39-55 (Lot 8 DP1191647) Oratava Avenue and part of 570 (Lot 3 DP1096405) Pennant Hills Road, West Pennant Hills
Transport Impact Assessment
39-55 Oratava Avenue and part of 570
Pennant Hills Road, West Pennant Hills

Transport Impact Assessment

Client: Kai Ling Australia Pty Ltd
Job Number: 155470
Issue: A
Date: 6/7/15

Quality Record

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<th>Date</th>
<th>Details</th>
<th>Prepared By</th>
<th>Reviewed By</th>
<th>Approved By</th>
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<tr>
<td>A</td>
<td>6/7/15</td>
<td>Final</td>
<td>Matthew Houlden</td>
<td>Alan Stewart</td>
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1. Introduction

1.1 Background

A rezoning application is currently being prepared for a proposed residential subdivision on land located at 39-55 (Lot 8 DP1191647) Oratava Avenue and part of 570 (Lot 3 DP1096405) Pennant Hills Road, West Pennant Hills. The proposed development incorporates 31 residential lots and the construction of three internal roads.

PeopleTrans was commissioned by Kai Ling Australia Pty Ltd in June 2015 to undertake a Transport Impact Assessment of the proposed development to accompany the Rezoning Application.

1.2 Scope and Objectives of this Report

The objectives of this report are not only to assess the transport implications of the proposed development from an environmental perspective but also to ensure that the development is designed in a way that maximises safety, functionality and useability for those people who will ultimately live, work and visit there.

The scope of this report includes the following:

1.3 Preliminary comments from Hills Shire Council

Preliminary planning documents were submitted to Hills Shire Council in May 2015 for comment. Council provided preliminary comments via email dated 29 May 2015, with the following comments in relation to roads and traffic, reproduced as follows:

“Roads and Traffic

- Traffic Assessment to be submitted with the planning proposal package.
- The traffic assessment shall provide detail on the internal road layout and shall assess the impact of future development on the performance of surrounding intersections (including the intersection of Pennant Hills Road and Oratava Avenue).”

The following report addresses the preliminary comments provided by Council as well as a number of other items in relation to the design of the proposed development.

1.4 References

In preparing this report, reference has been made to the following:

- a number of inspections of the site and its surrounds
- Hills Shire Council Local Environmental Plan 2012
- traffic surveys undertaken by PeopleTrans and others as referenced in this report
- subdivision plans for the proposed development prepared by Kai Ling Australia Pty Ltd (dated 11 May 2015) as provided in Appendix A
- RMS Guide to Traffic Generating Developments 2002
- RMS Technical Direction TDT 2013/14a
- other documents and data as referenced in this report.
2. Existing Conditions

2.1 Site Location & Description

The subject site is located at 39-55 (Lot 8 DP1191647) Oratava Avenue and part of 570 (Lot 3 DP1096405) Pennant Hills Road, West Pennant Hills. The site of approximately 18,000 sqm has a frontage of approximately 55 metres to Oratava Avenue.

The site is predominantly zoned E4 (Environmental Living) in the Hills Shire Council LEP and is currently unoccupied. The surrounding land-uses are predominantly low-density residential, plus some recreational, environmental living and forestry land-uses. There are some retail land-uses on the east side of Castle Hill Road.

The location of the subject site and the surrounding environs is shown in Figure 2.1 (aerial photograph) and Figure 2.2 (street-map), and the land zoning is shown in Figure 2.3.

Figure 2.1: Site Location and Immediate Vicinity

Base map source: maps.google.com.au
Figure 2.2: Site location and surrounding area (street map)

Base map source: street-directory.com.au
2.1 Local Area Travel Characteristics

In order to understand how future residents of the development will travel to and from this site, reference is made to the characteristics of the existing residents, as documented in the 2011 census and summarised by the NSW Bureau of Transport Statistics for travel zone 4576. These statistics are provided in Figure 2.4 to Figure 2.5.

