

# TECHNICAL NOTE

## Traffic and Transport Peer Review

**Project Code:** V204460      **Project Name:** Craigieburn West PSP

**Dept:** Transport Engineering

**Date:** 18 December 2020      **Version No.** 1

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**Reviewer:** Reece Humphreys & Hui-Lin Tan

**SUBJECT:** Peer Review of Transport Impact Assessment

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### Introduction

GTA have been engaged by Hume City Council to peer review the submitted technical material as part of the proposed Craigieburn West PSP to ascertain whether the work completed is suitably 'fit-for-purpose'.

At a high level, a 'fit-for-purpose' review seeks to determine whether or not the analysis undertaken as part of a submission can, at a minimum, provide outputs to enable an assessment of the proposal. In undertaking this review, documents were provided to GTA as summarised in Table 1, which includes the Craigieburn West Precinct Structure Plan Transport Impact Assessment prepared by onemilegrid.

**Table 1: Reviewed Material**

Material	File Name	File Description	Received by GTA
Transport Impact Assessment Report	Craigieburn-West-PSP-Transport-Impact-Assessment-One-Mile-Grid-November-2020.pdf	Transport Impact Assessment (09/11/2020)	3/12/2020

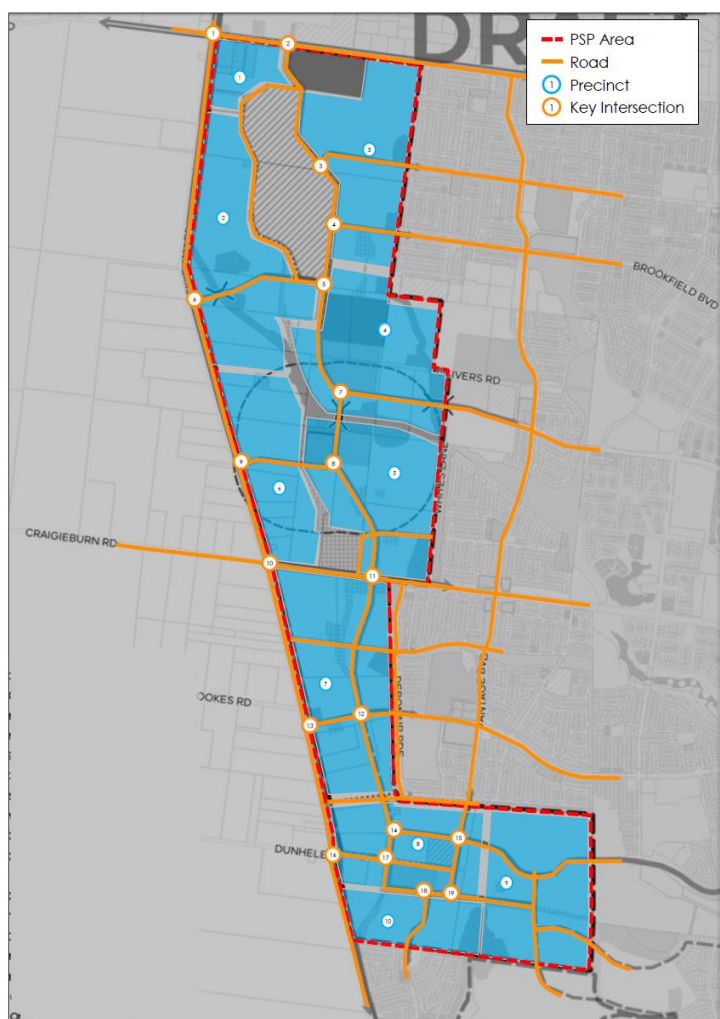
It is noted that the scope of our review would be limited to the reporting provided, rather than an audit of any electronic audit files. This memorandum summarises the findings of our review, with the major items discussed in the body whilst the moderate and minor items provided in a Table as an attachment.

In reviewing the documentation, it is clear that further information from the proponent is required to inform a position. Specific requests have been provided within the discussion within this document.

### Traffic Model

The traffic analysis within the report relies upon a bespoke traffic model. There are no details on the specific software used, however it is thought to be a spreadsheet-based model likely developed in excel. The extents of the model are presented in Figure 1.

