Generally, in the area there are no constructed pedestrian facilities except in the area around the existing school and the Ocean Drive / Houston Mitchell Drive roundabout. In this area shared pedestrian / cycle pathways 2.5 metres wide exist to aid safe cyclist movements through the intersection extending along Ocean Drive to the existing entrance to the school (see Photograph 6). This shared pathway will be extended at least along the frontage of the school on the new Rainbow Beach to Bonny Hills collector road currently being constructed along the northern boundary of the site. Pedestrian refuges have been provided within all the splitter islands in the Ocean Drive / Houston Mitchell Drive roundabout to aid pedestrian crossing of the local roads as shown in Photograph 7.

On the approaches to Ocean Drive / Houston Mitchell Drive roundabout the sealed shoulders of both Ocean Drive and Houston Mitchell Drive have been marked as on-road cycleways (see Photograph 8). However, by observation on site these markings only extended to the extent of road works undertaken when constructing the Ocean Drive / Houston Mitchell Drive roundabout which appears to be relatively recent work. Therefore, beyond the extent of these works’ pedestrians would currently be required to utilise the grass verges or sealed shoulders of the local and state road network and cyclists similarly would be required to utilise the sealed shoulders or share the travel lanes of the local and state road network with all other vehicles.
Photograph 6 – Off-road shared concrete pathway – Ocean Drive near school

Photograph 7 – Pedestrian Refuge Ocean Drive south of Houston Mitchell Drive.
8.0 DEVELOPMENT PROPOSAL

The proposal involves the construction of permanent buildings, car parking and landscaping to house the existing school as well as removal of all the existing temporary buildings on the site. Fully operational the school will house 430 students and approximately 35 staff. Specifically, the development involves the following;

♦ Construction of eight new buildings containing class rooms, administration centre, amenities and recreation facilities;
♦ Removal of all temporary buildings and removal of existing vehicular access to Ocean Drive;
♦ Stormwater drainage and landscaping to Port Macquarie-Hastings Council requirements; and
♦ Staff and visitor car parking providing a total of 40 car parking spaces.

The development concept plans are provided within Attachment A.

A temporary vehicular access to the site will be provided from a new roundabout being constructed as part of the Rainbow Beach to Bonny Hills collector road and located near the north-eastern corner of the site. As sporting fields are developed to the east of the site a permanent vehicular access will be constructed off the sports fields access road to service the proposed on-site car parking areas. A new four bay bus zone for school services and short term (5 minute) parking zone (kiss and ride) will be located within the parking lane being constructed along the southern side of the Rainbow Beach to Bonny Hills collector road along the school frontage with pedestrian access provided to the school along this frontage.
9.0 TRAFFIC GENERATION

The NSW RMS’ RTA’s Guide to Traffic Generating Development’s provides specific advice on the traffic generation potential of various land uses. However, this guide does not provide data specifically related to educational facilities.

Where no data is available the RTA Guide directs readers to the requirements of the Institution of Transport Engineers (USA) (ITE). The ITE manual recommends the following peak hour traffic generation rate for a middle school / junior high school;

ITE peak hour traffic generation = 0.16 v tph per student.

It is noted this traffic generation rate reflects high levels of alternate transport mode travel to and from school i.e. bus, bicycle and walking and that each vehicle generates an inbound and outbound trip.

Noting school student number capacity as 430 students the traffic generation as a result of this development can be calculated as follows accepting that the AM and PM peak traffic generation rates will be the same;

AM & PM Peak Hour

Traffic Generation = 0.16 vehicle trips per child x 430 children x 2 trips
= 137.6 v tph say 138 v tph.

It is noted that as the school is currently operating in temporary buildings and at near capacity already the proposal is will not add any significant additional traffic (vehicles, bicycle, pedestrian) to the road network however the changed access arrangements will result in a slight redistribution of traffic with the major impact being on the Ocean Drive / Houston Mitchell Drive roundabout with the construction of the fourth leg of the roundabout (Rainbow Beach to Bonny Hills collector road) and its use as the school access. Future pedestrian traffic may increase with the development of the adjoining residential development however will use the proposed concrete footpath network within the subdivision.