Figure 2.4: Journey to Work

Mode Share* for all places of work

- 71% Vehicle driver
- 13% Bus
- 7% Train
- 5% Vehicle passenger
- 2% Mode not stated
- 1% Walked only
- 1% Other mode

* Excludes those that did not go to work
Figure 2.5 indicates that the most dominant locations where residents work are Baulkham Hills, Ryde-Hunters Hill, Parramatta, Sydney Inner City and Pennant Hills-Epping.

2.2 Road Network

The existing road network is described in the following sections.

2.2.1 Adjoining Roads

Details of the roads in close proximity to the site are provided in Table 2.1.

Table 2.1: Summary of Adjoining Roads

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Classification</th>
<th>Orientation</th>
<th>Configuration</th>
<th>Kerb to Kerb Width (Approx.)</th>
<th>Ave Daily Volume (vehicle)</th>
<th>On-Street Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennant Hills Road</td>
<td>State road</td>
<td>North-south</td>
<td>Divided carriageway, 3 lanes in each direction</td>
<td>23m</td>
<td>64,500 [1]</td>
<td>No Stopping</td>
</tr>
<tr>
<td>Oratava Avenue</td>
<td>Local road</td>
<td>Northwest-southeast</td>
<td>1 lane in each direction</td>
<td>10m</td>
<td>600 [2]</td>
<td>No parking restrictions</td>
</tr>
<tr>
<td>Aiken Road</td>
<td>Connector road</td>
<td>East-west</td>
<td>1 lane in each direction</td>
<td>12m</td>
<td>On-street parking permitted in some locations</td>
<td></td>
</tr>
</tbody>
</table>


[2] Based on an average of the AM and PM peak hour flows and assuming an average peak-to-daily ratio of 10%
Existing Conditions

2.2.2 Surrounding Intersections

The key existing intersections in the vicinity of the site are summarised in Table 2.2.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Intersection Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennant Hills Road / Oratava Avenue</td>
<td>Unsignalised T-Intersection Give Way priority (left-in/left-out only)</td>
</tr>
<tr>
<td>Pennant Hills Road / Aiken Road</td>
<td>Signalised T-intersection Left in / Left out / Right In / No Right Turn out (Buses Excepted)</td>
</tr>
<tr>
<td>Pennant Hills Road / Karloon Road / Copeland Road</td>
<td>Signalised X-Intersection Karloon Road - Left in / Left out / Right Out / through Copeland Road – Full turning movements</td>
</tr>
</tbody>
</table>

2.2.3 Existing Site Constraints and Traffic Conditions

A site inspection was undertaken on 23 May 2015 in order to understand the existing site constraints, sight distances and traffic speeds as well as note any other general safety issues. The findings from this inspection are summarised as follows:

- Oratava Avenue has an existing posted speed limit of 50 km/h
- The Oratava Avenue carriageway is currently approximately 10m wide.
- Overall, the design of Oratava Avenue is considered satisfactory to cater for existing traffic volumes.

2.2.4 Existing Traffic Volumes

Existing northbound through traffic volumes on Pennant Hills Road at the intersection with Oratava Avenue have been sourced from Table 7-8 of the Northconnex Environmental Impact Statement, November 2014 and existing turning volumes at that intersection have been sourced through a survey undertaken by Austraffic on Thursday 25/6/15.

Based on the above, the existing AM and PM peak hour volumes are provided in Figure 2.6 and Figure 2.7.
2.2.5 Intersection Operation

Depending on the direction of travel, vehicles have the option to enter and exit the wider study area via The Northern Road / Oakes Road, Karloon Road, Aiken Road and Oratava Avenue. Based on the pre-DA meeting comments reproduced in Section 1.3, PeopleTrans has assessed the intersection of Oratava Avenue / Pennant Hills Road in detail.