Figure 1: Model Extents (reproduced from report)



A limitation of a spreadsheet model is that it does not have the ability to redistribute traffic through the network as a result of capacity limitations or availability. This may result in an underestimation (or even an overestimation) of some volumes on the network within Craigieburn West such as the congested network south of Craigieburn Road.

**Recommendation:** Information and clarification on the type of modelling platform/software used for the works

## Modelled Scenarios

The traffic model covers an interim scenario (2031) and ultimate scenario (2046) representing the 10-year and 25-year horizons respectively. However, the rationale and outcome of the interim scenario modelling is not clear.

Typically, 2046 or 2051 are used as ultimate years for greenfield traffic modelling and PSPs in the north growth corridor. There may be differences with traffic volumes where growth factors are applied to 2051 rather than 2046 however this difference is negligible. Notwithstanding, these represent the 'full build out' rather than a specific year and should be considered in that way.

**Recommendation:** VPA to provide rationale and purpose of the interim modelling

## Background Growth

The report states the following for background growth:

*For the purposes of a conservative analysis, a growth rate of 1% per year (compound) has been applied to several non-arterial roads within the vicinity of the site over a 10-year period (interim) and 25-year period (ultimate), equivalent to a 10.5% and 28.2% increase in traffic volumes respectively along the non-arterial roads. The traffic growth has been applied to the east-west aligned connector roads in the northern portion of the site. Whilst no growth was applied to Vantage Boulevard and Elevation Boulevard in the southern portion of the site where the Cardno (Aston Estate) traffic volumes were used.*

*In addition, a growth rate of 3% per year (compound) has been applied to Craigieburn Road traffic volumes over a 10-year period (interim) and 25-year period (ultimate), equivalent to a 34.4% and 109.4% increase in traffic volumes respectively. Whilst the Mickleham Road and Mt Ridley Road projected traffic volumes were based on the Lindum Vale PSP.*

*It is acknowledged that a growth rate of 4% was adopted for earlier modelling forecasts, however since those previous assessments updated traffic surveys were undertaken to capture traffic volume growth generated by development along the Craigieburn Road corridor.*

The source of the growth rates was not provided. Applying a compound growth to roads in growth areas can also provide inconsistent outcomes, particularly if applying this type of growth from a low base. This may have impacted the previous modelling forecasts.

**Recommendation: Provide further justification and sources for the adopted background growth rates**

### Traffic generation of surrounding PSPs

The model considers and uses some forecast traffic volumes from previous transport reports for the surrounding PSPs. The report includes a description of each report, ultimate traffic volumes at key intersections and any justifications where deviations from the reports were used.

Assumptions from the PSPs adopted for the ultimate scenario include:

- *A 20% reduction in the proportion of traffic accessing the Aston Estate via the intersection of Elevation Boulevard / Mickleham Road and Dunhelen Lane / Mickleham Road has been applied compared to the interim scenario. The reduction in traffic volumes is to account for the additional employment opportunities provided to the north and east of the Craigieburn R2 PSP which are anticipated to reduce the number of vehicles from the Aston Estate travelling south along Mickleham Road. Furthermore, it is expected that the construction of the Outer Metropolitan Ring Road would reduce the distribution of traffic from the Aston Estate to Mickleham Road, with vehicles instead using Craigieburn Road to access the Outer Metropolitan Ring Road when required;*
- *A reduction of 4,400 vehicles per day was applied to the daily volumes (and proportionately peak hour volumes) between Craigieburn Road (west of Vantage Boulevard) and Mickleham Road (north of Dunhelen Lane) to account for traffic utilise Vantage Boulevard for travel between Craigieburn Road and Mickleham Road;*
- *The traffic movements modelled under ultimate conditions at the intersections of Mickleham Road / Mt Ridley Road and Mt Ridley Road / Marathon Boulevard as part of the Lindum Vale and Merrifield West PSP have been adopted with no modifications to distributions;*
- *The through volumes along the northern portion of Mickleham Road (north of Craigieburn Road) have been calculated using the turning movements under ultimate conditions at Mickleham Road / Mt Ridley Road which were provided as part of the Lindum Vale PSP; and*

- The Mickleham Road through movements at the intersection of Mickleham Road / Craigieburn Road have been calculated by removing the turning movements (the surveyed volumes plus 109.4% growth) from the through movements. [due to OMR]
- Traffic distribution of 90% traffic travelling south along Mickleham Road and 10% travelling north at intersection with Elevation Boulevard (onemilegrid assumption based on the road network and surrounding land uses).