10.0 TRIP DISTRIBUTION

The traffic generated by the development needs to be distributed onto the local road network. In this regard assumptions need to be made in regard to origins and destinations of trips and the nature of the trips to and from the site. In determining the trip distribution, it is noted that as the school is already operating at near capacity the traffic generated by the school is already on the road network and captured in the traffic counts carried out in June 2018. However, this development will redistribute the traffic at the Ocean Drive / Houston Mitchell Drive roundabout with the construction of the Rainbow Beach to Bonny Hills collector road as the fourth leg of the roundabout and the school access relocated to being off this new road. Based on the existing traffic counts and the traffic generation calculation above the following trip distribution is considered likely post development;
AM & PM peak

- Traffic will be 50% inbound and 50% outbound as length of stays is less than 1 hour.
- 45% of inbound and outbound traffic will have an origin/destination to the south;
- 45% of inbound and outbound traffic will have an origin/destination to the north; and
- 10% of inbound and outbound traffic will have an origin/destination to the west.

The resulting trip distribution onto the Ocean Drive/Houston Mitchell Drive roundabout for the full development of the school is therefore likely to be as shown below in Figure 4.

Figure 4 – Development traffic trip distribution.
11.0 TRAFFIC IMPACTS OF DEVELOPMENT

11.1 Road Network Capacity

It has previously been shown in Section 6 of this report that the local road network is currently operating well within its technical capacity with the existing school operating within temporary buildings. It is also been advised that school student numbers are already near the school capacity of 430 students. Therefore, the proposed development will only have an impact on traffic volumes on the local road network with regard to construction traffic associated with the development. With up to 40 construction employees on-site at any one time and with deliveries considered the likely peak construction traffic volume on the road network would be of the order of 40 to 50 vtp/h in the early morning and late afternoon. The addition of this traffic on the road network will not cause traffic volumes on the local road network to even exceed the thresholds for LoS A on the road network therefore will not result in any change of LoS on the road network.

Therefore, it is reasonable to conclude that the proposed development will not adversely impact on the mid-block two-way flows on the local and state road network.

In terms of intersection performance, the main impact of the development will be with regard to the redistributed flows on the Ocean Drive / Houston Mitchell Drive roundabout. Currently the roundabout was observed to operate with uninterrupted flow conditions during the traffic counts undertaken in June 2018 and it would not be expected that the redistribution of flows and the addition of future residential development in the area will adversely impact on the operation of the roundabout. To demonstrate this the roundabout was modelled using the Sidra Intersection software.

This software package predicts likely delays, queue lengths and thus levels of service that will occur at intersections. Assessment is then based on the level of service requirements of the RMS shown below;

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Average Delay per Vehicle (secs/veh)</th>
<th>Traffic Signals, Roundabout</th>
<th>Give Way &amp; Stop Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 14</td>
<td>Good operation</td>
<td>Good operation</td>
</tr>
<tr>
<td>B</td>
<td>15 to 28</td>
<td>Good with acceptable delays &amp; spare capacity</td>
<td>Acceptable delays &amp; spare capacity</td>
</tr>
<tr>
<td>C</td>
<td>29 to 42</td>
<td>Satisfactory</td>
<td>Satisfactory, but accident study required</td>
</tr>
<tr>
<td>D</td>
<td>43 to 56</td>
<td>Operating near capacity</td>
<td>Near capacity &amp; accident study required</td>
</tr>
<tr>
<td>E</td>
<td>57 to 70</td>
<td>At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode</td>
<td>At capacity; requires other control mode</td>
</tr>
</tbody>
</table>


Assumptions made in this modelling were;

♦ The roundabout was modelled as per the concept designs shown within Attachment 1.
♦ Traffic volumes used in the modelling were as collected by Intersect Traffic in June 2018.
2028 future traffic is predicted using a 2% per annum background traffic growth rate which ensures the cumulative impact of future residential development in the area is considered in the 2028 modelling.

Traffic generated by the development is distributed onto the local road network as per Figures 4. In terms of the adjoining future residential development allowance has been made for up to 300 lots to utilise this intersection to access Ocean Drive or Houston Mitchell Drive. Trip distribution for the residential traffic was assumed to be 80% outbound during the AM peak and 70% inbound during the PM peak and directional split as per the school traffic with a traffic generation rate of 0.9 vtph per lot in the PM peak and 0.85 vtph per lot in the AM peak.

The results of the modelling for both the AM and PM peak hour traffic periods for the roundabout and the ‘all vehicles’ case are shown below in Table 1. The Sidra Movement Summary Tables for the modelling are provided in Attachment C.