The operation of the intersection is influenced by the signalised intersection of Pennant Hills Road / Aiken Road. During both peak periods, there were long periods where constant vehicle flow northbound on Pennant Hills Road prevented any vehicles exiting Oratava Avenue, leading to some vehicles experiencing delays of up to one minute. When the signals at Aiken Road changed to give priority to the right turn movement from Pennant Hills Road into Aiken Road, this provided the opportunity for vehicles to exit Oratava Avenue onto Pennant Hills Road.

To determine the capacity of the left turn movement onto Pennant Hills Road, PeopleTrans undertook a gap acceptance survey on 2/7/15 during the PM peak hour and on 3/7/15 during the AM peak hour. The results indicate a left turn capacity of 138 vehicles during the AM peak hour and 64 vehicles during the PM peak hour.

During the AM peak hour, the left turn Oratava Avenue exit onto Pennant Hills Road is operating at a degree of saturation of 0.41 and during the PM peak hour the left turn is operating at a degree of saturation of 0.36. This indicates that the left turn movement has spare capacity during both peak periods.

2.3 Car Parking

On-street parking is permitted on Oratava Avenue in vicinity of the subject site. Based on observations from site inspections, there appears to be little demand for on-street parking around the subject site.

2.4 Bus services

A review of the bus services available in the vicinity of the site, and their bus stops closest to the site, is summarised in Figure 2.8. Route descriptions and service and frequencies are summarised in Table 2.3. Buses operating in the area are operated by CDC Hillsbus.

The nearest bus stops to the subject site are:

- Oratava Avenue, west of the subject site.
- Pennant Hills Road, north and south of Aiken Road.
- Castle Hill Road, north of Pennant Hills Road.
Table 2.3: Existing Bus Routes

<table>
<thead>
<tr>
<th>Route No.</th>
<th>Route Description</th>
<th>Significant destinations on route</th>
<th>Service frequency</th>
<th>Distance to nearest stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>620N/620X</td>
<td>Dural - City</td>
<td>Dural, Cherrybrook, Sydney CBD</td>
<td>5 mins (peak); no off-peak service</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>621</td>
<td>Castle Hill - City</td>
<td>Castle Hill, Cherrybrook, Macquarie Park, Lane Cove, Sydney CBD</td>
<td>30 mins (peak); 60 mins (off-peak)</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>622</td>
<td>Dural - Milsons Point</td>
<td>Dural, Cherrybrook, Lane Cove, St Leonards, North Sydney, Milsons Point</td>
<td>20 mins (peak); no off-peak service</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>625</td>
<td>Pennant Hills - Parramatta</td>
<td>Pennant Hills train station, Carlingford train station, Parramatta CBD</td>
<td>30 mins (peak); 60 mins (off-peak)</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>632</td>
<td>Pennant Hills - Castle Hill</td>
<td>Castle Hill town centre, Pennant Hills train station</td>
<td>30 mins (peak); 60 mins (off-peak)</td>
<td>750m (Castle Hill Rd)</td>
</tr>
<tr>
<td>633</td>
<td>Pennant Hills - Castle Hill</td>
<td>Castle Hill town centre, Pennant Hills train station</td>
<td>30 mins (peak); no off-peak service</td>
<td>750m (Castle Hill Rd)</td>
</tr>
<tr>
<td>635</td>
<td>Castle Hill - Beecroft</td>
<td>Castle Hill town centre, Beecroft train station</td>
<td>30 mins / 60 mins</td>
<td>170m (Oratava Ave)</td>
</tr>
<tr>
<td>642</td>
<td>Dural - City</td>
<td>Dural, Lane Cove, Sydney CBD</td>
<td>40 mins (peak); no off-peak service</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>642X</td>
<td>Dural - City</td>
<td>Dural, Sydney CBD</td>
<td>8 mins (peak); 60 mins (off-peak)</td>
<td>550m (Pennant Hills Rd)</td>
</tr>
<tr>
<td>650/650X</td>
<td>West Pennant Hills / Knightsbridge - City</td>
<td>West Pennant Hills, Sydney CBD</td>
<td>7 mins (peak); no off-peak service</td>
<td>600m (Aiken Rd)</td>
</tr>
</tbody>
</table>
Existing Conditions

### 2.5 Trains

The nearest train stations to the site are Beecroft and Pennant Hills, as shown in Figure 2.8, which are around 2.5km and 3.2km respectively from the proposed development site.