Of these assumptions, is not entirely clear how the 90:10 traffic distribution split and the 4,400 vehicles per day reduction were derived.

**Recommendation: Document how the distribution split and reduction in 4,400 vehicles per day on Craigieburn Road (?) was derived.**

## Land Use

The land use adopted for the model and corresponding to the 10 precincts are presented in Table 2. The land uses have been determined from the Place Based Plan prepared by the VPA.

**Table 2: Proposed land use inputs adopted for the model (reproduced from report)**

Precinct	Use	Area
1	Residential	9.2 ha (153 dwellings)
	Government School Expansion	1.3 ha
2	Residential	53.3 ha (889 dwellings)
3	Residential	48.5 ha (808 dwellings)
4	Residential	34.1 ha (568 dwellings)
	Government School	8.3 ha
5	Residential	36.3 ha (604 dwellings)
	Local Town Centre	2.2 ha
	Mixed Use	2.2 ha
	Government School	3.3 ha
6	Residential	40.6 ha (677 dwellings)
7	Residential	51.5 ha (858 dwellings)
8	Residential	32 ha (534 dwellings)
	Community Facilities	1.2 ha
	Non-Government School	2.2 ha
	Government School	3.6 ha
9	Residential	46.5 ha (776 dwellings)
10	Residential	17.1 ha (286 dwellings)
<b>Total Dwellings</b>		<b>~6,153 lots</b>

It is based on a yield per developable hectare where residential uses were assumed to have an average lot size of 600sqm. The source of the average lot size has not been provided. The PSP documentation indicates that the net developable residential area is 414.3 ha and that the minimum average density should be 18.5 or 26.5 lots/ha dependent on its location within walkable catchments. Plan Melbourne suggests a target rate of 20 dwellings per hectare which would equate to 7382 lots when applied the reported residential area (369.1 ha) or 8286 using the area reported in the PSP – significantly more than the adopted 6153 lots.

Five schools are proposed within the PSP area, comprising four government schools (expected to be three primary schools and one secondary school) and a non-government primary school (expected to both be primary schools) in the southern portion of the site.

An existing government primary school is located at the south-eastern corner of the intersection between Mt Ridley Road / Mickleham Road and it is planned for its expansion. This (and the community facilities) was not included in the development yield as “they will be shifted with a school expansion.”

It should also be noted that the local town centre was not specifically modelled.

**Recommendation: Update traffic assessment with new development yield assumptions or following updated land use information from VPA**

## Traffic Generation Rates

The report utilises 9 vehicle trips per day per dwelling, with a peak to daily ration of 10% meaning that the trip generation for the AM and PM Peak would be 0.9 trips per dwelling.

It states that:

*It is generally accepted that single dwellings on a lot in outer suburban areas may generate traffic at up to 10 vehicle trips per day, whilst in areas with good public transport, and for higher density dwellings, lower traffic generation rates are often recorded.*

However, there is no source for the claim that 10 trips per day is “generally accepted”.

Furthermore, the adoption of 9 vehicles per day is on the basis that the site has a lot size of 600sqm (which is also not sourced, as mentioned earlier) and proximity of the site to the existing bus network which is expected to be extended into the site, implying the PSP has “higher density dwellings” and “good public transport” despite Craigieburn’s high level of car dependency and distance from the train station.

**Recommendation: Provide further justification and sources for the adopted trip rate (density and PT access)**

Despite the lack of justification, the adopted trip rate of 9 vehicle trips per day per dwelling is considered appropriate, when considering trip rates used for other PSPs in growth areas.