<table>
<thead>
<tr>
<th>Model Scenario</th>
<th>Degree of Saturation (v/c)</th>
<th>Average Delay (s)</th>
<th>LoS</th>
<th>95% back of Queue Length (cars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 AM + development</td>
<td>0.294</td>
<td>6.4</td>
<td>A</td>
<td>1.3</td>
</tr>
<tr>
<td>2028 AM + development</td>
<td>0.370</td>
<td>6.7</td>
<td>A</td>
<td>1.7</td>
</tr>
<tr>
<td>2018 PM + development</td>
<td>0.248</td>
<td>6.4</td>
<td>A</td>
<td>1.5</td>
</tr>
<tr>
<td>2028 PM + development</td>
<td>0.309</td>
<td>6.7</td>
<td>A</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The modelling shows that the Ocean Drive / Mitchell Houston Drive roundabout will continue to operate satisfactorily upon completion of the new school buildings and the new school access arrangements with the average delay, LoS and queue lengths at the roundabout being well within the acceptable criteria set by NSW RMS through to and beyond 2028 even with the additional residential development expected in the area. The degree of saturation values indicates that even in 2028 the intersection is only operating at 30 – 40% capacity.

It would therefore be reasonable to conclude the proposed new school buildings and modified access conditions will not adversely impact on the efficiency and effectiveness of the local and state road network.

11.2 Access

The on-site car parking for this development will eventually be accessed off an internal subdivision road providing access to the proposed adjoining sports fields. In accordance with the requirements of Australian Standards AS 2890.1-2004 Parking Facilities – Off-street car parking the access to the development providing access to a user class 3A (short term, high turnover) car parking facility of between 25 and 100 car spaces fronting a local road is required to be a category 1 access (Table 3.1 of AS 2890.1-2004). Table 3.2 of AS 2890.1-2004 specifies a category 1 access facility as a combined entry / exit between 3 and 5.5 metres wide.

It is proposed that the access crossing and driveway to the school be in excess of 6 metres wide to ensure the access arrangements comply with the requirements of AS2890.1-2004 Parking Facilities – Off-street car parking. Pedestrian and vehicular sight lines from the access as required by AS2890.1-2004 (Figures 3.2 and 3.3) will also have to be achieved. Currently the plans are not sufficiently detailed to undertake an assessment however this can be conditioned and confirmed at Construction Certificate stage.

Overall it is concluded that the proposed vehicular access arrangements to the on-site car parking area within the school can be designed to be compliant with Australian Standards AS 2890.1-2004 Parking Facilities – Off-street car parking and thus suitably safe.
It is assumed that the new road network being constructed as part of the subdivision works has been constructed to Port Macquarie-Hastings Council requirements and is suitable for bus use as the school buses will be required to use the new road and undertake a U-turn movement on the internal roundabout.

11.3 Off-Street Parking

On-site parking and manoeuvrability should comply with Australian Standard AS2890.1-2004 Parking facilities – Off-street car parking and Chapter 2.5 – Transport, Traffic Management, Access & Car Parking within the Port Macquarie-Hastings Council’s DCP (2013). The DCP in regard to education establishments does not have any required rates within its table of land use definitions. However, in terms of car parking the DCP has the following objective;

♦ Adequate provision is made for off-street parking commensurate with volume and turnover of traffic likely to be generated by the development. To ensure no adverse impacts on traffic and road function.

The development provision applicable to this development then from the DCP is as follows;

♦ b) Where a proposed development does not fall within any of the listed definitions, the provision of on-site parking shall be supported by a parking demand study.

As a primary school a reasonable parking demand would be the provision of 1 space for each staff member, some visitor car parking plus a drop off and pick up area. Therefore with 35 staff members the primary school on completion would need to provide the following on-site car parking to meet the likely peak parking demand;

On-site Parking Requirement = 35 staff parks + 5 visitor spaces = 40 spaces.

The plans for the proposal show the provision of an on-site car park with 40 car spaces, therefore in respect of these requirements it is considered the proposal is compliant with the objectives of the Port Macquarie-Hastings Council DCP (2013). It is noted all existing on-site car parking within the temporary school site will be maintained as part of this development with the kiss and ride area relocated to on-street on the new collector road. Additional bike storage areas will also need to be provided for staff and students while typical end of trip facilities including showers and lockers will be provided within the staff amenities.