### 2.6 Cycle Infrastructure & Facilities

A review of cycle conditions in the study area noted the following key points:

- the arterial roads along the primary corridor do not include any on-street cycle lanes,
- there is no dedicated right-of-way cycle infrastructure, and
- Local Roads in the area could be suitable for cyclists to use, in that the speed limits are low and there are suitably low traffic volumes (i.e. vehicles and cyclists can share the road).

However, given the undulating terrain it is considered an inconvenient option for cyclists.

The study area was further reviewed in the Roads and Maritime online tool *Cycleway Finder* to characterise cycle conditions on roads in the area. The findings are reproduced in Figure 2.9 and show that only some Local Roads have been rated; the Arterial Roads are generally unrated. Local Roads that are rated are generally of moderate difficulty. Also, there appears to be a lack of continuity in the rated roads.

Overall there is a lack of cycle infrastructure within the study area and cycling is considered challenging.

![Figure 2.9: Cycle difficulty of roads in area (source: Cycleway Finder v2, Roads and Maritime)](image)
2.7 Pedestrian Facilities

A sealed pedestrian footpath is provided on one side of Oratava Avenue, however the path stops around 100 metres south of the site location and does not continue until around 400 metres west of the site location, as shown in Figure 2.10. This discontinuity in the Oratava Avenue footpath means there is no pedestrian footpath along the site frontage.

Figure 2.10: Footpath on Oratava Avenue ends near site frontage
3. Proposed Development

3.1 Land Uses & People Occupancy

The proposed development includes a new subdivision of 31 residential lots. In people terms this is equivalent to approximately 93 residents, assuming an average of 3 residents per dwelling. Detailed plans of the subdivision are included in Appendix A of this report.

3.2 Vehicle Access

Access to the proposed subdivision is to via an intersection with Oratava Avenue via an extension of the existing private driveway (sealed) located on-site, to be renamed Horizon Street. Local roads within the subdivision would provide access to the individual lots.

The suitability of the proposed access arrangements is assessed in Section 4 of this report.

3.3 Pedestrian and Bicycle Access

The proposed subdivision has sufficient road reserve (and suitably low traffic volumes) to enable the provision of pedestrian and bicycle facilities. More detail regarding the pedestrian and bicycle facilities will be required at a later stage.
4. Access Strategy & Design Assessment

4.1 Proposed Access Location

Access to the proposed development would be from a single 6.0m wide crossover at the western boundary of the property. A crossover of this width is considered satisfactory and accords with Table 3.2 of AS/NZS2890.1:2004.

4.2 Access Assessment

PeopleTrans undertook a site inspection to measure the sight distance at the location of the proposed access point. Photos of the view from a vehicle stopped at the proposed access location are provided in Figure 4.1 and Figure 4.2.

Figure 4.1: Sight Distance Looking East

Figure 4.2: Sight Distance Looking West

Available sight distance in both directions satisfies Figure 3.2 of AS/NZS2890.1:2004 and as such, the proposed driveway location is considered satisfactory. More detailed design considerations will be required at a later stage.
5. Transport Impact Assessment

5.1 Traffic Generation

An estimate of the traffic generation of the proposed development has been sourced from the RMS Technical Direction 2013/04a which is an update of the RMS Guide to Traffic Generating Development 2002. The trip generation assessment for the subject site provided in Table 5.1.

<table>
<thead>
<tr>
<th>Number of Residential Dwellings</th>
<th>AM Peak Hour Traffic Generation Rate</th>
<th>AM Peak Hour Traffic Generation</th>
<th>PM Peak Hour Traffic Generation Rate</th>
<th>PM Peak Hour Traffic Generation</th>
<th>Daily Traffic Generation Rate</th>
<th>Daily Traffic Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>0.95 vehicle trips / dwelling</td>
<td>30 vehicle trips in the AM peak hour</td>
<td>0.99 vehicle trips / dwelling</td>
<td>31 vehicle trips in the PM peak hour</td>
<td>10.7 movements / dwelling</td>
<td>332 vehicle trips per day</td>
</tr>
</tbody>
</table>

Table 5.1 indicates that the site could generate an additional 30 vehicle peak hour trips during the AM peak hour, 31 vehicle trips during the PM peak hour an up to 332 vehicle trips per day.

5.1.1 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development has been estimated based on the following:

♦ Our understanding of the local travel characteristics of the area as indicated in Section 2.1 of this report.
♦ Our understanding of the existing road network configuration and intersection operation.
♦ The location and layout of the proposed roadways and intersection configuration.
♦ The location of the surrounding commercial centres and the associated employment, retail and recreational opportunities.

Using the information in Section 2.1 regarding the destination for residents, PeopleTrans has made an assessment of the percentage that would be likely to use Oratava Avenue to exit the subject site towards Pennant Hills Road. For exiting traffic, during the AM peak hour it is conservatively estimated that 40% of residents would use Oratava Avenue with remainder using other streets.

For inbound and exiting traffic in the PM peak hour 50% of vehicles are assumed to use the intersection of Oratava Avenue / Pennant Hills Road with 50% using Oratava Avenue west of the site.

The following has been applied to the total traffic generation volumes for the immediate post development assessment:

♦ 80% out / 20% in during the AM peak hour
♦ 60% in / 40% out during the PM peak hour
Table 5.2: Anticipated Development Volumes

<table>
<thead>
<tr>
<th>Timer period</th>
<th>Vehicles In</th>
<th>Vehicles Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oratava Ave</td>
<td>Oratava Ave</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Dir.</td>
<td>Other Dir.</td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>3</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>PM</td>
<td>10</td>
<td>6</td>
<td>31</td>
</tr>
</tbody>
</table>

Based on the above and the existing assessment in Section 2.2.5, adding an additional 10 vehicle movements exiting Oratava Avenue to Pennant Hills Road during the AM Peak hour would increase the degree of saturation of the left turn from 0.41 to 0.49. During the PM peak hour, the additional vehicles would result in the degree of saturation increasing from 0.36 to 0.45.

The assessment indicates that there is sufficient spare capacity at the intersection of Oratava Avenue / Pennant Hills Road to cater for the anticipated development vehicles.

Based on the additional vehicle volumes split evenly to other directions between The Northern Road / Oakes Road, Karloon Road and Aiken Road, the proposed development is not anticipated to compromise the function or safety of the surrounding road network.
6. Conclusions

After undertaking a traffic, transport and access assessment of the proposed residential subdivision at 39-55 (Lot 8 DP1191647) Oratava Avenue and part of 570 (Lot 3 DP1096405) Pennant Hills Road, West Pennant Hills, which consists of 31 residential lots we can confirm the following:

Operational Traffic Impact

- The anticipated traffic generation of the proposed development is not expected to compromise the safety or function of the existing road network.
- The intersection of Pennant Hills Road / Oratava Avenue is anticipated to operate satisfactorily following full development of the subject site.
- Based on the additional vehicle volumes split evenly to other directions between The Northern Road / Oakes Road, Karloon Road and Aiken Road, the proposed development is not anticipated to compromise the function or safety of the surrounding road network.

Access

- The proposed access location on Oratava Avenue provides satisfactory sight distance and is considered a suitable location.

Detailed Internal Design

More information on the detailed internal design of the site driveway and turning of vehicles will be required at a later stage.

Pedestrian and Bicycle Access

More information on pedestrian and bicycle access inside the site will be required at a later stage.
Appendix A

Development Plan