The report references trip rates adopted for surrounding PSPs:

*The SMEC traffic report for the Merrifield West PSP and Cardno traffic report for the Lindum Vale PSP adopted 8.5 vehicles per lot. Whilst Ashton Traffic Services adopted a rate of 9 vehicles per lot when modelling the Craigieburn R2 PSP*

Further benchmarking with PSPs in the north growth corridor which used VITM modelling includes a rate of 8.3 daily trips per dwelling for Beveridge North West PSP which has similar proportions of land use (residential / employment / enrolments) to Craigieburn West. Modelling for Shenstone Park PSP resulted in 14.7 trips per dwelling, however that the PSP included a much higher proportion of employment uses.

## Directional splits

The report states the following directional distributions were adopted for the residential traffic generation.

- AM peak hour: 70% outbound, 30% inbound; and
- PM peak hour: 40% outbound, 60% inbound.

No source has been provided for these assumptions. The reported survey data (Figure 8 and 9 from report) for traffic from Highland Drive / Vantage Boulevard and Waterview Boulevard onto Craigieburn Road supports the adopted split for the AM peak hour, however it shows closer to a 50:50 split of traffic in the PM peak hour, which was 3:30-4:30pm and may not capture the full tidal nature of work trips.

A review of SCATS data at the Highland Drive / Vantage Boulevard and Craigieburn Road intersection on weekdays in October 2019 was undertaken. The reported peak hours are consistent with the model (8-9am and 3:30-4:30pm) and the directional distribution for the AM peak hour. However, for the PM peak, the directional distribution for outbound to inbound was around 45:55 to 50:50.

It is also not stated what the AM and PM peak hour turning movement diagrams were used for in the modelling, particularly as the modelling was for the daily period. AM and PM network plots have not been provided in the report.

**Recommendation: Provide further justification and sources for the adopted directional splits**

## Other uses

No traffic generation was considered for the other uses. As stated in the report, there are “a variety of other uses including five schools, a Local Town Centre, a mixed-use zone, community facilities, local parks and local sports reserves.”

The town centre and schools would generate a level of traffic that have the potential to influence the daily demands on the network as well as the distribution and catchment.

The report states:

*onemilegrid and other traffic consultants generally consider the use of a higher traffic generation rate for the residential uses to be the more conservative and the appropriate approach in regard to traffic generation for new PSPs especially where no large employment precincts are provided (as is the case with the Craigieburn West PSP). The adoption of a higher rate for the residential component acknowledges that a high proportion of movements associated with uses such as the town centre and community facilities are internal trips, and in terms of modelling, the movement is allocated to the residential use rather than the destination to save double counting.*

The report does note the limitation of this approach when considering school uses “which are likely to draw a larger proportion of external trips than the other non-residential uses”. Enrolment numbers were also not available when the report was prepared, however schools in growth areas can be subject to rules of thumb<sup>1</sup> to determine enrolment numbers.

**Recommendation: Provide further justification and sources for the adopted trip rate (exclusion of other uses) or update traffic assessment with updated land use from VPA**

## Traffic Distribution

The report states that VISTA was used in the model to determine trip purpose distributions for typical households. However, it is not stated what is considered a “typical household” (e.g. inner, middle, outer Melbourne) and whether it is appropriate for a primarily residential PSP such as Craigieburn West.

The directional distributions were determined based on the notable uses to the north, south, east and west of the site. It also considered that 9% of trips were internal. Some description was provided on how the external trips would use the internal network.

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[1] Source: Department of Education and Training, as advice provided to VPA.

- 1 Government Primary School, per 3,000 dwellings in growth areas
- 1 Government Secondary School, per 10,000 dwellings in growth areas
- Government Primary School: 450-475 Enrolments (students)
- Government Secondary School: 1,100 Enrolments (students)
- This would be referenced to the assumption of around 2.8 to 3.1 people per household in the growth areas. Any private or catholic school would be on top of these (where a site is identified). The assumption would be for similar student numbers per site, unless otherwise known.



Table 3: Proposed traffic distribution (reproduced from report)

Origin/Destination	Percentage <sup>1</sup>	Notable Uses
North	14.5%	Merrifield Employment Park / Folkestone Employment Park / Mickleham Town Centre / Regional Victoria
South	32.7%	Tullamarine Employment Area / Inner Melbourne / Western Ring Road Access
East	39.4%	Craigieburn Town Centre / Craigieburn Employment PSP / Craigieburn Train Station / Craigieburn R2 PSP / Campbellfield Employment Area / Roxburgh Train Station / Alternative Western Ring Road Access
West	4.4%	Sunbury
Internal	9%	

<sup>1</sup>Daily Percentage. AM peak and PM peak vary slightly

The source of these distributions are not entirely known. These require further interrogation to form an opinion.

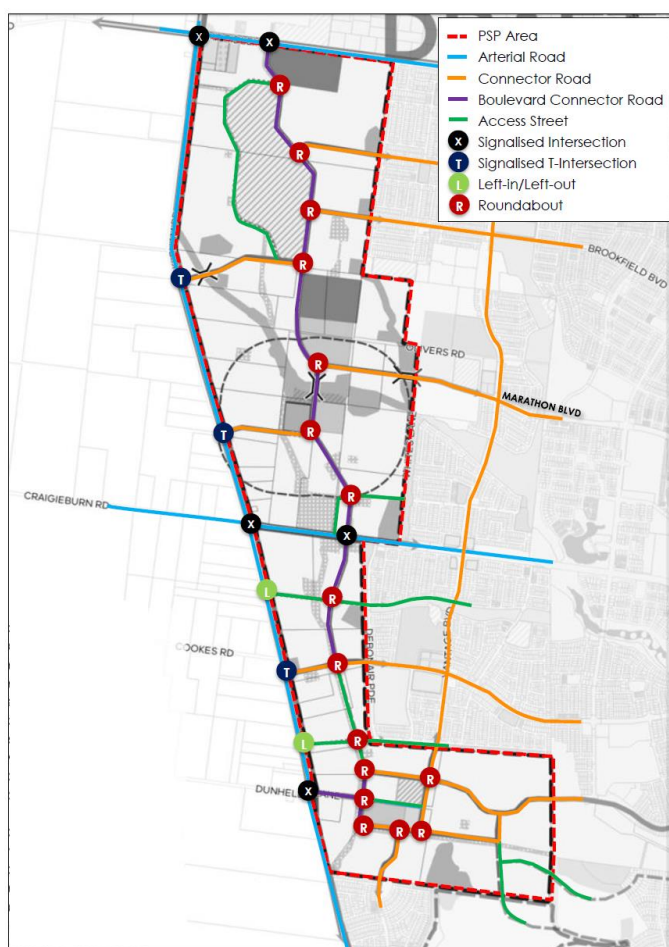
**Recommendation: Provide further justification and sources for the adopted directional distribution and use of VISTA**

## Transport Network

Based on our review of the PSP network and resultant modelled road volumes, the following comments are provided:

1. The majority of internal intersection have been nominated as roundabouts. Consideration should be given to nominating some of the intersections in the vicinity of the school and local town centre as signalised intersections. These would better facilitate the modelled volumes and better accommodate for pedestrians and cyclists.
2. Within the vicinity of Elevation Boulevard, the East-West Connector Road 1 and 3 are over capacity, to provide better certainty, consideration to a new access link connecting to Craigieburn Road could be provided in the form of left-in left out intersections, especially in the northern portion of the site. It is noted that these could be provided as part of the subdivision, however the fragmented land ownership may be challenging for certainty for this to be delivered.
3. To accommodate high volumes on Vantage Boulevard, the southern portion of the north-south PSP link could be considered to be upgraded from "Access Street" to "Boulevard Connector Road" to assist in any potential redistribution of traffic volumes from the congested Vantage Boulevard.
4. The southern portion of the PSP also contains several roundabouts surrounding the proposed schools, typically roundabouts do not provide good levels of service for pedestrians and cyclists as well as resulting inefficient journey for through traffic when a more direct link could be provided. It may be more appropriate to remove the intersection control from the report.
5. There is also a limited level of active travel discussion within the report, with no mention of implications on pedestrians or cyclists (such as impact of high traffic volumes or roundabouts). It is noted that the pedestrian and bicycle network within the PSP street network plans do indicate the links for actives uses as part of their cross sections.

Figure 2: PSP Road Network and Intersections (reproduced from report)





# ATTACHMENT 1

Table 4 provides a summary of discussion points including those above and additional points of comment.

**Table 4: Summary of discussion points**

Section/Topic	Comment	Priority
4. Traffic model / 4.1 Overview	It is not clear on the modelling platform used for the assessment; however it is assumed that it is a spreadsheet model. It is not clear what the rationale is for the interim year modelling. Using an ultimate year of 2046 will provide slightly lower volumes on the network compared to 2051.	Minor Minor Minor
4.3.1 Traffic generation of surrounding PSPs / 4.4 Future Base Case Traffic Volumes	It is not clear where the 4,400 vehicles per day using Vantage Boulevard to access Mickleham Road has been derived from. It is not clear from the corresponding figure of peak periods. This number is then used as an assumption to determine the forecast traffic volume on Craigieburn Road. It is also not clear how the distribution split of 90% of traffic travelling south along Mickleham Road and 10% travelling north at the intersection with Elevation Boulevard was derived.	Moderate  Minor
4.3.2 Through Traffic Growth	It is not clear where the adopted growth rates (1% for several non-arterial roads, 3% for Craigieburn Road) have been derived. Clarification on the source for these rates is recommended.	Minor
4.5 Proposed Land Uses	It is not clear where the 600sqm per lot assumption has come from. Other yields from PSPs in growth areas are significantly higher when applied to the area. This may need to be updated with new assumptions and following updates to development yields when the PSP is finalised.	Moderate
4.6 Traffic Generation	It is not clear where the statement that 10 vehicle trips per day per dwelling is “generally accepted” and how it was determined that the PSP has density and good public transport access to justify a rate of 9 vehicle trips per day on this basis. The decision to only use a higher residential generation rate and not schools or employment references “other traffic consultants” and that it is a “conservative and appropriate of approach”, without reference to previous examples and data points. Notwithstanding, it is agreed that the resultant generation rate is acceptable when compared to other growth area PSPs in the north growth corridor.	Moderate
4.6 Traffic Generation	It is not clear how the directional distributions of the AM and PM peak have been derived. (AM peak hour: 70% outbound, 30% inbound; and PM peak hour: 40% outbound, 60% inbound). A review of the reported survey data and SCATS data show that the PM peak hour distribution is closer to a 50%/50% split.	Moderate
4.7 Traffic Distribution	VISTA has been used to determine trip purposes for typical households, but it is not stated what areas were considered for the adopted purposes (e.g. inner, middle, outer Melbourne). The proposed traffic distribution for uses external to the PSP were described, but the 9% for internal trips was not justified.	Minor
4.10 Traffic Impact	There are no performance plots of the network during the peak period so it is unclear as to how the network performs. These are typically shown in volume to capacity (V/C) plots.	Minor
3.3.3 Overall Road Network (Figure 11: PSP Road Network and Intersections)	It is not clear how the intersections have been determined. Typically, these are provided / determined by the VPA and are generally not considered as part of the PSP planning and analysis. Notwithstanding, their location and treatment are generally suitable for the proposed road network, with the exception of the vicinity of the schools and activity centres where better control for pedestrians and cyclists could be nominated.	Comment

Section/Topic	Comment	Priority
5. Conclusions and Recommendations	The report assesses the future traffic volumes within and connecting the PSP, however it does not include recommendations arising from the modelling to inform the development of the final PSP.	Comment
4.10 Traffic Impact and 5. Conclusions and Recommendations	The report highlights that Vantage Boulevard is over capacity with 11,100 vehicles a day, above the target of 3,000-7,000 vehicles per day. The report also references other consultants work which showed volumes above capacity, which is assumed to be the Cardno Aston Estate traffic report with a projected 11,000 – 12,500 vehicles per day presented in Figure 18 of the report. Additional north-south connectors running parallel may help to accommodate these volumes.	Comment
Staging	The staging of development is a consideration for the subdivision stage, however there may be benefit indicating this on the plan to provide more certainty.	Comment