It is also proposed that the new road frontage along the northern boundary of the site be suitably regulated to provide a kerbside pick-up and set-down area for parents during the peak pick-up and set-down periods i.e. 8.00 am – 9.00 am and 2.30 pm to 3.30 pm within the southern parking lane. It is recommended that five (5) minute parking be regulated and enforced during these periods. This area would have a capacity of approximately 18 cars (this may need to be slightly reduced as a result of the school crossing requirements) and would work efficiently during the morning set-down peak hour. However, like all ‘kiss and ride’ facilities this area will face difficulties within the afternoon pick-up period as a result of parents parking longer than 5 minutes to pick up their children. Therefore, the successful operation of the kiss and ride will depend on the school undertaking an education program for parents and marshalling the area with staff during these periods. Initial enforcement of the 5-minute parking may also be required if unsafe traffic movements and queuing was occurring in the PM pick-up period.

The school is currently serviced by three (3) school bus services as shown in Figure 3. Whilst it is unlikely that additional bus services be provided some scope for growth has been provided within a proposed 4 space school bus zone also within the southern parking lane within the new road along the northern boundary of the school. The bus zone and car parking areas are to be suitably and physically separated by a blister island that will also accommodate a school pedestrian crossing to allow students to safely cross the new collector road along the northern boundary of the school. Overall it is considered the proposed bus zone is satisfactory.
The on-site car parking area also provides access to a service vehicle loading / unloading area within the school. The design of this loading area accommodates the following at any time during the schools opening hours;

- Internal waste collection which will be undertaken out of school hours;
- Other servicing (e.g. canteen, stationary etc) during school hours;
- Access for emergency vehicles; and
- All service vehicles to enter and exit the site in a forward direction.

Overall it is concluded that the proposed on-site car parking and servicing facilities would comply with the objectives of the Port Macquarie-Hastings Council DCP (2013) and Australian Standard AS2890.1-2004 Parking facilities – Off-street car parking. There is sufficient parking supply to cater for the expected peak demand from the development and the provision of a kiss and ride drop off and pick-up area is both safe and convenient for parents and children.

There may be occasions when special events at the school will generate a spiked peak parking demand. As a result, the additional parking demand may need to be catered for within on-street car parking and overflow parking areas both within and external to the school. These events will therefore require preparation of a special event traffic management plan which can be conditioned on a consent and required prior the issue of an Occupation Certificate. Alternatively, Council may choose to require separate or time limited Development Applications for special events at the school.

11.4 Construction Traffic

The construction of the development will result in additional traffic entering and exiting the site via the Ocean Drive / Houston Mitchell Drive roundabout and the new collector road. It is estimated that during the peak construction periods up to 30 construction employees will be on-site at any one time. If a car occupancy rate of 1.2 is assumed for employee traffic this would result in an AM and PM peak traffic flow to the site of in the order of 25 vtph. This will also increase the peak parking demand at the site by a similar number during construction.

Material deliveries will add to this traffic with peak materials delivery traffic expected during the pouring of concrete slabs early on in the construction period. With a large pour and a fleet of concrete trucks sourced from nearby it is likely that a further 10 vtph could occur during the AM peak period as a result of this construction activity. Therefore, overall it is estimated that the peak construction traffic generation resulting from the construction of the development will be in the order of 35 vtph during the AM peak. With subdivision road works also likely to occur during the school construction period the additional construction traffic could be doubled to up to 70 vtph. Data obtained in Sections 5 & 6 of this report has identified that the local road network has a spare two-way mid-block capacity in excess of 1,000 vtph therefore will be easily able to cope with the additional construction traffic. Modelling of the existing Ocean Drive / Houston Mitchell Drive roundabout has shown that it is currently operating at approximately 30 % capacity so again will be easily able to cope with construction traffic generated by the development and the adjoining residential development.

Construction traffic is a short-term traffic impact that is best managed through the preparation of a construction traffic management plan prepared and implemented prior to commencement of construction activities by the builder or civil contractor. This plan may seek to minimise the impacts of construction activities by designating travel routes, access points, construction employee parking areas, material delivery procedures and times etc. This plan is best prepared, implemented and enforced by the head contractor. It is recommended that a construction traffic management plan be prepared and implemented prior to the commencement of construction activities for the development and this be conditioned on the consent.
12.0 PEDESTRIAN FACILITIES

The proposed development is likely to generate some external pedestrian traffic with the existing pedestrian facilities near the site, with the construction of suitable pedestrian paths within the future residential areas and along the northern boundary of the school being considered excellent and suitable for the development. A school crossing is also proposed across the new collector road being constructed along the northern boundary of the site.

