour traffic volumes have not been provided.

Halcrow's Initial Comment:

From the information available, it is not possible to ascertain the currency and validity of the intersection counts. Traffix is to provide the date and time when the traffic surveys were conducted and figures showing the peak hour intersection turning movement flows.

Consultant's Response:
Traffix has indicated that the surveys were conducted on 6th and 14th August 2009. Traffix separately advised the time periods were 7:00am to 9:00am and 4:00pm to 6:00pm.

Status:
Noted. Issued closed.

Intersection Analysis

Issue:
It is noted that the RTA has requested for a number of nearby intersections to be assessed. One of which is the intersection of Old Canterbury Road with Parramatta Road. Although, it was not stated in the RTA's request, it should include the Tebutt Street intersection on the side of Parramatta Road as the Tebutt Street intersection is a key intersection along the traffic route providing access into Sydney CBD via Parramatta Road.

Halcrow's Initial Comment:
This should be included in the assessment.

Consultant's Response:
The intersection of Parramatta Road with Trebutt Street was not requested within the Roads and Maritime Services (formerly the RTA) input to the DGRs and therefore was not included in the surveys or modelling undertaken. From the traffic distribution included in Appendix C1, it can be seen that 95% of all northbound and 40% of all eastbound exit movements have been distributed to Parramatta Road. As such, the left turn movement from Trebutt Street could potentially increase by up to 61 veh/hr during the AM peak, with only 18 veh/hr during the PM peak period. This equates to approximately on a single additional vehicle movement every minute which is not expected to have a significant impact on the performance of this intersection. Despite being a priority controlled intersection, exit movements benefit from regular gaps in through traffic along Parramatta Road due to the signals immediately to the west of the departure side of this intersection.

Status:
Noted. Issued closed.

Existing Intersection Capacity Analysis Results

Issue:
Table 1 of the TMAP report indicates at the intersections assessed, the SIDRA analysis results for evening peak conditions were worse than the morning peak conditions. However, based on observations conducted by Halcrow, morning peak conditions appear to be significantly worse than evening peak period. The TMAP analysis results may only relate to surveys of traffic flows based on actual capacity of the intersections (i.e. the surveys only recorded traffic flows that passed the intersections, and not those queued behind the stop lines).

Halcrow's Initial Comment:
The SIDRA traffic models should be calibrated to match the observed traffic queues at the intersections and if necessary the analysis should include the queued vehicles behind the stop line as additional existing traffic demand.

Consultant's Response:
The surveys undertaken included cycle times and queue lengths in addition to traffic volumes through the intersection at a number of key intersections. Queue length surveys were used to assist in the calibration of the SIDRA modelling undertaken as part of the original TMAP assessment. Peak periods varied between intersections, however it is noted that existing delays at the critical intersection of Old Canterbury Road/Longport Street and Railway Terrace were comparable during both peak periods with a LoS F during both periods. Similarly, the intersection of Old Canterbury Road with Toothill Street was assessed with a LOS C during both peaks which corresponds to an average delay of 40 seconds during the morning and 29.8 seconds during the afternoon peak. In this regard, the reported existing conditions are considered consistent with conditions in the locality.

It is also noteworthy that the ARUP report identified and existing LOS of D and B at the intersections of Old Canterbury Road with Railway Terrace and Toothill Street, respectively. As such, the original TRAFFIX TMAP assessment (based on 2009)

volumes is considered to form a worst case base scenario.

The SCATES modelling of the future conditions, as included as part of the PPR report does not represent an existing road environment and therefore conditions could be expected to alter significantly. It is assumed that the future signalised intersection of Old Canterbury Road and Edward Street would be coordinated with the existing signals which provides network efficiency benefits for the wider area.

Nevertheless, the modelling undertaken to date has generally been accepted by the RMS to whom electronic copies of the relevant models have been provided previously.

Status:
Halcrow disagrees with some of the consultant's comments on this issue. The intersection analysis results presented in Table 1 of the original TMAP does not reflect existing traffic conditions, specifically during the morning period at the intersections of Longport Street with Smith Street, and Old Canterbury Road with Toothill Street.

It is unclear how signal coordination could reduce average intersection at the Old Canterbury Road intersection with Railway Terrace from an existing 124 seconds to a future delay of 12 seconds given that there will be additional vehicle in the future.

Halcrow does not consider the intersection analysis in the TMAP and PPR traffic reports to be reliable. However, given that Halcrow has conducted its own independent analysis, it can be considered the issue to be closed.

Proposed Development and McGill Street Precinct

Issue:
The PPR traffic report indicated that the remainder of the McGill Street Precinct would accommodate an additional 220 residential units. It is also clear, that the combined McGill Street Precinct (including Lewisham Estate site) would predominately have residential use with little or not retail/commercial uses.

Halcrow's Initial Comment:

The proposed mix for the entire precinct by the proponent of the Lewisham Estate site is significantly different to the Marrickville Council's vision for the site which the adopted Masterplan envisaged to include significantly more retail/commercial uses. The proponent is to explain the rationale for this change in the land use mix for the McGill Street Precinct and what implications this would have to the urban planning in the vicinity of the site.

Consultant's Response:

The development yields associated with the remainder of the McGill Street Precinct were provided by other parties. An appropriate development mix for the remaining half of the McGill Street Precinct would be as follow:

- 280 residential units;
- 5,152m^2 of commercial floor space; and
- 2,306m^2 of retail floor area.

See comments included under the heading "McGill Street Precinct Assumed Development Traffic" for further details regarding the impact of these adopted yields in the context of the wider area.

Status:

Noted. The consultant has clarified information in relation to the development mix for the remaining half of the McGill Street Precinct is generally consistent with Halcrow's assumptions. Issue closed.

Transport Management – Traffic Generation

Issue:

The TMAP at the introduction to Section 5 indicated that the traffic impact assessment is based upon a 10 per cent in the reduction in the assumed traffic generation using RTA's unconstrained rates. Although the development traffic was estimated based on RTA's generation rates, the TMAP converted RTA traditional traffic generation rates from trips per floor area of development to trips per car space provided, and applied the modified rates to the reduced car parking provision. With this method and an applied 10 per cent reduction in traffic generation, it means that there could a "double dip" reduction of the traffic generation estimates. This would result in the under estimation of development traffic for any level of development proposed.

Halcrow's Initial Comment:

It is agreed that the RTA converted trip generation rates based on trips per car space provided could be used, and should not include a further 10 per cent discounting of the development traffic estimated this way unless backed by evidence.

Consultant's Response:

A traffic generation rate of 0.4 trips per unit has been adopted for modelling purposes which is considered to provide a conservative assessment. This is discussed further under TMAP Traffic Assessment – Adopted Trip Generation Rates.

Status:

The consultant has not responded to the issue raised accordingly i.e. the "double dipping" reduction of assumed trip rates. However, as Halcrow has conducted an independent assessment, this issue could be considered as closed.

Arrival and Departure Trip Patterns

Issue:

The PPR traffic report has not provided the estimates for the future number of arrivals and departures for the retail component during the peak periods.

Halcrow's Initial Comment:
The PPR traffic report should provide this, although it is noted that the estimated number of retail trips will be very small.

Consultant's Response:
Appendix C1 of the PPR report included a retail traffic generation of 17 vehicles per hour based on a trip rate of 2.3 trips per 100m^2 retail floor area. A total of 20 vehicles per hour was adopted for modelling purposes.

Status:
Noted. Issue closed.

Transport Management – Bus Services

Issue:
The TMAP indicated that "*all weather shelters are considered essential along both sides of Old Canterbury Road*". It further stated that "*use of these services should be encouraged by residential strata managers and employers…provision of current service timetable and route information*".

Halcrow's Initial Comment:
This is agreed. Consent conditions of any approval should include a provision for the proponent to prepare a Travel Access Guide and Green Travel Plan with real tangible commitments from the proponent (e.g. free bicycles given out to the first residential occupants in each unit, free Travel Ten bus tickets to employees for the first three months).

Consultant's Response:
Agreed in principle, however the exact nature of the tangible commitments will need to be further developed. A Travel Access Guide and/or Green Travel Plan can readily conditioned as a requirement prior to approval of a construction certificate.

Status:
Noted. This is be conditioned in any approval with an agreed set of commitments to be agreed between the proponent and DoPI. This is also to be reflected in the Statement of Commitments. Issue closed.

Transport Management – Rail Services

Issue:

The TMAP proposed a marked foot crossing to be provided on Railway Terrace directly opposite the railway entrance.

Halcrow's Initial Comment:

There is no pedestrian entrance to the railway station on Railway Terrace. The rail station is accessed from stairs provided within Victoria Street, near Railway Terrace. An existing pedestrian crossing is available on Victoria Street. However, the principle behind the proposal has merits. As such, improved pedestrian facilities should be provided along the pedestrian desirelines between the site and the railway station (e.g. crossing of Old Canterbury Road, improved pedestrian paths along Henry Street and Jubilee Street).

Consultant's Response:

No longer proposed. Pedestrians will use the signalised crossings of Railway Terrace with Old Canterbury Road and West Street.

Status:

Noted. Issued closed.

Transport Management – Car Share

Issue:

The TMAP suggested that implementation of a car share (for one or two car spaces) be conditioned as part of the approval process.

Halcrow's Initial Comment:

This is agreed.

Consultant's Response:

Accepted in principle, subject to negotiations with Car Share provider regarding the financial viability of this option.

Status:
Noted and agreed. Issue closed.

Parking Provision

Issue:
The TMAP proposed a slight variation to the proposed parking provision in contrast to Council's requirements.

Halcrow's Initial Comment:
This is further dealt with in Section 5.

Consultant's Response:
See Section 5 for details.

Status:
See Section 5 for details.

Traffic Generation

Issue:
The TMAP provided an estimate of the traffic arising from the development

Halcrow's Initial Comment:
This is further dealt with in Section 6.

Consultant's Response:
See Section 6 for details.

Status:
See Section 6 for details.

Development Traffic Distribution

Issue:
In both the TMAP and PPR traffic reports, it is unclear how the development traffic arising from the proposal would be distributed to the surrounding road network

Halcrow's Initial Comment:

Halcrow is not able to make further comments in relation to this. The TMAP prepared by ARUP for the Summer Hill Flour Mill has pointed out a number of inconsistencies in the Traffix report. In the absence of any reliable information, it is suggested that this should be based on surveys of existing traffic in the area. Traffix is to provide this information for comparison.

Consultant's Response:

The TRAFFIX PPR report essentially adopted the traffic distributions outlined by ARUP for modelling purposes which stated a 'forecast distribution' of

- North 20%
- East 30%
- South 20%
- West 30%

Reference should be made to Appendix C1 of the TRAFFIX PPR report which provides tables indicating a further breakdown of traffic distributions based on distributions. For example, vehicles exiting the subject site (Site A) in an eastbound direction are expected to be distributed as follows during the AM peak:

- 20% to Parramatta Road from William Street
- 20% to Parramatta Road from Hudson Street
- 20% along Railway Terrace, via Longport Street (using the roundabout at Smith Street)
- 40% using Toothill Street

Status:

Noted. Issue closed.

Traffic Improvements

Issue:

It is not clear whether the TMAP proposed road improvements are still being contemplated in the revised scheme. The TMAP proposed the following interim road improvements:

- left-in/left-out access arrangement at Brown Street access;

- re-linemarking of the western approach of Longport Street to allow a dedicated left turn into Old Canterbury Road and through eastbound traffic lanes reduced from two lanes to one lane;
- provision of clearway restrictions on Old Canterbury Road;
- conversion of one northbound through lane to allow the exclusive right turn into Toothill Street only; and
- no right turn into Hudson Street from Old Canterbury Road, but right turn from Hudson Street would still be possible utilising a proposed median storage facility;
- southbound right turn movement along Old Cantebury Road into the site to be focussed at McGill Street as "*discussed with the RTA*"; and
- re-linemark the western approach at the Railway Terrace intersection with West Street to allow a dedicated left turn lane into the West Street.

The longer term road improvements proposed are (to accommodate additional traffic demand from the remainder of the McGill Street Precinct redevelopment):

- the construction of a fourth leg to serve the site at the Toothill Street signalised intersection with Old Canterbury Road; and
- the construction of left turn lane into Longport Street from Old Canterbury Road.

The RTA has indicated that they do not support the interim traffic arrangements, specifically they have raised issues related to the provision of a dedicated left turn into Old Canterbury Road from Longport Street. The RTA also questioned the SIDRA analysis results.

Halcrow's Initial Comment:

It is agreed that the proposed provision of a dedicated left turn lane at both intersections is impractical. On-site observations indicate that the eastbound queue along Longport Street/Railway Terrace extended significantly beyond the end of the proposed left turn lanes at their respective intersection. As such, the provision of such is unlikely to provide any significant benefits. Notwithstanding RTA's comments, left turn traffic would not be able to enter the left turn lane to avoid the congestion on Longport Street (and Railway Terrace). They would continue to be delayed as they would be held back by the extensive queues on Longport Street/Railway Terrace.

Halcrow also questions whether the proposal is able to yield such a vast improvement as shown in the existing and future conditions SIDRA results, especially when the future conditions would add significantly more traffic to the intersections than existing conditions.

Old Canterbury Road and Longport Street are multi-lane roads, therefore all uncontrolled accesses serving the proposed development on Old Canterbury Road and Longport Street should be provided as left-in/left-out arrangements for safety reasons.

The RTA has refuted that there was an agreement to allow all southbound right turns to occur at the McGill Street intersection. The RTA has requested the submission of traffic analysis to ascertain the effect of this. This request from the RTA is supported.

Similarly the provision of a left turn lane on Railway Terrace into West Street is unlikely to be beneficial.

Finally, the TMAP and PPR traffic reports have not adequately addressed how "rat running" through the site identified in the TMAP report would be addressed.

Consultant's Response:
None of the listed traffic improvements are considered necessary, with the exception of the following:

- Left-in/left-out access at Brown Street
- Parking restrictions on Old Canterbury Road during peak periods. The affected areas are not sufficient in length to warrant establishment of Clearway restrictions.
- Right turn entry movements from Old Canterbury Road are to be focussed at McGill Street.

Restricting all movements to left-in/left-out at all intersections is generally accepted with the exception of the McGill Street intersection. Reference should be made to the response prepared for the RMS associated with the future performance of this intersection.

Localised widening of Old Canterbury Road to provide a right turn storage lane would be beneficial for the operation of this intersection. However, the southern component of the McGill Street Precinct is not under control of the proponent and therefore any additional land dedication to facilitate any widening cannot be provided by the proponent. Furthermore, the modelling undertaken demonstrates that this widening is not required in any case.

A threshold treatment could potentially be provided at William Street, if required, to further discourage 'rat running' through the subject site. However, it should be noted that no direct connection is provided between Longport Street and McGill or Hudson Streets, with all future access through the basement car park. Furthermore, William Street is to be constructed with a relatively narrow carriageway width which will discourage its use by traffic wanting to turn left at the intersection of Old Canterbury Road and Longport Street.

Status:
Halcrow has no issue with the provision of a right turn movement into the site at McGill Street, but it will not be configured as a protected right turn for safety and road efficiency reasons. Marrickville Council's adopted Masterplan for McGill Street Precinct will need to be revised and amended to allow a protected right turn lane on Old Canterbury Road at McGill Street.

It is also agreed that threshold treatment should be provided at William Street.

Issue closed.

Toothill Street Four-way Signalised Intersection

Issue:
The TMAP indicated that the existing Toothill Street signalised intersection with Old Canterbury Road would have an additional leg from the development site. Analysis results contained in the TMAP indicated it would operate with similar level of service to the results for the intersection operating without the fourth leg, albeit with a slight increase in the average delay.

Halcrow's Initial Comment:

The TMAP has not provided any details on the proposed intersection reconfiguration. The results of this intersection operating with a fourth leg would depend on the traffic signal phasing arrangement. The RTA has also indicated that they are not able to comment on this until such time that this information is made available.

Consultant's Response:

A fourth leg to the signalised intersection of Toothill Street and Old Canterbury Road is no longer proposed.

Status:

Noted. Issue closed.

McGill Street Precinct Assumed Development Traffic

Issue:

The PPR traffic report assumed that the remaining half of the McGill Street Precinct (i.e. excluding Lewisham Estate site) would generate about 88 vph. Combined with the Lewisham Estate traffic, the entire site would generate a total of 275 vph.

Halcrow's Initial Comment:

It appears that the PPR traffic report has underestimated the development traffic for the remaining half of the McGill Street Precinct as it did not include the retail and commercial uses as envisaged in the adopted McGill Street Precinct masterplan. The difference in development traffic is some 62 vph. The difference is considered to be significant.

Consultant's Response:

The consultant has recognised the contrast in the assumed development yield for the McGill Street Precinct. The consultant provided the following development mix for the remaining half of the McGill Street Precinct:

- 280 residential units;
- 2,306m^2 of retail floor area; and
- 5,152m^2 of commercial floor space.

The consultant has re-estimated the development traffic for all three sites using more appropriate traffic generation rates and land use assumptions, and found that the revised trips would be lower than that modelled in the PPR traffic report.

Status:

Noted. Issued closed.

SCATES Modelling Results

Issue:

The PPR traffic report provided SCATES analysis results for three intersections along Old Canterbury Road. The results show that all three intersections would operate with very good level of service (A and B) with delays as low as two or three seconds.

Halcrow's Initial Comment:

The results appear to be very optimistic, especially given that Old Canterbury Road currently has extensive queues in both peak periods, in particularly during the morning peak period. The existing case SCATES model should be calibrated to observed traffic conditions on site.

Consultant's Response:

The intersections have been optimised to represent future conditions, including the proposed new signals and additional development traffic. In this regard, calibration with existing traffic volumes and queues is of less relevance. It is also noted that these volumes include traffic associated with redevelopment of the Summer Hill Flour Mill site which would be further expected to alter traffic flows throughout the area.

Status:

See Halcrow's previous comments under the heading *Existing Intersection Capacity Analysis Results*. This issue could be considered closed.

4.2 Summer Hill Flour Site TMAP Review

The identified issues relating to the review of the TMAP for the Summer Hill Flour Site are provided below.

Existing Site Traffic

Issue:

The TMAP report indicated that the existing use (remnant office use of former activities on the site) would generate about 20 vehicle trips per peak hour based on an observation that some 40 vehicles were on the site and 50 per cent of these would arrive and depart during the peak periods.

Halcrow's Initial Comment:

The estimate of the existing site generated traffic should be derived from traffic surveys or estimated based on the number of employees and floor area with the relevant RTA traffic generation rates. The McGill Street Precinct was surveyed by the consultant to generate 60 vph during the peak periods. It could be the case that the Summer Hill Flour Mill site would generate a similar volume of the traffic.

Consultant's Response:

The existing site is no longer occupied and hence no advantage in undertaking surveys.

Status:

Noted. Issue closed.

Intersection Surveys

Issue:

The intersection flows at the required intersections (as requested by the RTA) were surveyed on Wednesday 9 February 2011 for both commuter peak periods, while some

flows were obtained from a separate surveys conducted on Wednesday 9 June 2010 with some obtained from the TMAP for the Lewisham Estate site.

Halcrow's Initial Comment:
The surveys conducted in February 2011 are acceptable, but it is unclear which peak periods the June 2010 surveys are relevant to. As indicated previously, the TMAP for the Lewisham Estate site did not indicate when their surveys were conducted, therefore the currency and validity of these surveys are questionable.

Consultant's Response:
The surveys undertaken by Arup in June 2010 occurred on Wednesday 9 June between 7am and 9am and between 4pm and 6pm.

It was also separately indicated by Traffix, the surveys conducted for the Lewisham Estate project was on August 2009.

Status:
Noted. Issue closed.

Existing Road Network Operation

Issue:
The TMAP indicated the following operating conditions were observed:

- at the intersection of Old Canterbury Road with Railway Terrace, "*despite the significant queues, all vehicles were able to clear the intersection in a single signal cycle*";
- at the intersection of Old Canterbury Road with Edward Street, restrictive sight lines were noted "*at the base of the railway overpass*";
- vehicles queuing past the Old Canterbury Road-Longport Street intersection did not affect the operation of the roundabout; and
- "*no significant levels of queuing was observed during on-site observations*" at the intersection of Old Canterbury Road with Toothill Street..

Halcrow's Initial Comment:
The above is contrary to Halcrow's site observations for both peak periods with the morning peak period being more congested than the evening peak. To some extent,

some of the comments would only apply to the evening peak period (i.e. queued vehicles cleared within the same cycle but not at the intersection of Old Canterbury Road with Railway Terrace where vehicles queued in both peak periods).

Additionally, restrictive sight lines at the Edward Street intersection exist to both directions on Old Canterbury Road, not just to the railway overpass.

Consultant's Response:
The Old Canterbury Road and Railway Terrace intersection is a key constraint in the sub-arterial road network with limited through capacity on the departure side of the intersection for northbound and eastbound traffic. This particularly affects the morning peak with the northbound and eastbound traffic flows occurring in these directions. Extended traffic queues form along Old Canterbury Road and Longport Street affecting adjacent intersections.

Status:
The Consultant's response is consistent with our site observations and analyses. The effects of existing congestion will need to be considered in traffic assessment of the proposed development (see further discussion in Section 9.5 of this report).

Public Transport

Issue:
The TMAP provided comments relating to the frequency and walking distances of existing nearby public transport services. It also indicated that the light rail proposal would have positive benefits to both the Summer Hill Flour Mill and Lewisham Estate sites.

Halcrow's Initial Comment:
In this respect, Halcrow agrees with the above assessment. However, the indicated timetable for the provision of the light rail may be out of date.

Consultant's Response:
The Transport for NSW website anticipates that the Inner West Light Rail Extension will be operational in early 2014.

Status:

The Inner West Light Rail project would mostly to be in operation before or shortly after the initial occupation of the proposed developments. As such, the light rail proposal would bring benefits to both developments. Issue closed.

Travel Patterns

Issue:

i) The TMAP conducted an analysis of 2006 ABS Journey to Data to determine the traffic distribution of existing traffic for one travel zone. This is then used in the traffic analysis. The TMAP presented the proportion of trips by destination LGA in Table 7 and the existing and future adjusted distribution for each of the four compass directions.

ii) Only one travel zone was used for this analysis which encompasses the development site.

iii) The future distribution was adjusted to favour travel to and from the south and west. The reason given for this was because the south and west is not well serviced by public transport.

Halcrow's Initial Comment:

i) This approach is supported. However, it is not clear how the information in Table 7 relates to Table 13 or the approach routes (e.g. the destination Sydney is in the east, but there are a number of different approach routes).

ii) The travel zone used for the ABS JTW data has a total of 538 trips. This may not be a sufficient number of trips to provide sufficiently accurate analysis of the current situation.

iii) Regardless of whether the reason given is correct or not, this adjustment should not have been made because this would have been accounted for in the actual ABS data.

Consultant's Response:

The ABS JTW data has been reviewed for the surrounding zones 1542, 1541, 363,362 and 1537 representing over 4000 trips. This indicates that the average of these zones is very similar to Zone 1543 used for the analysis. Section 6.3 of the TMAP explains that the distribution of trips identified for all trips types has been adjusted for application to vehicle trips on the basis that trips towards the city would be biased by public transport. On this basis the eastern vehicle trips have been assigned as 30% rather than 49%.

Status:

The consultant has provided a response to Issue ii) identified above, but not to Issues i) and iii). However, Halcrow has conducted an analysis of the traffic distribution (see Section 9.2), and in very broad term the distribution factors are generally acceptable. Issue closed.

Parking Provision

Issue:

The TMAP proposed a slight variation to the proposed parking provision in contrast to Council's requirements.

Halcrow's Initial Comment:

This is further dealt with in Section 5.

Consultant's Response:

See Section 5 for details.

Status:

See Section 5 for details.

Traffic Generation

Issue:

The TMAP provided an estimate of the traffic arising from the development.

Halcrow's Initial Comment:
This is further dealt with in Section 6.

Consultant's Response:
See Section 6 for details.

Status:
See Section 6 for details.

McGill Street Precinct Assumed Development Traffic

Issue:
The TMAP assumed that the McGill Street Precinct would generate about 287 vph in total.

Halcrow's Initial Comment:
It appears that the TMAP traffic report has underestimated the development traffic for the McGill Street Precinct by as much as 24 vph.

Consultant's Response:
The transport analysis undertaken for the McGill Street Masterplan was prepared by Arup in 2009. Various traffic generation rates were adopted based on the RTA Guide to Traffic Generating Developments with adjustments applied to recognise public transport accessibility and Council Car Parking provision. This resulted in a PM peak traffic generation of 287 vehicles per hour. Choosing slightly different rates could result in higher or lower traffic generation and a difference of 24 vph (8%) is not considered significant.

Status:
In the light of overall additional development traffic from all nearby proposed developments (and existing traffic within the network), a difference of 24 vph is acceptable. Issue closed.

SIDRA Analysis

Issue:

The TMAP indicated that intersection performance is assessed using four factors – degree of saturation, average delay, level of service and 95th percentile queue length. However, the included summary tables of the intersection performance results did not include reporting of the queue length.

Halcrow's Initial Comment:

Generally, calibration of intersection capacity analysis of the existing condition is done by comparing the observed queue lengths with the modelled queue lengths to enable a robust assessment of future conditions. In this case, it is not clear how well the assessed intersections have been calibrated.

Consultant's Response:

The extensive queuing on a number of intersection approaches extend back through adjacent intersections making it difficult for SIDRA to model queue lengths accurately. The RTA has requested that a Transyt model be built for Old Canterbury Road to allow improved consideration of the operation of the series of traffic signals along this route under heavy traffic conditions.

Status:

Halcrow agrees that the Old Canterbury Road road corridor should be assessed through the use of a separate traffic modelling software (e.g. Transyt, LinSig) that considers the effects of queuing of traffic into adjacent intersections. See discussion in Section 9.5 of this report.

Analysis Results of Existing Configuration with Existing Scenario

Issue:

i) The analysis results tabled in Table 17 of the TMAP indicate morning peak conditions are worse than evening peak conditions especially at the critical intersections.

ii) The TMAP implied that there was "*significant queuing*" with some vehicles waiting "*for a number of phase changes…to traverse the traffic signals*" at the intersection of Old Canterbury Road with Railway Terrace, and SIDRA is not able to accurately assess

the performance of the intersection. Similar comments were made about the intersections of Old Canterbury Road with Toothill Street and Railway Terrace with West Street intersections.

Halcrow's Initial Comment:

i) The results are consistent with our site observations, however, the reported results are at best very optimistic e.g. the Old Canterbury Road intersection with Railway Terrace is reported with a delay of 53 seconds during the morning peak. The travel time along Longport Street/Railway Terrace in the eastbound direction from Lackey Street to West Street was recorded by Halcrow to be more than eight minutes.

ii) This statement contradicts an earlier statement about traffic being able to clear in the same signal cycle. The TMAP also did not mention how the inability of SIDRA to model this particular situation could be rectified and addressed in the TMAP.

Consultant's Response:

See consultant's response to the issue under the heading of "SIDRA Analysis".

Status:

See issue status under the heading of "SIDRA Analysis".

Intersection Improvements

Issue:

i) The TMAP adopted the same intersection improvement works suggested by the Lewisham Estate TMAP.

ii) The proposed improvements would mean that the traffic capacity along Old Canterbury Road in the northbound direction south of Toothill Street would be reduced to one traffic lane.

iii) Provision of dedicated left turn lanes into Old Canterbury Road and West Street have been indicated as being beneficial.

Halcrow's Initial Comment:

i) This is in spite of the RTA explicitly stating that the RTA does not support the

proposed improvements for practical and safety reasons.

ii) The existing flow along Old Canterbury Road in the northbound direction is more than 850 vph. This would be very close to the capacity of one traffic lane, and at the signalised intersection it would be reduced further. A significant proportion of the traffic signal green would need to be devoted to the Old Canterbury Road traffic to the detriment of the traffic on the side street. Furthermore, traffic is likely to significantly increase in the future, meaning that the traffic flows would exceed the capacity of one lane. In addition, bus stops are located on both sides of Old Canterbury Road, south of Hudson Street. On this basis, it is likely to have an adverse impact on the operation of the Toothill Street intersection as well as Old Canterbury Road itself.

iii) These proposals are unlikely to have any effect on improving traffic capacity the respective intersections for reasons stated earlier in this report.

Consultant's Response:

The TMAP adopted the intersection improvement works suggested by the Lewisham Estate TMAP at the request of the Department of Planning. These intersection improvement works relate to the Lewisham Estate and McGill Street precinct in general and not the Flour Mills site. Our modelling of these works does not indicate our support for their adoption.

Status:

Halcrow has no further comment on this issue. Issue closed.

Smith St-Carlton Cres Proposed Traffic Signals

Issue:

The TMAP conducted an analysis comparing its operation as a roundabout with a proposed upgrade to traffic signals at the request of Ashfield Council. The results indicate that the intersection operating under traffic signal control would experience extremely long delays and high degree of saturation with LoS F for both peak periods. The TMAP recommended that this intersection remain under the control of a roundabout. In this way, it would permit traffic from the McGill Street Precinct development to travel east by taking a u-turn at this roundabout.

Halcrow's Initial Comment:

It is doubtful that this intersection under traffic signal control would have such long delay and high degree of saturation. Even though, there is a high proportion of right turn traffic in the westbound direction, this intersection should not operate worse than the adjacent Old Canterbury Road given that the intersection has a lower traffic demand than at the Old Canterbury Road intersection.

The TMAP also suggested this intersection if operating as a roundabout could be used to allow traffic to travel east from McGill Street Precinct via Brown Street. The roundabout is located some 120m to the west of Brown Street, and the eastbound direction along Longport Street from Old Canterbury Road is congested. It is unlikely that the roundabout would be used in such a manner.

Consultant's Response:

The traffic lane arrangements used for modelling with traffic signals utilised the existing single lane approaches. This resulted in very poor operation of the intersection under traffic signal control. The intersection has been remodelled with 2 traffic lanes on all approaches and a right turn phase on Longport Street and Carlton Crescent resulting in the following performance for the traffic scenario with Existing + McGill + Mills + Lewisham – LoS E in the morning and LoS C in the evening. This indicates that traffic signals could be installed at this intersection however a lower level of service and greater average delay would be experienced by drivers.

Status:

Halcrow has no further comment on this issue. Issue closed.

Vehicle Access Points

Issue:

The TMAP made recommendations about vehicle access points to serve the proposed development. This is depicted on Figure 19 in the TMAP.

Halcrow's Initial Comment:

This is agreeable in principle. That is all access points on Old Canterbury Road and Smith Street should be provided as left-in/left out only. Access along Edward Street

could cater for all movements under priority control. Finally, the intersection of Old Canterbury Road with Edward Street should operate under signal control, and the Smith Street intersection with Edward Street should be provided as a roundabout.

Consultant's Response:
Not required.

Status:
Resolved.

4.3 Summary of Review

In summary, all the issues raised have been adequately addressed by the respective traffic consultants with the exception of the intersection analysis results. Halcrow does not consider the intersection analysis results to be reliable. However, given that Halcrow has conducted its own independent analysis, this issue can be considered as closed.

5 TMAP Parking Assessment

This section documents the review of the proponent's traffic consultants' assessment and assumptions in deriving proposed parking provisions for both development proposals.

5.1 Lewisham Estate

5.1.1 Marrickville Council Parking Requirements

Marrickville Council's current parking requirements for any proposed developments are stipulated in their development control plan, namely DCP 19. However, Council has recently developed a comprehensive development control plan, with a section specifically dealing with parking. Although, this is still in draft form, it is considered to be relevant as it has adopted more contemporary policies relating to parking and is consistent with the wider State Government objectives of reducing travel by private cars and increasing shift to public transport modes.

The site is within the draft DCP's Parking Areas 2 and 3, but it is considered Area 2 is more applicable.

The relevant required parking rates are:

- residential units
  - studio/1-bed units – one space per four units;
  - 2/3-bed units – one space per unit; and
  - Visitors – one space per 10 units;
- retail use (500-750m^2 GFA) – seven spaces plus one space per 45m^2 over 500m^2 for customers and staff.

The revised development comprises:

- 430 (comprising 53 studio/1-bed units, 325 2-bed units and 52 3-bed units) residential units; and
- 739m^2 of retail floor area.

Based on Council's parking requirements, the residential component will require 433 car spaces (including 43 car spaces for visitors). The retail use will require 12 spaces. Therefore, based on Council's requirements the entire development will require a total of 445 spaces.

5.1.2 Proposed Parking Provision

The proponent proposes to provide 492 spaces on the basis that additional car space area is required to accommodate accessible car parking (accessible parking spaces are provided with a greater width to cater for mobility impaired people).

The TMAP indicated that approximately 20 per cent of the residential units would be provided as adaptable units (i.e. 83 adaptable units) which will each require one accessible car space. In addition, two per cent of the visitor car spaces would be provided as accessible car spaces (approximately one visitor space). Therefore, a total of 84 accessible car spaces would be required.

The TMAP stated that the accessible spaces will be provided in accordance with AS2890.6 which requires the accessible spaces be provided with a standard width car space (2.4m) with a shared area (2.4m wide, but which can not be used a car space) adjacent to an accessible car space (i.e. if two adjacent accessible spaces are provided, it will required an effective width of three car spaces at 2.4m wide (2.4m wide space + 2.4m wide shared area + 2.4m wide car space = 7.2m)).

Therefore, to accommodate the width required for 84 accessible spaces, 126 standard width spaces will need to be provided. This would bring the total required standard width spaces to about 489 car spaces (i.e. 363 general spaces + 84 accessible spaces + 42 shared spaces). However, the proponent proposes to provide a total of 492 spaces (including accessible spaces and spaces for use as a shared area as required in AS2890.6).

The proposed provision of 492 car spaces will exceed the draft DCP requirements by about three spaces. Given that the site is located in close proximity to public transport services, the number of excess spaces is only minimal, this is considered to be satisfactory. However, there should be a consent condition restricting the effective car spaces for the entire development as proposed to be 448 car spaces.

5.1.3 Consultant's Response

A condition of consent specifying an effective number of parking spaces is not supported. Instead, it is recommended that any condition to this effect be related to a maximum number of parking spaces to be permitted is in accordance with Council's draft DCP rates. This provides a level of flexibility for future refinement of the design whilst still ensuring that the number of parking spaces is constrained.

5.1.4 Status

Halcrow agrees with the above. Therefore, the approval is to include a condition requiring the development to provide parking at the rates specified in the current draft DCP 2010 for Area 2.

5.2 Summer Hill Flour Mill

5.2.1 Ashfield Council Parking Requirements

Ashfield Council's parking requirements for any proposed developments are stipulated in their development control plan, namely DCP 2007 Part C11. This DCP applies to all developments within the Ashfield area. The DCP specifies minimum parking requirements.

The relevant required parking rates are:

- residential units – one space per unit,
  plus one additional space for every five 2-bed units,
  plus one additional space for every two 3-bed,
  plus one visitor space per five units; and
- retail/commercial uses – one space per 40m^2.

The Summer Hill Flour Mill site is proposing to accommodate:

- 290 residential units (comprising 118 1-bed units, 130 2-bed units and 42 3/4-bed units);
- 2,500 to 2,800m^2 of retail use; and
- 3,500 to 4,000m^2 of commercial use.

The residential component will require 395 spaces (including 58 visitor car spaces). The retail use will require between 63 and 70 car spaces, while the commercial use will require from 88 to 100 car spaces. The entire development will require from 546 to 565 car spaces in total.

5.2.2 Proposed Parking Provision

For the Summer Hill Flour Mill site, the proponent is proposing to provide a total of 450-550 underground spaces plus an additional 50 to 70 on-street spaces. This represents a total parking provision of 500-620 car spaces. The higher number would exceed Council's requirements by about 55 car spaces, which is considered to be excessive, in particular when Council's parking provision rates are the same as RTA's unconstrained rates (see discussion below).

5.2.3 Consultant's Response

The proponent proposes to provide car parking in accordance with the Ashfield Council DCP parking rates. This includes shared use of on-street car parking within the development for visitor use for residents, retail and commercial, which will allow some relaxation of underground visitor car parking. Further reductions to car parking provision for retail and commercial use are considered appropriate and would be determined at time of lodgement of the development applications for these specific uses. Ashfield Council are keen for the development to provide adequate car parking for residential uses to ensure there is no overspill onto local streets adjacent to the site. Car ownership (and hence the need to park these vehicles) does not correlate directly to peak hour traffic generation in transit oriented developments such as this.

5.2.4 Status

The site is within easy access of existing and future public transport services, as such it is recommended for the proposed development to be provided with reduced parking as recommended below. See discussions below in Sections 5.3 to 5.5.

5.3 RTA's Parking Requirements

In the RTA's *Guide to Traffic Generating Development*, 2002, parking rates are provided for various land uses. The relevant ones are:

- residential[1]
  - 1-bed – 0.6 spaces per unit;
  - 2-bed – 0.9 spaces per unit;
  - 3-bed – 1.4 spaces per unit;
  - visitors – one space per five units;
- retail – one space per 22m^2 GLFA or one space per 30m^2 GFA; and
- commercial – one space 40m^2 GFA.

Table 5.1 compares the parking requirements from the Councils with those contained in the RTA guidelines and those proposed by the proponents.

Table 5.1 Comparisons of Parking Requirements

Development Sites and Uses	Marrickville Council	Ashfield Council	RTA Requirements	Proposed Provision
Lewisham Estate				
- Residential	390	-	397	391
- Residential Visitors	43	-	86	43
- Retail	12	-	25	13
- *Total*	*445*	-	*508*	*447*
Summer Hill Flour Mill				
- Residential	-	337	247	?
- Residential Visitors	-	58	58	50-70
- Retail	-	63-70	83-93	?
- Commercial	-	88-100	88-100	?
- *Total*	-	*546-565*	*476-498*	*500-620*

It is prudent to note that the parking rates stipulated in Ashfield Council's DCP for multi-unit housing is consistent with the RTA rates for medium density residential developments (20 units or less) which are more generous in terms of required parking when compared with high density residential developments (more than 20 units). Clearly the Summer Hill Flour Mill proposed development is not a medium density development.

[1] This relates to high density residential development (i.e. more than 20 units) located in a metropolitan sub-regional area.

The RTA rates represent unconstrained parking rates. In recent years, there is a move away from providing unconstrained rates in various local Council areas for environmental sustainability reasons. Contemporary council parking policies stipulate suppressed parking provision with the objectives of reducing car ownership and travel by private car, and modal shift to non-car modes.

From **Table 5.1**, it can be seen that the proposed parking provision for the Lewisham Estate is generally consistent with Council's requirements and is below the RTA's unconstrained provision. Therefore, in the light of the above discussion, it is considered the proposed provision for the Lewisham Estate is appropriate.

In relation to the Summer Hill Flour Mill site, it is considered the proposed parking provision is excessive given the site's proximity to existing and future public transport services.

It is considered that residential parking should be provided at rates similar to Marrickville Council for Parking Area 2 (i.e. for studio/1-bed units at one space per four units and for 2/3-bed units at one space per unit plus one space per 10 units for visitors). In relation to retail and commercial, an appropriate rate would be one space per 50m^2 GFA.

Using the suggested rates, the Summer Hill Flour Mill residential component would require 231 car spaces (including 29 visitor spaces). The retail use would require 50 to 56 car spaces, while the commercial use would require 70 to 80 car spaces. The total required parking provision would be 351 to 367 car spaces.

It is further recommended that all visitor parking for both development sites be provided as on-street parking spaces within the respective development site. All on-street spaces should be time limited for the exclusive use of visitors. In addition, consideration should be given to the provision of additional commuter parking spaces (whether as on or off-street parking) for the future light rail station. All residential and retail/commercial occupants/tenants parking should be provided within the basement.

5.4 Motorcycle and Bicycle Parking Provisions

Parking provisions for motorcycles and bicycles to be provided consistent with the requirements set out in the respective Council's DCPs except in the Ashfield's Council DCP where it requires bicycle parking to be provided at rate of one space per 10 units for residential occupants. This should be increased to at least one space per two units.

5.5 Car Share Parking Provision

In relation to parking provision for car share, it is recommended at least one car share space be dedicated to one commercial car share operator at each of the development site.

5.6 Summary of Review

All identified have been addressed by the respective traffic consultants. Halcrow recommends for suppressed parking be provided to serve the proposed developments.

6 TMAP Traffic Assessment

6.1 Lewisham Estate

6.1.1 Adopted Trip Generation Rates

The PPR traffic report adopted a rate of 0.4 trips per hour per unit for the residential component. The PPR traffic report indicated given the proximity to public transport services, a rate of 0.29 trips per hour per unit would be more appropriate.

The rate of 0.4 trips per unit is consistent with RTA's suggested traffic generation rate for medium density residential developments (i.e. residential developments with less than 20 residential units). However, as the proposed development is a high density residential development (i.e. with more than 20 residential units), the more appropriate rate to use is 0.29 trips per hour per unit, regardless of its proximity to public transport services and other amenities. Given the suppressed parking stipulated by Council and anticipated good future accessibility to public transport, the traffic generation rate is likely to be reduced further. However, for traffic analytical purposes the rate of 0.29 trips per hour per unit would be the more appropriate rate to use.

In relation to the retail use, the PPR traffic report adopted a rate of 2.3 trips per hour per $100m^2$, but it also recognises the RTA's suggested rate of 4.6 trips per hour per $100m^2$ for "*secondary retail*". The report effectively proposed to half the RTA's suggested trip rate for specialty retail based on Council's suppressed parking requirement and the retail use has a local catchment area.

The above is not supported. The development traffic for the retail use should be estimated based on turnover of the car parking space.

Based on RTA's guidelines, for a general retail use, the trip generation rate is 5.6 trips per hour per $100m^2$ of floor area (which is extracted from the RTA's regression equations for retail use on a Friday afternoon). The comparable parking demand rate is 4.5 car spaces per $100m^2$ of floor area. This equates to a trip rate of 1.2 trips per hour per space. This rate would be more appropriate.

6.1.2 Consultant's Response

A residential traffic generation rate of 0.4 trips per unit was adopted to provide a conservative assessment. Following confirmation of the Light Rail extension, a reduced rate of 0.29 trips per unit is considered more appropriate. In this regard, the modelling undertaken represents a worst case assessment and provides robustness in the event that the distribution of traffic onto the surrounding road network were to vary slightly in the future.

Halcrow's recommended trip rate of 1.2 trips per retail space would nominally results in a traffic generation of 16 trips per hour associated with the required 13 retail parking spaces. This compares with 17 trips per hour as assessed within the PPR report. As such, the outcomes from both alternative assessment methods are consistent and will not affect the modelling undertaken.

6.1.3 Status

Halcrow agrees with the above. Issue is now closed.

6.2 Summer Hill Flour Mill

The TMAP adopted a trip generation rate of 0.4 trips per unit consistent with RTA's suggested traffic generation rate for medium density residential developments. However, as previously indicated, the residential component is considered to be high density rather than medium density. The RTA's suggested rate for high density is 0.29 trips per unit.

For commercial use, the TMAP estimated traffic by assuming that the 50 per cent of the car spaces provided for commercial use turnover during the peak period. This would result in an effective generation rate of 0.5 trips per car space. It is appropriate to estimate development traffic based on turnover rates of car spaces (i.e. a rate of trips per hour per car space). However, the adopted rate seems to be minimal. This is not supported as RTA data[2] implies a rate of 0.8 trips per hour per car space – the adopted rate is almost 40 per cent less than the RTA's rate.

[2] For commercial use, the RTA suggests a trip generation rate of 2.0 trips per hour per 100m^2 and a parking provision rate of one space per 40m^2. This equates to a traffic generation rate of 0.8 trips per hour per space.

In relation to retail use, the TMAP also adopted a trip generation rate based on turnover of the car spaces at a rate of 2.0 trips per hour per space. However, it appears that the TMAP based the trip rate on a major retail shopping centre rather than a general retail use.

As discussed above, based on RTA's guidelines, a more appropriate generation rate for general retail use would be 1.2 trips per hour per space.

6.2.1 Consultant's Response

The traffic generation rates adopted by the TMAP gave consideration to the location, the type of development and the public transport accessibility. This resulted in an evening peak hour traffic generation of 289 vehicles per hour. The traffic generation rates suggested by Halcrow may also be valid and when applied result in an evening peak hour traffic generation of 235 vph (23% reduction). A worst case scenario has therefore been assessed.

6.2.2 Status

See discussion in Section 6.3.

6.3 Comparisons of Estimated Trips

Table 6.1 compares the development traffic estimated by the traffic consultants with those considered by Halcrow as part of this review.

From **Table 6.1**, it can be seen the traffic consultants' estimates of development traffic are higher than those using RTA's generation rates.

Table 6.1 Comparison of Development Trips

Development Sites and Uses	TMAP Reports		RTA Generation Rates	
	Trip Rates	Peak Hour Trips	Trip Rates	Peak Hour Trips
Lewisham Estate				
- Residential	0.4 vtph per unit	172 vph	0.29 vtph	125 vph
- Retail	2.3 vtph per 100m^2	17 vph	1.2 vtph per space	16 vph
- *Total*	-	*189 vph*	-	*141 vph*
Summer Hill Flour Mill				
- Residential	0.4 vtph per unit	116	0.29 vtph	84
- Retail	2.0 vtph per space	126	1.2 vtph per space	76
- Commercial	0.5 vtph per space	48	0.8 vtph per space	76
- *Total*	-	*290*	-	*236*

Halcrow's estimates of the development traffic for non-residential uses for both sites were based on applying the RTA's suggested traffic generation rates (per car space provided) to the applicants' proposed car parking provision for each relevant use.

6.4 McGill Street Precinct Development Traffic

Table 6.2 presents the parking requirements (based on draft DCP 2010 parking requirements) and estimated development traffic for the proposed development on the entire McGill Street Precinct site (including the Lewisham Estate site) as envisaged by Marrickville Council.

Table 6.2 McGill Street Precinct Parking and Traffic

Land Use	Unit/Floor Area	Parking Requirements[3]	RTA Generate Rates	Peak Hour Trips
Residential	500 units	-	0.29 vtph	145
Retail	2,942m^2	85	1.2 vtph per space	102
Commercial	6,409m^2	80	0.8 vtph per space	64
Total	**-**	**-**	**-**	***311***

Note: The above estimated traffic relates to the evening peak period. The morning peak traffic would be the same as evening peak period, except the retail use would be generating traffic at half the evening peak period during the morning peak period.

Under the Masterplan envisaged by Marrickville Council, the McGill Street Precinct would generate some 311 vph during the peak periods in total.

[3] Parking requirements based on Marrickville Council's Draft DCP 2010.

The Lewisham Estate site comprises Site 1 and approximately half of Site 5 within the McGill Street Precinct. **Table 6.3** presents the change in traffic from the McGill Street Precinct due to the proposed Lewisham Estate.

Table 6.3 Adjusted McGill Street Precinct Traffic

Land Use	Development	RTA Generate Rates	Peak Hour Trips
McGill St Less Lewisham Estate			
- Residential	280 Units	0.29 vtph	81
- Retail	2,040m² (55 Car Spaces)	1.2 vtph per space	66
- Commercial	4,900m² (61 Car Spaces)	0.8 vtph per space	49
Sub-Total		-	*196*
Lewisham Estate			
- Residential	430 Units	0.29 vtph	125
- Retail	739m² (13 Car Spaces)	1.2 vtph per space	16
- Commercial	-	0.8 vtph per space	-
Sub-Total		-	*141*
Combined			
- Residential	710 Units	0.29 vtph	206
- Retail	2,779m² (68 Car Spaces)	1.2 vtph per space	82
- Commercial	4,900m² (61 Car Spaces)	0.8 vtph per space	49
Total		**-**	***337***

Note: The above estimated traffic relates to the evening peak period. The morning peak traffic would be the same as evening peak period, except the retail use would be generating traffic at half the evening peak period during the morning peak period.

Replacing the proposed development as envisaged in the adopted McGill Street Precinct Masterplan with those now proposed by the proponent of the Lewisham Estate, the overall traffic from the entire McGill Street Precinct would increase from 311 vph to 337 vph – an increase of 26 vph. From a traffic perspective, this increase is considered to be minimal.

The cumulative traffic implications of all the sites are discussed further in Section 9.

6.5 Summary of Review

All identified have been addressed by the respective traffic consultants. No understanding issue in relation to traffic generation estimates.

7 Review of Authority Submissions

A number of submissions were received from the various authorities on the proposed developments. Those that are specifically relevant to traffic and transport are summarised below follow by comments from Halcrow indicating support or non-support of the comments.

7.1 Lewisham Estate

7.1.1 Marrickville Council

Initially Council was concerned about the scale and types of development being proposed in the original concept plan, as well as its consistency with the adopted Masterplan for the McGill Street Precinct. The nature of the retail component would promote Lewisham to a town centre status rather a neighbourhood centre.

Council, in conjunction with Ashfield Council commissioned traffic consultant Colston Budd Hunt Kafes Pty Ltd (CBHK) to conduct a detailed assessment of the TMAP report for the Lewisham Estate proposal. A preliminary assessment by CBHK identified "*significant impacts with the proposal, questioned the practicality of the proposed mitigation measures and recommended that a traffic simulation model be prepared*".

Following the release of the PPR traffic report, Council provided additional comments. Council is still concerned about the over development of the site, and it would continue to restrict development of surrounding sites on the remainder of the McGill Street Precinct. Council pointed out that the PPR concept plan proposes to provide up to 430 units while the adopted Masterplan for the entire McGill Street Precinct proposes to provide approximately 500 units.

Council supports the proposed reduced parking provision (reflecting the Council's Draft Development Control Plan 2011), but it also pointed out that there will need to be provision for on-street parking for both visitors and service vehicles.

In a separate submission, Council also made various comments on the configuration of the internal road network e.g. all internal roads to allow two-way traffic flows with a parking lane on at least one side of the road, internal roads design to allow a medium rigid truck to service the site, vehicular access, parking areas and service areas to be designed in accordance with the relevant Australian Standard.

Halcrow agrees with the above comments.

7.1.2 Ashfield Council

Council acknowledged in their response to the PPR that the RTA will be carefully examining the cumulative traffic assessment of new developments in the area, and requested that Ashfield Council be advised of the findings.

Council is also concerned about the overspill of parking into the Summer Hill area because the Lewisham Estate is proposed to provide reduced parking when compared with Ashfield Council parking requirements stipulated in their development control plan.

Halcrow's view is that there should not be a significant overspill of parking. The site is well serviced by existing and future public transport services – the site developed into a mixed use high density development could be made a good example of a Transit Oriented Development, TOD. Reduced parking to encourage modal shift to non-car modes is one of the main essential elements of a TOD.

7.1.3 Roads and Traffic Authority (RTA, now known as Roads and Maritime Services)

The RTA has indicated they do not support the proposed access arrangement as outlined in the original TMAP traffic report for safety and practicality reasons.

The RTA has requested for additional information and additional modelling using SCATES or LinSig in relation to the proposed fourth leg at the Toothill Street intersection with Old Canterbury Road before making further comments on this matter.

The RTA advised that they are not aware of any discussions taking place in relation to southbound right turn movements along Old Canterbury Road to be focused at McGill Street.

The RTA also questioned the predicted improvements on the operation of the intersections in the future.

The RTA also advised that clearway restriction along Old Canterbury Road could not be implemented because clearway restriction is required to be applied to a section of road with a minimum length of 5.0km. Instead, the RTA advised that "No Stopping" restrictions should be implemented.

The RTA made a request for updated information addressing the above comments to be forwarded for further review and endorsement, and that the DoP should not determine the application until the RTA is satisfied that the issues raised have been addressed.

Halcrow supports all of the above comments.

Following the submission of the PPR traffic report, the RTA has indicated that they do not object to the development proposal in principle, but the RTA is still concerned about the having all right turn access to the development from the uncontrolled intersection of Old Canterbury Road with McGill Street. The concerns relate to the fact that additional traffic using this access would increase safety risk of right turn movements into the site and have a detrimental effect on traffic flows on Old Canterbury Road. The RTA has requested that a SIDRA analysis of this intersection be conducted.

The applicant has subsequently provided the requested information. The analysis shows that with right turn movements permitted, the intersection would operate unsatisfactorily. To address this, the applicant has suggested that the right turn from McGill Street be banned during the peak periods. However, one of the two lanes on Old Canterbury Road would need to be reconfigured to provide an "unprotected" shared right turn lane into McGill Street.

The RTA has reviewed the information, and suggested that the applicant explore the feasibility of providing a fourth leg, opposite Toothill Street.

Halcrow does not support having unprotected and uncontrolled right turn movements to and from the site at McGill Street (or anywhere along Old Canterbury Road and Longport Street) for safety and road capacity reasons. Due to the expected moderately high right turn flows into the site and heavy traffic flows along Old Canterbury Road, there would be a significant risk for collisions to increase at this location. In addition, this would also effectively reduce the capacity for the through movement along Old Canterbury Road from two lanes to one lane. Halcrow agrees with the RTA comment that further options to safely and efficiently accommodate the right turn movements to/from the site should be investigated. Providing a fourth leg at the existing Toothill Street intersection would appear to be a good option. However, Marrickville Council has indicated this may have detrimental effects on the potential development yield on land within the McGill Street Precinct due to fragmented land ownerships of the land involved. This option has merits and investigations should be conducted to explore opportunities to address Council's concern.

7.1.4 Department of Transport

The Department of Transport has offered their comments in relation to the original Concept Plan application. The Department has recommended the following travel demand management measures to be provided in the Statement of Commitments:

- reduced parking provision;
- improvements to pedestrian and cyclist connections to the proposed light rail stop and Lewisham Station;
- provision of car share spaces; and
- provision of a Transport Access Guide.

The Department also made further comments to relation to the proposed light rail stop:

- the loading dock adjacent to the proposed light rail stop will introduce unnecessary conflict between pedestrians and service vehicles; and
- the internal road layout does not provide good legibility to and from the light station.

Halcrow agrees with the above comments.

7.1.5 RailCorp

RailCorp has provided comments for the original Concept Plan application. RailCorp went in great lengths to discuss about proposed linkages to Lewisham Station. Acknowledging the application is for a Concept Plan approval, it requested that a condition be imposed that it requires the proponent to consult and liaise with RailCorp to obtain their requirements in relation to the need to upgrade Lewisham Station and to cater for likely increased patronage as a result of the development.

RailCorp also pointed out some anomalies in the TMAP report such as the distance from the site to the Lewisham Station, the use of pedestrian path along the southern side of Railway Terrace and the proposed crossing on Railway Terrace.

RailCorp also indicated support for a restrained approach to parking provision as the site is close to public transport services. It also indicated that the proposed provision of 100 car spaces for visitors is viewed as excessive.

Halcrow agrees with all of the above comments.

7.1.6 CBHK Review of TMAP Traffic Report

Marrickville Council commissioned CBHK to conduct a review of the TMAP traffic report. CBHK has summarised the review as follow:

In summary, our review of the Traffix TMAP has found:−

i) the proposed development has excellent access to public transport;

ii) appropriate parking provision should be provided to discourage travel by private vehicles;

iii) suggested parking rates are:−

- *retail, 1 space per 30m^2 GLA;*
- *commercial, 1 space per 50m^2 GFA;*
- *residential, 1 space per unit plus 1 visitor space per five units.*

iv) traffic studies should be undertaken for Saturday as well as weekday peak periods;

v) cumulative traffic analysis should be undertaken for the subject development, the adjacent development and the Flour Mill site development;

vi) micro simulation computer modelling, such as Paramics, should be undertaken to assess traffic effects;

vii) outputs from this modelling should be used for SIDRA/SCATES analysis;

viii) some of the Traffix proposed roadworks are impractical;

ix) the principles for the construction traffic management plan should be determined prior to granting consent to the subject Part 3A application;

x) SRDAC has provided advice regarding the traffic aspects of the proposed development;

xi) a number of matters identified by SRDAC should be implemented as consent conditions;

xii) a pedestrian safety audit should be undertaken prior to granting consent to the subject Part 3A application.

Halcrow generally agrees with the above, except that we believe that parking should be provided at Marrickville Council's draft DCP 2010 rates for all uses.

7.2 Summer Hill Flour Mill

7.2.1 Ashfield Council

Council is concerned that there are no binding commitments to deliver the required infrastructure to support the proposed development, especially when some improvements require land acquisition from other land owners. Council is also concerned about the timing and threshold of the development that would trigger the need for certain improvement works to be carried out. Council requested for all improvement works to be identified and fully costed with an indication of time frame or development threshold for these to be implemented.

Council requested for additional traffic modelling to address cumulative traffic impacts at major intersections through the use of micro-simulation modelling software. Council also recognises that there are no "real" options to resolve existing road capacity issues. But Council does not believe that future residential development on the site should be restricted as it agrees with the applicant that the continuing industrial uses on the sites would also have major traffic impacts on the current road network, instead it requested the developer to deliver all traffic management improvements identified so far plus any recommendations that may be required by the RTA.

In separate submissions, Council stated that parking for residential component to comply with requirements set out in their relevant development control plan. They would also consider increasing the parking rates for the retail and commercial uses, if it could be demonstrated such is warranted.

Halcrow agrees to Council's comments above, except that parking should be provided at environmental sustainable rates i.e. at reduced rates for all uses (see discussion in Section 5).

7.2.2 Marrickville Council

Marrickville Council also requested that a cumulative traffic impact assessment be conducted.

Council supports the provision of car share spaces, but recommended that a minimum of two car share spaces be provided. These are to be located in a publically accessible area.

Council has made requests that public access to the light rail station from Smith Street and Longport Street be provided at the first stage of the development. This is to be reflected in the Statement of Commitments.

Council also requests that bicycle parking for visitors be provided within public spaces in convenient locations spread throughout the site.

Halcrow agrees to all of the above comments.

7.2.3 Leichhardt Council

Council stated that there would additional traffic from the proposed development using Brown, Hathern and Tebutt Street citing the traffic analysis in the traffic report suggesting there would an additional 64 cars per hour using Old Canterbury Road. Council is concerned about safety implications along this corridor as there is an existing perceived road safety problem.

Council is also concerned about traffic diverting into residential streets to avoid the congestion at the Old Canterbury Road-Railway Terrace intersection.

Halcrow believes that Council's concerns are unfounded in this case. An additional 64 vph is unlikely to create any noticeable impacts as this volume would be relative low when compared with the total volume on Tebutt Road.

7.2.4 Roads and Traffic Authority (RTA, now known as Roads and Maritime Services)

The RTA requested that a TRANSYT model to be undertaken for the traffic signals on Old Canterbury Road including the proposed signalisation of the Edward Street intersection. The TRANSYT model was to include 10 year background traffic growth. The TRANSYT model is to be independently audited by a third party before submitting to the RTA for review. The RTA also requested that the proposed development not be approved until such time the RTA has reviewed the TRANSYT model and all necessary road infrastructure improvements on Old Canterbury Road have been identified to the satisfaction of the RTA.

The RTA has acknowledged Council's request for a micro-simulation traffic model of the area, but has indicated that it is not required by the RTA.

The RTA does not support a provision of an access on Old Canterbury Road, east of Edward Street.

RTA has requested that all internal roads have a self enforcing low speed environment, as such threshold entry treatments are to be implemented. Any changes to existing speed limits will require approval from the RTA.

RTA requested that the developer improve pedestrian accessibility, amenity and safety between major pedestrian generators and attractors such as shops, schools, public transport services to the satisfaction of DoPI. RTA also noted that new traffic signals on pedestrian accessibility grounds will not be approved by the RTA.

RTA also made further general comments regarding a number of other issues e.g. all vehicles to enter and exit the site in a forward direction, swept path of the longest vehicles in accordance with AUSTROADS guidelines etc.

Halcrow agrees with all of the above RTA's comments.

7.2.5 Department of Transport

The Department has indicated support for the following transport initiatives and measures proposed by the applicant:

- reduction in parking provision;
- timed on-street parking and resident parking schemes off-site;
- provision of car share spaces;
- conditions of consent of future project applications to include a Workplace Travel Plan and Travel Access Guide;
- through site pedestrian/cycle connections; and
- provision of facilities and storage as proposed in the draft Statement of Commitments.

Halcrow agrees with all of the above comments.

7.2.6 RailCorp

RailCorp has requested for the proponent to reconsider providing parking at the DCP rates, and instead provide parking for all uses at sustainable parking rates and to promote the use of public transport services including bus services.

Halcrow agrees with this (see Section 5).

7.2.7 CBHK Review of TMAP Traffic Report

Ashfield Council commissioned CBHK to conduct a review of the TMAP traffic report. CBHK has summarised the review as follow:

In summary, our review of the Ove Arup transport assessment has found:-

i) the proposed development has excellent access to public transport;

ii) appropriate parking provision should be provided to discourage travel by private vehicles;

iii) suggested parking rates are:-

- *retail, 1 space per 30m^2 GLA;*
- *commercial, 1 space per 50m^2 GFA;*
- *residential, 1 space per unit plus 1 visitor space per five units.*

iv) traffic analyses should be undertaken for Saturday as well as weekday peak periods;

v) cumulative traffic analysis should be undertaken for the subject development, the Lewisham and adjacent development sites;

vi) micro simulation computer modelling, such as Paramics, should undertaken to assess traffic effects;
vii) outputs from this modelling should be used for SIDRA/SCATES analysis;
viii) prior to the results of the Paramics modelling, it should be noted that there is a number of traffic issues associated with the proposed developments, particularly with the McGill Street Precinct site;
ix) proposed developments will generate a total of some 1000 vehicles per hour in weekday peak periods;
x) this is a significant volume of additional traffic in an area where there are already a number of traffic constraints;
xi) the development of the Flour Mill site on its own would generally satisfactory, 'subject to the adoption of the measures set down in paragraph 2.24;
xii) the exception is the intersection of Railway Terrace/Old Canterbury Road/Longport Street, which operates at capacity today. No mitigation measures have been suggested by Ove Arup although Traffix have suggested measures.
xiii) with regards to the McGill Street development, the level of development is larger than the Flour Mill site with significantly' higher levels of traffic generation;
xiv) measures to cater for traffic are set down in paragraphs 2.29 and 2.30;
xv) these measures should be tested using the Paramics cumulative traffic modelling to establish their appropriateness and practicality;
xvi) the principles for the construction traffic management plan should be determined prior to granting consent to the application.

Halcrow generally agrees with the above comments with the exception of:

- parking should be provided at reduced rates similar to the parking rates stipulated in Marrickville Council's draft DCP 2010;
- Saturday analysis is considered not required as retail traffic is only moderate, and background traffic would also be lower on a Saturday; and
- two northbound traffic lanes should be maintained along the entire length of Old Canterbury Road.

8 Consultation with Councils

Separate meetings were held with representatives from Marrickville and Ashfield Councils. These meetings were held on Thursday 24 November 2011. Below is a summary of the issues discussed.

Halcrow's assessment of the proposed developments and recommendations have taken the comments from Council into consideration where appropriate.

8.1 Marrickville Council

In the meeting, Marrickville Council continued to express their concern that the Lewisham Estate development is excessive and over development which would have detrimental traffic effects on the surrounding road network. It is also not compatible with the development yield envisaged in the Council's adopted Masterplan for the McGill Street Precinct in that it does not have equitable development yield across the entire precinct resulting in other sites within the Precinct not being viable while still requiring to comply with the same development yield as envisaged in the Masterplan.

Council requested that a solution be developed to provide a crossing across Old Canterbury Road between Railway Terrace and Toothill Street for residents to access Lewisham Railway Station. The proponent is to contribute funding (e.g. through a voluntary planning agreement) for such a future solution.

Council also requested that the cumulative traffic assessment should include an additional traffic scenario where the McGill Street Precinct would be developed in accordance with Council's adopted Masterplan.

Council's opinion was also sought on the provision of a fourth leg at the existing signalised intersection of Old Canterbury Road with Toothill Street to provide access to serve the proposed development. Council indicated that uptake of land within the site to allow this would have detrimental effects on the potential development yield of the affected sites due to fragmented site ownership.

8.2 Ashfield Council

Council would like to have all infrastructure, both external and internal, required to support the proposed development identified and agreed between all stakeholders. The provision of all necessary infrastructure would need to be fully costed and funded. All costs for the required infrastructure would be fully apportioned to the developments. These are to be conducted through a "water tight" process to ensure that the required infrastructure is provided. Council expressed that the provision of any infrastructure to support the development is to be at no cost to Council. Council's existing Section 94 plan does not apply to the site. As such, a Section 94 plan specific to this site will need to be prepared.

Council is unclear about the staging of the proposed development and its relationship with the provision of a light rail station adjacent to the site. Council requested that all accesses to the rail station on the development site to be constructed earlier rather than later (before the completion of the proposed development), even if they are only temporary measures. Adequate parking provision for commuters using the light rail station is also to be provided.

Council is concerned that the proposed development would result in overspilling of parking demand arising from the proposed development into the adjacent residential streets. Council does not have an existing resident parking scheme, nor does it have the resources to implement one. Council's view is that provision of a car space does not necessarily generate additional trips. As such, Council is adamant that the proposed development is to provide on-site parking at the full DCP parking rates.

Council is also concerned about excessive development on the site. There should not be any large scale retail development (e.g. supermarket) due to the additional traffic and parking demand arising from it.

Council perceives that there is a safety issue at the intersection of Longport Street with Smith Street. Anecdotal evidence suggests there are pedestrian and cyclist activities at this intersection, which were perceived not to be compatible with this intersection operating as a roundabout.

Council raised a number of issues in relation to Edward Street. It is concerned that Edward Street may have its residential amenity adversely affected due to the additional development generated by the proposed developments. RTA's *Guide to Traffic Generating Development*, 2002 indicates that residential streets with more than 300 vph would have local neighbourhood amenity adversely affected. Council is also concerned about potential speeding at the new access opposite Wellesley Street where traffic from the development would enter Wellesley Street at excessive speed across Edward Street. Council made requests for a partial road closure of Wellesley Street as well as additional funding for traffic calming devices to be installed on Edward Street.

9 Cumulative Traffic Impact Assessment

9.1 Traffic Assessment

This section discusses the results of the independent cumulative traffic assessment, undertaken by Halcrow, of the proposed developments at both the Lewisham Estate site and the Summer Hill Flour Mill site. The assessment also considers the traffic impacts from the remaining McGill Street Precinct site as envisaged in the Council's adopted Masterplan.

The assessment was conducted using the traffic modelling software LinSig and SIDRA.

LinSig is a recognised traffic modelling software tool to assess the effects of traffic demands and queuing within a network of intersections. SIDRA is another traffic modelling software to assess the performance of isolated intersections operating as signalised, roundabout or sign controlled intersections under a given set of prevailing traffic conditions.

A LinSig model of the linear series of intersections along Old Canterbury Road was developed for the morning and evening peak periods to compare the traffic effects of the development traffic arising from the proposed developments. It includes the following intersections along Old Canterbury Road:

- Longport Street;
- Toothill Street; and
- Edward Street (operating as a signalised intersection under future condition).

SIDRA was used to assess the traffic effects of the proposed developments at the following intersections:

- Railway Terrace-West Street;
- Longport Street-Smith Street; and
- Smith Street-Edward Street.

Peak hour signal timing data (i.e. cycle and phase times) was measured on site which compared very well with those obtained from the RTA. These were input into the traffic capacity analysis in both LinSig and SIDRA. They were also maintained in the future case analysis to enable a direct comparison of the traffic effects arising from the additional development traffic (i.e. with no optimisation of the future case analysis).

9.2 Traffic Demand and Distribution

The traffic demand arising from the proposed developments assumed in the assessment are presented in **Table 9.1**. The estimations of these were discussed in Sections 6.3 and 6.4. It is noted that the traffic estimates prepared by the applicants are higher than the estimates prepared by Halcrow. The cumulative traffic assessment has undertaken a conservative approach by essentially adopting the development traffic estimated by the respective traffic consultants for the Lewisham Estate and Summer Hill Flour Mill sites. In regards to the remaining McGill Street Precinct, this assessment assumes that it would be developed as envisaged in the Council's adopted Masterplan and the appropriate RTA's traffic generation rates applied accordingly (see **Table 6.3**).

Table 9.1 Traffic Demand

Site	Morning Peak Hour			Evening Peak Hour		
	In	**Out**	**2-Way**	**In**	**Out**	**2-Way**
Lewisham Estate[4]	41	139	181	146	43	189
Summer Hill Flour Mill[4]	85	141	227	173	117	290
McGill St Precinct	82	81	163	122	74	196
Total Traffic	**208**	**361**	**571**	**441**	**234**	**675**

Note: The cumulative assessment assumes that all retail uses in the morning peak period would generate traffic at approximately half the rate of that in the evening peak period.

It should be noted that the above traffic estimation for the proposed developments would be similar to if the sites were continue to be used as industrial developments, as rightly pointed out by the applicant's traffic consultants.

[4] Based on estimates provided by the applicants.

The McGill Street Precinct has a site area of some 35,000m^2 while the Summer Hill Flour Mill site has a site area of some 25,000m^2. The two sites have a combined site area in the order of 60,000m^2. Assuming the current allowable floor spaces ratios on these sites at 1:1 for industrial use would continue, and applying the RTA suggested traffic generation rate for industrial use at 1.0 trip per 100m^2, this would equate to some 600 vph during the busiest periods. In addition, a relatively large proportion of the industrial traffic would be trucks with adverse effects to the surrounding neighbourhood amenities.

In consultation with the RTA, they have also requested for the cumulative assessment to include a 10-year background traffic growth in the through traffic along Old Canterbury Road. They have provided growth rates in the range of 0.7 to 0.8 per annum. This assessment has adopted a growth rate of 0.8 per annum which represents traffic growth factor of eight per cent over a 10 year period.

The above traffic would be distributed based on existing traffic patterns obtained from the traffic counts provided in the TMAP and PPR traffic reports prepared by the respective traffic consultants for their development sites. The traffic distribution proportions at each cordon point of the local road network in the vicinity of the development sites are presented in **Table 9.2**.

Table 9.2 Traffic Distribution

Approach Road	Morning Peak Period		Evening Peak Period	
	In	Out	In	Out
Old Canterbury Rd North	15%	23%	25%	15%
West St North	10%	11%	12%	11%
Railway Tce East	20%	23%	24%	15%
Toothill St East	9%	11%	11%	9%
Old Canterbury Rd South	23%	12%	13%	26%
Smith St West	8%	3%	4%	5%
Carlton Cres West	7%	7%	9%	9%
Grosvenor Cres West	9%	10%	3%	10%
Total	100%	100%	100%	100%

The intersection turning movement traffic volumes for existing traffic conditions are presented in **Figure 4**. Similarly, the intersection volumes for future traffic conditions are presented in **Figure 5**.

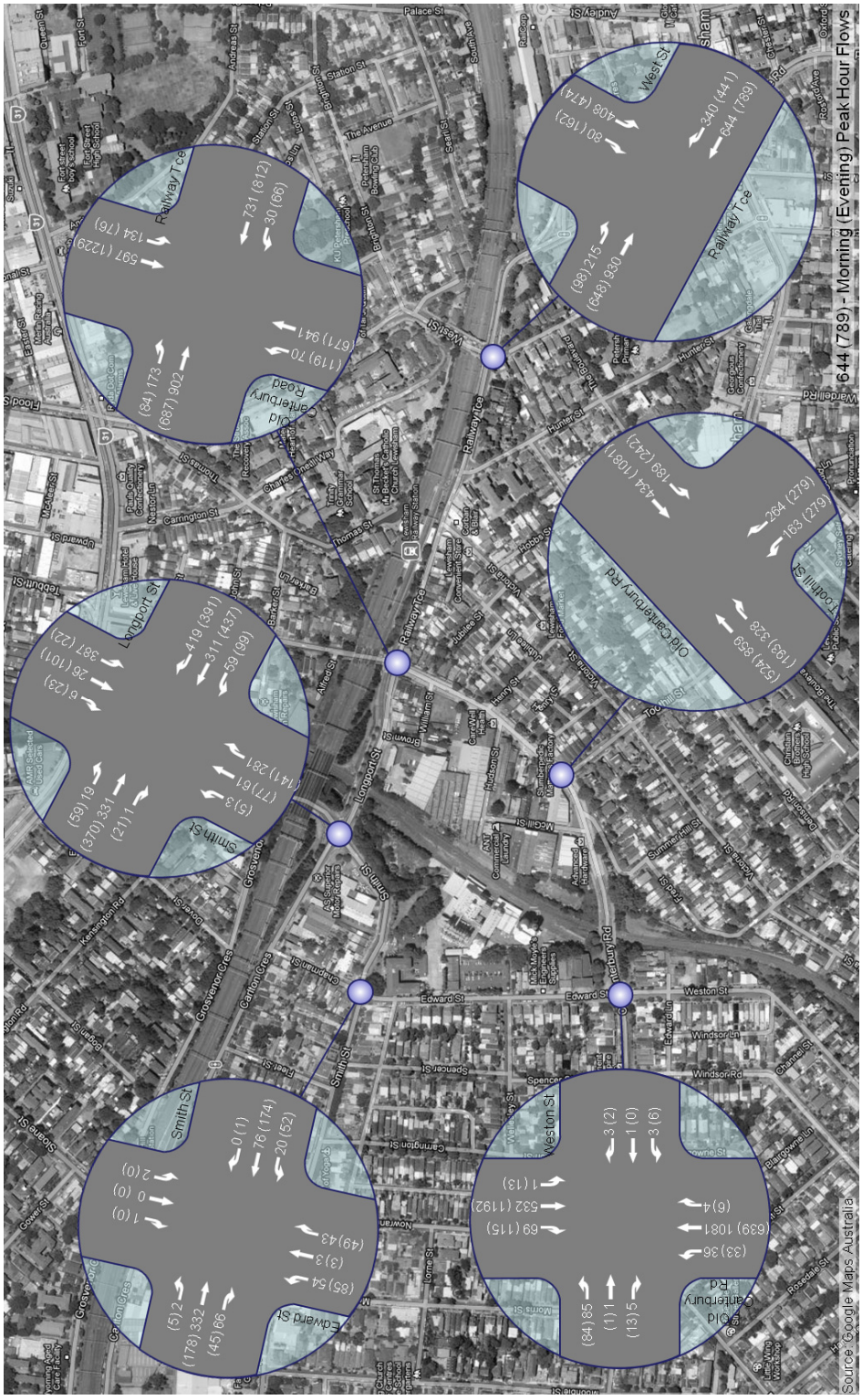

Figure 4 Existing Condition Peak Hour Intersection Volumes

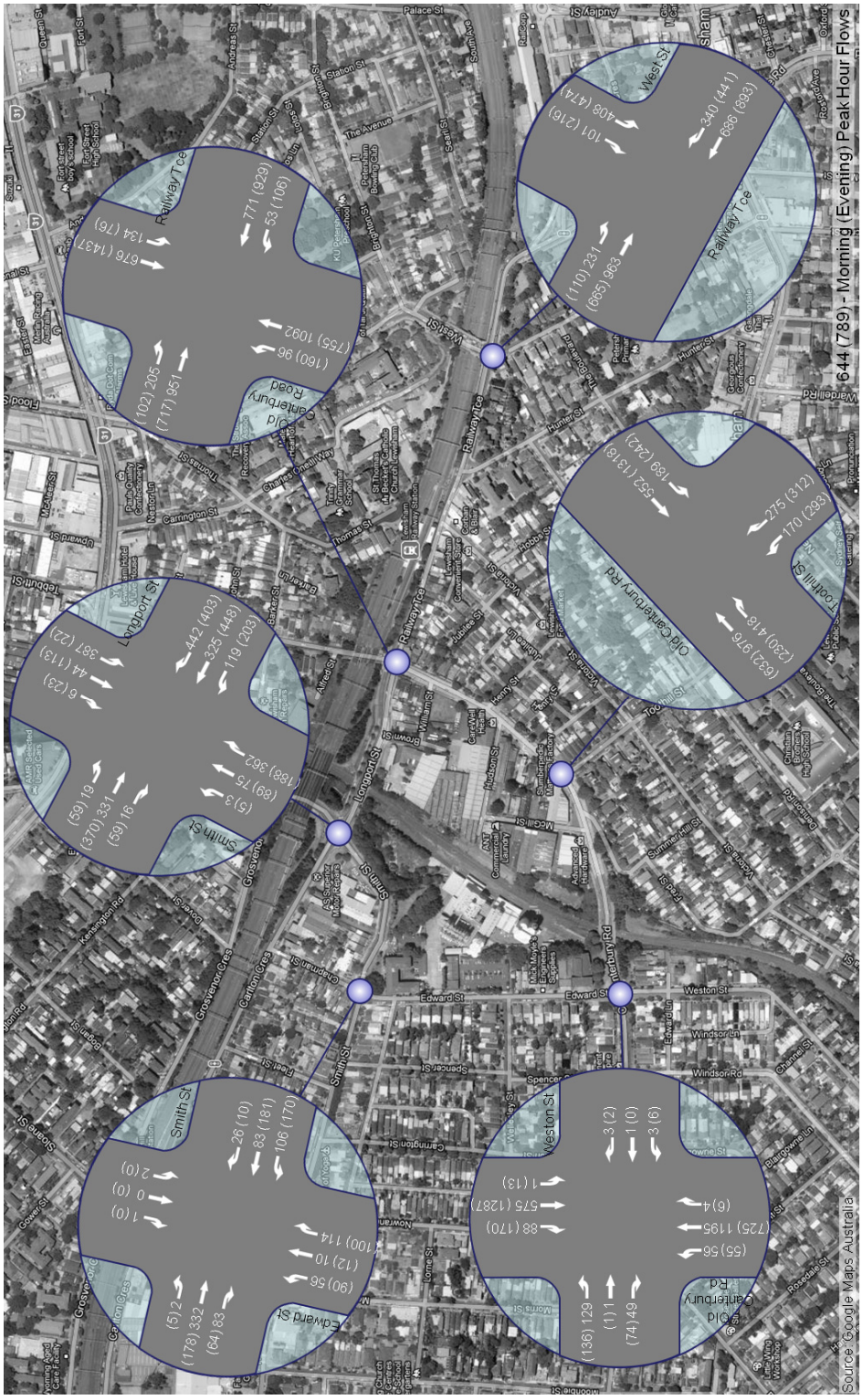

Figure 5 Future Condition Peak Hour Intersection Volumes

9.3 Applicants' Proposed Road Improvements

Following a discussion with Traffix[5], they advised that the following proposed access points and improvements:

- left-in/left-out at Brown Street;
- "no stopping" parking restriction along Old Canterbury Road;
- left-in/left-out at Hudson Street; and
- Old Canterbury Road southbound right turn into McGill Street.

Similarly, in the meeting with ARUP[5], they confirmed that access points and road improvements are as per the traffic report, that is:

- signalisation of the Old Canterbury Road with Edward Street;
- conversion of the Smith Street and Edward Street intersection to operate as a roundabout;
- two access points on Smith Street configured as left-in/left-out; and
- two access points on Edward Street.

The above access points and road improvements are included in the cumulative traffic assessment.

In relation to the provision of right turn into McGill Street from Old Canterbury Road, it is noted that the cumulative traffic assessment has included the provision of the right turn movement into the site. However, if this was not achievable, this would mean that the traffic would circulate around the site or approach the site from a different direction. This is unlikely to affect the assessment results.

9.4 Intersection Assessment Criteria

The efficiency of an intersection can be measured by a number of performance measures such as degree of saturation, average delay, level of service and vehicle queue lengths. These performance measures are further explained in **Appendix A**. However, the RTA generally considers the level of service (LoS) of an intersection to determine its efficiency. LoS A indicates good operating conditions, while LoS F indicates unsatisfactory performance. LoS D is the long term desirable operating condition.

[5] Separate meetings were held with Traffix and ARUP on Thursday 10 November 2011.

However, there are many intersections in the Sydney metropolitan area operating at the worse end of LoS F during peak traffic conditions.

9.5 Assessment Results

9.5.1 Existing Conditions

The intersection performance of the intersections under existing traffic conditions (using traffic flows contained in **Figure 4**) is presented in **Table 9.3** for the intersections along Old Canterbury Road (using LinSig).

All assessed intersections have been calibrated to generally reflect the queue lengths observed on site.

Table 9.3 Existing Performance Results (Old Canterbury Road Intersections)

Intersection	Control Type	Degree of Saturation	Average Delay (sec/veh)	Level of Service	Queue Length (veh)
Morning Peak					
- Old Canterbury Rd-Railway Tce	Signal	1.11	138	F	79
- Old Canterbury Rd-Toothill St	Signal	1.05	99	F	48
Evening Peak					
- Old Canterbury Rd-Railway Tce	Signal	0.94	45	D	34
- Old Canterbury Rd-Toothill St	Signal	0.73	19	B	10

The Old Canterbury Road-Railway Terrace intersection currently operates at a poor level of service at LoS F with an average intersection delay of about 140 seconds during the morning peak period. The maximum intersection queue, which is attributed to the Longport Street eastbound traffic movement, is about 79 vehicles long or about 470m long (extending back to near Fleet Street). In the morning peak period, the traffic demand at this intersection exceeds the available intersection capacity by about 10 per cent. However, the intersection operates at an acceptable level of service during the evening peak period with LoS D. The evening period traffic demand is about 94 per cent of the available capacity. The evening maximum intersection queue (which occurs on the Railway Terrace eastern approach) is 34 vehicles or about 200m (extending past Victoria Street).

At the Old Canterbury Road intersection with Toothill Street, it operates with very similar condition to the Railway Terrace intersection i.e. LoS F and traffic demand exceeding available capacity by more than five per cent. The morning maximum intersection queue, which occurs on Old Canterbury Road southern approach, is about 48 vehicles long or about 290m (extending past Edward Street). During the evening peak, the intersection operates satisfactorily with LoS B with minimal queues.

Below is a description of the existing traffic condition analysis results using SIDRA (with existing traffic flows contained in **Figure 4**). **Table 9.4** provides a summary of the SIDRA analysis results.

Table 9.4 Existing Performance Results (Other Intersections)

Intersection	Control Type	Degree of Saturation	Average Delay (sec/veh)	Level of Service	Queue Length (veh)
Morning Peak					
- Railway Tce-West St	Signal	1.31	116	F	130
- Longport St-Smith St	Roundabout	1.21	242	F	55
- Smith St-Edward St	Priority	0.23	10	A	1
Evening Peak					
- Railway Tce-West St	Signal	1.04	41	C	37
- Longport St-Smith St	Roundabout	0.85	18	B	16
- Smith St-Edward St	Priority	0.15	10	A	1

The Railway Terrace intersection with West Street is reported to operate at LoS F with average intersection delay of about 116 seconds per vehicle and a degree of saturation of 1.31. The maximum queue in the morning peak which occurs on the western approach is about 130 vehicles or 909m long (extending to near Fleet Street). During the evening peak, it operates satisfactorily with LoS C. However, the maximum queue remains at about 37 vehicles or 256m which occurs on the eastern approach (extending past Trafalgar Street).

Similarly, the performance at the intersection of Longport Street-Smith Street has an unsatisfactory LoS F with excessive delay of about 240 seconds per vehicle. The maximum queue occurs on Carlton Crescent western approach with a queue length of about 55 vehicles or 385m (extending past Fleet Street). During the evening peak, the intersection operates satisfactorily with a LoS B.

The Smith Street-Edward Street intersection has been assessed to operate satisfactorily in both peak periods under existing traffic conditions. It has LoS A operation and traffic demand is well below available capacity in both peak periods with minimal queues.

As indicated previously, the traffic conditions in the local road network are a result of traffic congestion and issues originating outside of the local road network near New Canterbury Road and reverberating back along Railway Terrace/Longport Street with the resulting adverse effect to the intersections along it and as well as those along Old Canterbury Road.

9.5.2 Future Conditions

The intersection analysis was repeated for future traffic conditions (using traffic demands shown in **Figure 5**). Post development analysis assumes that the traffic congestion issues outside of the local road network as discussed previously would continue to exist.

The LinSig results are summarised in **Table 9.5**, which is followed by a description of the results.

Table 9.5 Future Performance Results (Old Canterbury Road Intersections)

Intersection	Control Type	Degree of Saturation	Average Delay (sec/veh)	Level of Service	Queue Length (veh)
Morning Peak					
- Old Canterbury Rd-Railway Tce	Signal	1.16	167	F	103
- Old Canterbury Rd-Toothill St	Signal	1.26	259	F	127
- Old Canterbury Rd-Edward St	Signal	0.83	27	B	17
Evening Peak					
- Old Canterbury Rd-Railway Tce	Signal	1.10	109	F	88
- Old Canterbury Rd-Toothill St	Signal	0.78	18	B	11
- Old Canterbury Rd-Edward St	Signal	0.95	30	C	30

The existing traffic congestions found under existing conditions would be further exacerbated from the additional traffic demand arising from the proposed developments and natural growth background traffic.

Under post development traffic condition, the performance of Old Canterbury Road intersection with Railway Terrace would deteriorate in both peak periods. In the morning peak period, the average intersection delays would increase from 138 seconds per vehicle to about 167 seconds per vehicle. The maximum queue (on Longport Street western approach) would increase from 79 vehicles to 103 vehicles extending to almost near Summer Hill Railway Station. The degree of saturation would increase from 1.11 to 1.16. During the evening peak period, it level of service would worsen from an acceptable LoS D to an unsatisfactory LoS F. Its evening period maximum queue (on the eastern approach) would extend to near Trafalgar Street.

At the intersection of Old Canterbury Road with Toothill Street it would continue to operate at LoS F with delay increased from 99 seconds per vehicle to 259 seconds per vehicle. Maximum traffic queue would also increase from 48 vehicles to 127 vehicles along Old Canterbury Road. However, in the evening peak period the intersection would continue at a similar level of performance found under existing traffic condition i.e. LoS B.

The Old Canterbury Road intersection with Edward Street upgrade to a traffic signal control is expected to provide good level of service in both peak periods in the future i.e. LoS C or better.

The SIDRA analysis results for the post development traffic conditions are summarised in **Table 9.6**.

Table 9.6 Future Performance Results (Other Intersections)

Intersection	Control Type	Degree of Saturation	Average Delay (sec/veh)	Level of Service	Queue Length (veh)
Morning Peak					
- Railway Tce-West St	Signal	1.37	139	F	152
- Longport St-Smith St	Roundabout	1.54	526	F	118
- Smith St-Edward St	Roundabout	0.43	14	A	3
Evening Peak					
- Railway Tce-West St	Signal	1.06	43	D	39
- Longport St-Smith St	Roundabout	1.03	56	D	61
- Smith St-Edward St	Roundabout	0.36	13	A	2

Under post development traffic condition, the Railway Terrace-West Street intersection would have its morning peak average intersection delays increased from 116 seconds per vehicle to about 139 seconds per vehicle while the maximum queue length (which occurs on Railway Terrace western approach) increased from 130 vehicles to 152 vehicles. However, in the evening peak it would operate with conditions similar to the existing situation, albeit its level of service would increase from LoS C to LoS D (the level of service was borderline between LoS C and D in either case).

At the Longport Street roundabout with Smith Street, the additional traffic from proposed developments has worsened the operating conditions in both peak periods (especially in the morning peak period). Under existing morning period traffic conditions, the most disadvantaged movement at this intersection was the eastbound traffic along Carlton Crescent. With the additional traffic from the proposed developments, the traffic movements on Smith Street would become the most disadvantaged movement. Its delays and queues would increase dramatically due to the additional traffic using Smith Street. Its degree of saturation would increase from 0.99 to more than 1.54. This is on the basis that the congestion along Longport Street would still persists in the future. In the evening peak period, its level of service would worsen from LoS B to LoS D, and its maximum queue length (on Longport Street eastern approach) would be about 61 vehicles or more than 400m long, extending across Old Canterbury Road and past Victoria Street.

In the future, the Smith Street intersection with Edward Street converted to a roundabout would continue to operate satisfactorily, even with additional development traffic arising from the future developments. It would continue to good level of service operation with minimal delays and queues.

9.6 Additional Network Improvements

From the above discussion of the traffic impact analysis results, the surrounding local road network in the vicinity of the development sites is already experiencing traffic congestion during peak period traffic demand. Additional development traffic arising from the proposed developments would further exacerbated current traffic congestion in the area.

The existing traffic congestion arises because of the wider regional network capacity issues elsewhere, which reverberates back to the surrounding road network near the development sites. This "pinch point" originated at the New Canterbury Road intersection with Gordon Street which created a bottleneck at this location resulting in extensive delays and queues along Longport Street and Railway Terrace extending past the subject sites to be near Summer Hill Railway Station. This also affected Old Canterbury Road.

In the longer term, solutions for improvements to road infrastructures in the wider regional road network will need to be developed and implemented i.e. the removal of the "pinch point" at New Canterbury Road. However, this will be a matter for the relevant road authorities to consider.

The only short term option available in the local road network is the provision of an exclusive right turn lane from Old Canterbury Road into Toothill Street. However, analysis of the critical morning peak period indicates that this option would afford about 10 per cent reduction in the travel time of right turn movements into Toothill Street. At this level of benefit, it is likely to fail a cost-benefit analysis test. Therefore, this option should not be considered, unless this could be provided as an additional third lane along Old Canterbury Road for some distance.

With the continuation of the "pinch point", traffic conditions would continue to deteriorate, and delays or travel time would continue to increase to a point until such that other alternate parallel routes would be more attractive. Once this equilibrium is reached, motorists would begin to seek out other less "costly" routes (in terms of travel time) to travel in preference to the roads they are currently using.

Possible alterative routes to avoid travel through this area include Great Western Highway Parramatta Road, M5 Motorway, New Canterbury Road/Stanmore Road, and City West Link Road.

Our analysis of the future scenario in the critical morning peak indicates that 15 per cent diversion of the existing traffic on Longport Street/Railway Terrace and Old Canterbury Road would return the operating conditions in the local road network to a manageable traffic conditions.

In summary, there does not appear to be any feasible options to improve traffic condition within the local road network in the short term.

10 Summary, Conclusion and Recommendations

10.1 Summary

Halcrow has been commissioned by the Department of Planning and Infrastructure to conduct a traffic assessment review of the two separate concept plan applications for two mixed used developments at two adjacent sites, namely the Lewisham Estate and Summer Hill Flour Mill sites.

The sites adjoin each other on either side of a disused goods railway line. The sites are remnant of the former industrial developments surrounded generally by low density residential developments.

The Lewisham Estate scheme comprises:

- a maximum of 430 residential units, including 19 SOHO units; and
- 739m^2 of retail floor area.

The Summer Hill Flour Mill scheme proposes to accommodate:

- 290 residential units;
- 2,500 to 2,800m^2 of retail use; and
- 3,500 to 4,000m2 of commercial use.

In addition to the above, Halcrow was requested to conduct the review with consideration to the McGill Street Precinct which Marrickville Council has developed and adopted a Masterplan for the entire precinct (which included the Lewisham Estate site). The adopted Masterplan envisaged that the entire site would be redeveloped to accommodate:

- 500 residential units;
- 2,942m^2 of retail use; and
- 6,409m^2 of commercial use.

The sites are located within walking distance to existing public transport services as well as the future light rail extension to Dulwich Hill which includes a light rail stop located adjacent to the development sites. The State Government has committed to this project. Construction work has begun in earnest and is expected to be fully operational by 2013.

Based on site observations conducted on two consecutive days, extensive queuing in the eastbound direction along Longport Street/Railway Terrace and northbound direction along Old Canterbury Road was observed in the morning peak period. Queues on Longport Street/Railway Terrace were observed to extend from New Canterbury Road to as far back as near Summer Hill Railway Station. Similarly, the northbound queue on Old Canterbury Road started at Longport Street and extended past Edward Street. Moderate queues were also observed along Railway Terrace in the westbound direction and Smith Street in the northbound direction.

However, during the evening peak period traffic conditions was observed to be a vast improvement when compared with the morning conditions. Some queues still persisted in the evening peak period, but these were generally localised to be near the intersection except on Railway Terrace between Old Canterbury Road and West Street. Evening peak period queues were generally observed to clear the intersections within the same signal cycle.

It is prudent to note that the extensive queues observed during the morning peak period (and to a lesser extent the evening queues) were a result of congestion problem outside of the local road network. The congestion originated at the intersection of New Canterbury Road with Railway Terrace. For reasons unknown, traffic queues formed at this "pinch point", and created a bottle neck adversely affect the wider network resulting in extensive delays and queues extending past the subject sites to be near Summer Hill Railway Station.

This is a wider network issue that will require to be resolved some time in the future by the road authority.

In the review of the traffic reports prepared by the respective traffic consultants to accompany the applications, a number of issues were identified. These were provided to the respective traffic consultants, and discussed in separate meetings. Written responses to the issues raised were obtained from the consultants. These are presented in Sections 4 to 6 of this report. Generally identified issues have been satisfactorily clarified by the respective traffic consultants with the exception of the intersection modelling results conducted by Traffix.

It is considered the analysis results for some intersections do not reflect conditions observed on site, in particular during the morning peak period. At best, these results are optimistic, in particular the SCATES analysis results for the future conditions. Therefore, some of these results are considered to be unreliable.

A review of the submissions made by Councils and the relevant State Government authorities were also undertaken. The recurring theme amongst the submissions made by both Marrickville and Ashfield Councils is that both the Lewisham Estate and Summer Hill Flour Mill applications should assessed jointly by the same assessment panel, and that cumulative traffic impacts should be conducted.

Marrickville Council is also concerned that the scale of the proposed development on the Lewisham Estate would disadvantage the sites within the remaining half of the wider McGill Street Precinct.

Additionally, Ashfield Council is adamant that all infrastructure required to support the proposed developments should be identified and agreed by all stakeholders and fully costed and apportioned to the relevant developments. These should be done upfront so that funding is guaranteed. Ashfield Council is also adamant that parking should be provided at full Ashfield Council DCP parking rates for fear of parking overspill into other nearby residential area.

In relation to the RTA's submissions, after having resolved some of the issues the RTA has previously identified, they now indicate that they do not object to the proposed Lewisham Estate, but requested for further investigations be conducted to accommodate right turn movements into the site from Old Canterbury Road.

In relation to the Summer Hill Flour Mill application, the RTA has requested for additional modelling to be conducted. The proponent has yet to undertake the required modelling.

The other State Government agencies have generally indicated that the proposed developments be provided with reduced parking provision.

The review conducted by Colston Budd Hunt and Kafe Pty Ltd (CBHK) on behalf of Marrickville and Ashfield Councils supported the reduction in parking provision and suggested for the proposed road improvements to be tested through combination of a micro-simulation traffic model and SIDRA intersection analysis.

Using appropriate rates (as suggested by the RTA's *Guide to Traffic Generating Development*, 2002), this assessment estimates that the Lewisham Estate and Summer Hill Flour Mill would each generate 141 vehicles per hour (vph) and 236 vph respectively. In comparison with the estimates prepared by the applicants, 189 vph and 290 vph respectively, Halcrow's estimates are lower.

The remaining half of the McGill Street Precinct (as envisaged in the Masterplan) would generate an additional 196 vph. The total future development traffic would therefore be in the order of 563 vph during the busiest period.

As a conservative measure, this assessment has adopted the higher development traffic discussed above to conduct the cumulative traffic assessment. The cumulative traffic assessment was conducted using LinSig along the linear series of intersections along Old Canterbury Road and SIDRA at isolated intersections.

For the future scenario, the assessment assumes the following proposed road improvements and access points:

- left-in/left-out at Brown Street;
- "no stopping" parking restriction along Old Canterbury Road;
- left-in/left-out at Hudson Street and William Street;
- Old Canterbury Road southbound right turn into McGill Street;
- signalisation of the Old Canterbury Road with Edward Street;

- conversion of the Smith Street and Edward Street intersection to operate as a roundabout;
- two access points on Smith Street configured as left-in/left-out; and
- two access points on Edward Street.

The intersection traffic models developed for the existing scenario have been calibrated to reflect traffic queues observed on site. This enables the intersections to be robustly assessed for future traffic conditions with the additional development traffic (including growth of background traffic) and the proposed road network improvements.

Assuming that the "pinch point" has not been eliminated, under future traffic conditions the nearby intersections would continue to experience extensive delays and queuing in particular at the Old Canterbury Road intersection with Toothill Street and Longport Street with Smith Street intersection.

An analysis of the two-hour morning and evening periods revealed that the morning peak period traffic demand was less than the evening peak period. However, it was observed morning peak congestion was far greater than the evening peak period. This is due to the "pinch point" identified at the New Canterbury Road intersection with Gordon Street.

It is considered that if the New Canterbury Road "pinch point" was to be eliminated, then the morning peak operating conditions would be vastly improved (and to a lesser extent the evening peak would also be moderately improved as it also manifested itself to a lesser extent). With the "pinch point" eliminated, it could be expected that the morning peak period operating condition would return to satisfactory level.

In addition, traffic conditions within the local road network would continue to deteriorate to a point that travel through this local area would not be as attractive as other available alternatives outside of the area. Motorists would begin to seek out alternatives in an effort to improve their travel times in their daily commute. A 15 per cent reduction in the through traffic in this area as a result of traffic diverting to other routes could see the return of traffic conditions to a manageable level.

Finally, in relation to the permitting right turn movements to and from the site from Old Canterbury Road at McGill Street, the traffic consultant has submitted additional information.

The traffic consultant's analysis indicated that the provision of a right turn movement out of the site would result in unsatisfactory level of service for this intersection, but the provision of a right turn movement into the site would provide satisfactory intersection performance. On this basis, the traffic consultant proposed that right turn out from the site be banned during peak periods, while the right turn movement should be permitted at all time. The consultant suggested that this could be facilitated by re-linemarking one of the two lanes on Old Canterbury Road as a shared through and right turn lane.

The RTA has reviewed this information, and has recommended that the proponent investigates other alternatives to safely accommodate the right turn movements along Old Canterbury Road. The RTA further suggested an exploration into the feasibility of providing a fourth leg at the Toothill Street intersection to facilitate this.

Halcrow does not support the provision of unprotected and/or uncontrolled right turn lane into the site along Old Canterbury Road (or Longport Street).

10.2 Conclusion

The Lewisham Estate and Summer Hill Flour Mill sites are both located within close proximity to existing and future public transport services with direct services into the City Centre. The re-development of these sites affords good opportunities to integrate it to both existing and future public transport services with good pedestrian permeability into the sites. The proposed developments are mixed high density developments allowing it to be made a good example of a Transit Orient Development, TOD.

It is consistent with a number of State Government objectives and planning principles including:

- encouraging a transport modal shift non-motorised transport modes;
- increasing access to other modal choice;
- improving access to housing, employment and services using public transport;

- reversing growth in vehicle demand and distance travelled;
- reduces car dependencies; and
- supporting the efficient and viable operation of public transport services.

The schemes as proposed by the respective applicants (including the remaining McGill Street Precinct) would generate some 563 vph during the busiest peak period (based on Halcrow's estimate). The additional development is expected to add to current traffic congestion experienced within the local road network, if the identified "pinch point" at the New Canterbury Road is not removed.

In addition, it is recognised that the continued use of the sites as industrial developments would generate a similar volume of traffic – up to approximately 600 vph with a relatively larger proportion of heavy vehicles. This could result in negative effects on surrounding residential amenities.

However, the continued use of the sites as industrial developments is no longer compatible with the existing residential use that currently surrounds the sites.

Additionally, in the longer term with the elimination of the "pinch point" at New Canterbury Road, it is expected traffic operating conditions in the vicinity of the sites could improve to operate satisfactorily at a similar level to that found under existing evening peak condition. There is also the potential that due to chronic congestion within the local road network in the vicinity of the site, some traffic may divert away from the surrounding area to other arterial roads resulting in an overall improvement to the operation of the local road.

10.3 Recommendations

Although this assessment found that the existing local road network experiences extensive traffic congestion in the morning peak period, and that the additional traffic from the proposed developments would add to the existing condition, the proposed developments should be approved as proposed.

This recommendation is on the basis that:

- the continuation of the existing use as industrial developments would generate numerically similar level of traffic, if not more;
- the existing morning peak congestion is a result of a "pinch point" outside the influence of the local road network; and
- the sites have good potential to be developed as a TOD and would be consistent with the broader State Government transport planning objectives.

However, it should only be approved with the following recommendations:

- the respective applicants continue to work with Roads and Maritime Services, RMS and the respective Councils to identify and agree on all required road and traffic infrastructures to support the proposed developments on both internal and external (local and arterial) roads including traffic calming works on existing and future local residential streets within and outside of the development sites;
- the identified and agreed works to be documented in a Infrastructure and Traffic Management Plans to be approved by RMS and Councils;
- the Infrastructure and Traffic Management Plan shall include full costing (fully indexed) of all identified works by a qualified civil engineer or similar and timing of the identified works;
- the Infrastructure and Traffic Management Plans will be legally binding and enforceable to the applicants and its successors should the applicants wish to transfer its interest to another party (excluding sale of individual apartments, retail or commercial tenancies);
- the applicants to work with Marrickville Council and RMS to explore opportunities for the provision of a pedestrian crossing across Old Canterbury Road between Longport Street and Toothill Street;
- the applicants to make monetary contribution towards such a crossing and other embellishment of existing pedestrian facilities connecting the sites to Lewisham Station;
- parking provisions to support the proposed developments to be suppressed so that to encourage modal shift to non-car mode and encourage better use of existing and future public transport services;

- the following parking rates[6] (for both sides) are recommended:
  - residential units
    - studio/1-bed units – one space per four units;
    - 2/3-bed units – one space per unit; and
    - Visitors – one space per 10 units;
  - retail use (500-750m^2 GFA) – one space per 60m^2 for customers and staff; and
  - commercial uses – one space per 80m^2 GFA for staff and visitors.
- all visitor spaces are to be located outside of the basement car parking areas and provided on the internal roads;
- the on-street spaces are to be restricted to 2-hour parking with some signed as loading zones (number to be agreed with Councils);
- parking provisions for motorcycle and bicycle parking are recommended to be provided consistent with the requirements set out in the respective Council's DCPs except for bicycle parking which is to be increased from one space per 10 units as set out in Ashfield Council's DCP to at least one space per two units;
- access to and from the sites along Old Canterbury Road and Longport Street is to be configured to permit left-in/left-out movements only;
- unprotected right turn movements into the site shall not be permitted along Old Canterbury Road and Longport Street (including at McGill Street);
- at the Old Canterbury Road intersection with William Street, traffic movements should be restricted to be left-in/left-out with a threshold treatment at the throat of the intersection on William Street to mitigate any further potential "rat running" through the development site;
- a minimal of two car spaces located in a convenient and publically accessible area to be provided for each proposed development (subject to negotiations with a commercial car share operator);
- the applicants to work with Councils to explore opportunities and to make monetary contribution to assist with the implementation of time restricted parking and/or resident parking scheme on affected existing nearby residential streets;

[6] These rates are generally based on those contained in Marrickville Council consolidated draft Development Control Plan 2010.

- all internals roads that will be dedicated to Councils are to be designed to Councils' specifications and requirements, and have self enforcing low speed environment, as a minimum the internal roads should allow access by a medium rigid vehicle (8.8m long) to enter and leave the site in a forward direction;
- the loading dock proposed as part of the Lewisham Estate should be modified to address Department of Transport's concern regarding potential pedestrian conflicts; and
- a condition should be put in place to ensure that a Workplace Travel Plan and Travel Access Guide to be provided.

Separately, it is also recommended that at the time of the redevelopment of the remaining half of the McGill Street Precinct, the development should consider the provision of a safe and efficient access for southbound traffic to turn right into the site from Old Canterbury Road to serve traffic from both the McGill Street Precinct and also the Lewisham Estate development. All stakeholders including RMS and Marrickville Council should investigate opportunities to provide (protected and controlled) right turn access to and from the site along Old Canterbury Road via the existing signalised Toothill Street intersection.

Appendix A Intersection Performance Measures

Intersection modelling software calculates intersection performance measures such as the degree of saturation, average delay that vehicles encounter and the level of service which can be compared to the performance criteria set out by the RTA. Theses are presented in **Table A1** below.

Table A1 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.

Degree of saturation (DoS) is defined as the ratio of demand flow to capacity. As it approaches 1.0, extensive queues and delays could be expected. For DoS greater than 1.0, a small increment in traffic volumes would result in an exponential increase in delays and queue length. For a satisfactory situation, the DoS should be less than the nominated practical degree of saturation which is usually 0.9. The intersection DoS is based on the movement with the highest ratio for all types of intersection.

Level of service (LoS) is one of the basic performance parameters used to describe the operation of an intersection. The levels of service range from A (indicating good intersection operation) to F (indicating over saturated conditions with long delays and queues). At signalised and roundabout intersections, the LoS criteria are related to average intersection delay (seconds per vehicle). At priority controlled intersections, the LoS is based on the average delay (seconds per vehicle) for the worst movement.

Delay is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. The delays include queued vehicles decelerating and accelerating to and/or from stop, as well as delays experienced by all vehicles negotiating the intersection. At signalised and roundabout intersections, the average intersection delay is usually reported and is taken as the weighted average delay by summing the product of the individual movement traffic volume and its corresponding calculated delays and dividing by the total traffic volume at the intersection. At priority controlled intersections, the average delay for the worse movement is usually reported.