The provision of concrete pedestrian footpaths on both sides of the new collector road being constructed along the northern boundary of the site and a school pedestrian crossing across this new collector road as shown in the concept plans in Attachment A will ensure suitable pedestrian facilities exist near the site to cater for the likely pedestrian traffic generated by this development.

13.0 ALTERNATIVE TRANSPORT MODES

The proposed development will generate a demand for school bus services and this demand has already been generated by the operation of the school in temporary buildings. Currently the school is serviced by 3 bus services and it is unlikely any additional services will be required as a result of this development given school numbers are already near capacity. Therefore, in terms of bus facilities a minimum 3 space bus zone would be required to service the school. With a four-space bus zone being proposed within the new collector road along the school frontage site it is concluded that suitable bus facilities have been designed into the development. It is noted that the existing public bus service past the site would be expected to cater for the small amount of demand likely to be generated by this development.

The development is likely to generate some bicycle traffic and suitable on and off-road cycleways should be incorporated into the new subdivision road works for the future residential areas around the site. If not already being provided within the road works, the existing shared pathways and on-road cycleways should be extended along the new collector road to the new school entrance as part of this development.

The preparation of a Green Travel Plan for this development is not considered warranted due to the small-scale nature of the development and the lack of public transport services and alternative transport mode infrastructure in the area. However, should a Green Travel Plan be required it can be conditioned on a consent and provided prior to issue of an Occupation Certificate.
14.0 CONCLUSIONS

This traffic and parking assessment for the proposed new school buildings and vehicular access to Lake Cathie Primary School at 1240 Ocean Drive, Lake Cathie has concluded;

♦ Current traffic volumes on the local road network are below the technical mid-block capacities of the streets and as such there is spare capacity within the road network to cater for development in the area.
♦ It is expected that the traffic generated by the development will be up to 138 vtp/h in the AM and PM peak periods.
♦ The proposed development will not adversely impact on the mid-block two-way flows on the local and state road network.
♦ The proposed new school buildings and modified access conditions will not adversely impact on the efficiency and effectiveness of the local and state road network.
♦ The proposed vehicular access arrangements to the on-site car parking area within the school can be designed to be compliant with Australian Standards AS 2890.1-2004 Parking Facilities – Off-street car parking and thus suitably safe.
♦ The proposed on-site car park (40 car space capacity) and loading area would comply with the objectives of the Port Macquarie-Hastings Council DCP (2013) and Australian Standard AS2890.1-2004 Parking facilities – Off-street car parking. There is sufficient parking supply to cater for the expected peak demand from the development and the provision of a kiss and ride drop off and pick-up area on the new collector road is both safe and convenient for parents and children.
♦ Servicing facilities within the site are satisfactory and ensure forward entry and exit to and from the site for all service vehicles.
♦ The provision of concrete pedestrian footpaths on both sides of the new collector road being constructed along the northern boundary of the site and a school pedestrian crossing across this new collector road as shown in the concept plans in Attachment A will ensure suitable pedestrian facilities exist near the site to cater for the likely pedestrian traffic generated by this development.
♦ Servicing of the site will occur outside the AM and PM peak drop off and pick up times for children at the school therefore will be able to safely and conveniently utilise the existing on-site set down and drop off area as currently occurs.
♦ Suitable school bus facilities have been designed into the development with a four-space bus zone proposed within the new collector road adjacent to the site.
♦ Suitable on and off-road cycleways should be incorporated into the new subdivision road works for the future residential areas around the site. If not already being provided within the road works, the existing shared pathways and on-road cycleways should be extended along the new collector road to the new school entrance as part of this development.

15.0 RECOMMENDATION

Having carried out this traffic and parking assessment for the proposed new school buildings and vehicular access to the Lake Cathie Primary School at 1240 Ocean Drive, Lake Cathie it is recommended that the proposal can be supported from a traffic impact perspective as it will not adversely impact on the local road network and complies with all relevant Port Macquarie-Hastings Council, Australian Standard and NSW Roads and Maritime Services (RMS) requirements.

JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd