APPENDIX 6

Preliminary Traffic Assessment

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TDG Ref: 14683
4 September 2017

Issued via email: John.meredith@rdtpacific.co.nz

Dear John

Preliminary Transportation Assessment - Proposed TKKM Te Wananga Whare Tapere o Takitimu Kura and Kohanga Reo School at 90-120 Bennett Road, Hastings

Further to your request, we are pleased to provide you with the following report confirming our initial investigations relating to a proposal by the Ministry of Education (**MoE**) to establish a new kura and kohanga reo educational facility (**TKKM**) at 90-120 Bennett Road, Hastings.

Traffic Design Group (**TDG**) has been commissioned by RDT Pacific on behalf of the MoE for this proposal. Based on the information that we have received, it is understood that the MoE is currently investigating the viability of establishing the TKKM at the above site whereupon key elements, including the likely issues relating to traffic generation and its integration onto the local road network, require an initial investigation and specialist consideration. Accordingly the MOE requires confirmation on the condition of the existing carriageways that are expected to provide vehicle, and also potentially pedestrian, access to and from the site and the likelihood that these roads will be able to support the establishment of the TKKM.

It is also noted that at this preliminary phase of the project no detailed design of the proposal has been developed. Given that this report is intended to support the Notice of Requirement (**NoR**) to be lodged with Hastings District Council (**HDC**), our investigations and the findings that are provided in this regard are appropriate for the intended purposes. As such, this report is not a full transportation engineering assessment.

Notwithstanding this, in order to highlight issues that will need to be addressed during the detailed design phase, traffic matters including road safety; compliance with the Hastings District Plan[1] (i.e. involving access, sightlines, loading and parking) have been considered and the outcomes of these findings are reported as follows.

1. Introduction

The MoE has commissioned RDT Pacific to project manage the completion of a range of preparatory investigations relating to its proposal to establish a TKKM facility along Bennett Road in Hastings.

[1] *September 2015 Proposed District Plan*

The site under consideration is located between Hastings and Whakatu and generally surrounded by farmlands. The site is currently vacant and used for grazing purposes. It is understood that the proposed TKKM will be developed progressively with pupil numbers growing from around 120 to a maximum of 350 students (including 50 Kohanga Reo children).

Accordingly, the proposal will increase the traffic generation attributed to the site and increase the demand for on and off-street parking. RDT Pacific has commissioned TDG to evaluate what effect the TKKM is likely to have on the efficiency and performance of the local road network; including the ability to access the site from Bennett Road; and the general level of on and off-street parking that would be required to service this facility once fully developed.

This report is to accompany the NoR application and as such attempts to, as far as possible, address the following key issues:

- the extent of additional traffic expected to be generated by the TKKM and the integration of this traffic into the surrounding road network;
- the likely effect that generated traffic will have on the operational safety and efficiency of the surrounding road network;
- the ability of the site and its surrounds to accommodate the parking and pedestrian demands expected to be created by the proposed facility; and
- the extent of compliance of the proposal with the objectives, rules, and assessment criteria of the HDP.

It should be noted that given that this is a NoR application, no detailed designs of the proposal have yet been developed and as such our report represents our preliminary investigations only.

2. Existing Transport Infrastructure

2.1 Location in the Transport Network

Figure 1 shows the geographical location of the site together with the surrounding road network, while **Figure 2** shows the existing Road Hierarchy, as defined within Appendix 69 of the HDP.

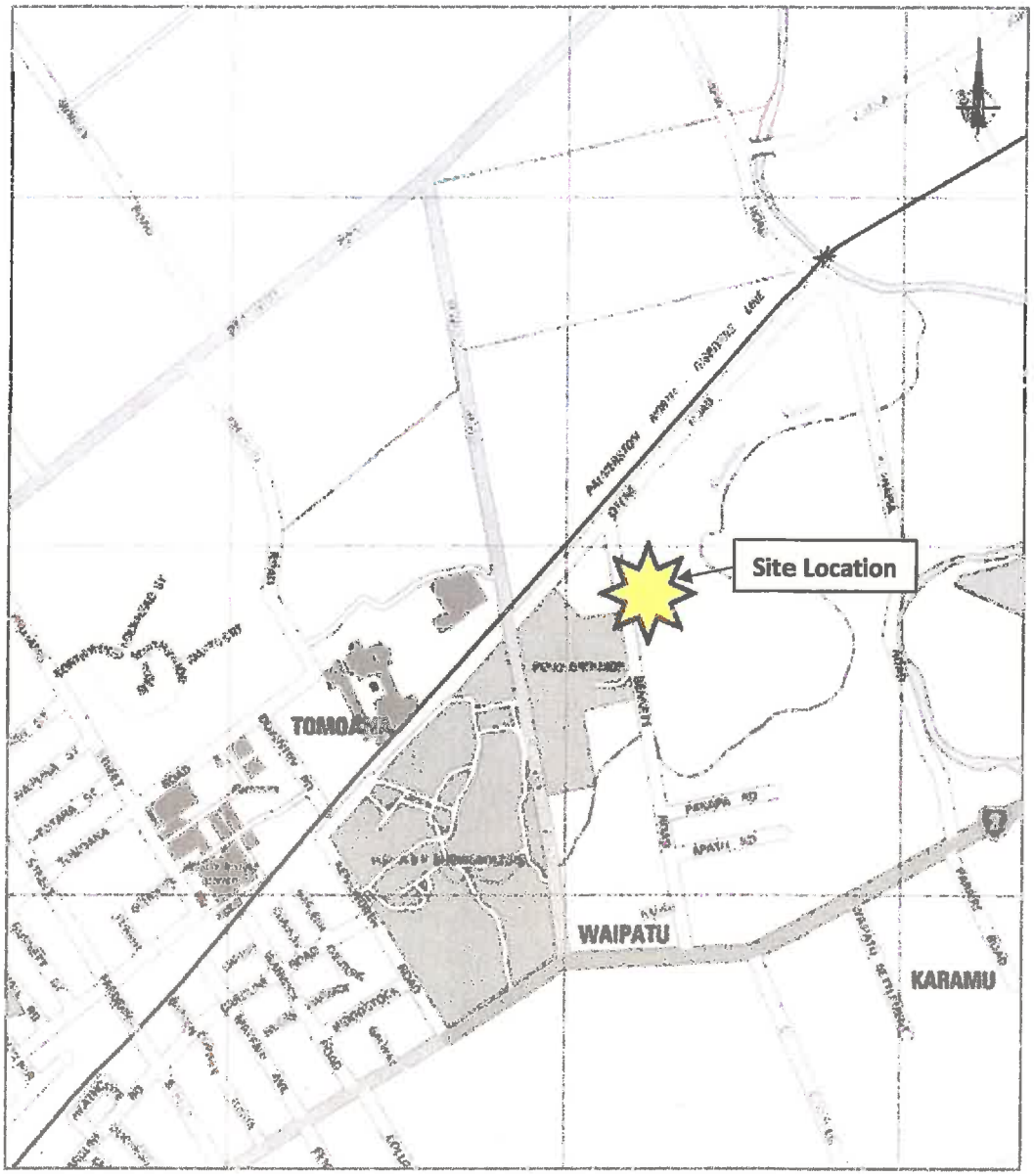

Figure 1: Site Location

The site has direct frontage access to Bennett Road (a Local Road) which connects with Otene Road to the north (a Collector Road) and State Highway 2 (**SH2**) to the south (a National Route). Vehicular access to the proposed TKKM is available from these surrounding roads including Elwood Road (a Collector Road), which run parallel to Bennett Road and provides access to both SH2 to the south and Pakowhai Road to the north (an Arterial Road).

Hastings city centre is located approximately 3km to the southwest of the site.

Panapa Road, Apatu Road and Kauru Road all intersect with Bennett Road south of the site. These roads are minor local residential roads serving no more than 35 dwellings each.

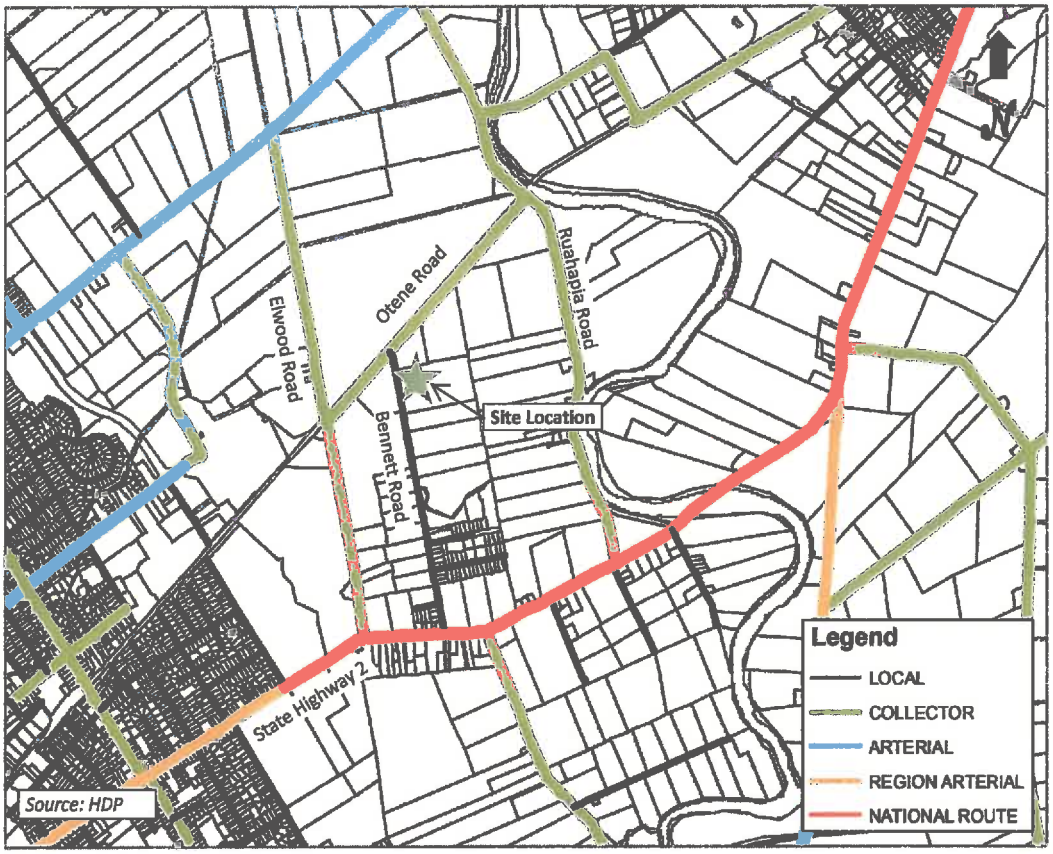

Figure 2: Existing Road Hierarchy

2.2 Local Access

Vehicular access to and from the site is easiest from the south on account that Bennett Road intersects with the SH2. SH2 provides direct linkages to Hastings Town Centre and Whakatu. To the north Bennett Road intersects with Otene Road which provides limited access on account that it runs parallel to an existing railway line with limited crossing opportunities. Elwood Road on the other hand, does offer access from the north.

The anticipated traffic generated from the proposed TKKM is expected to be disbursed predominately from the West / Southwest (70%) with the remainder being from the East / Northeast (30%).

2.2.1 Bennett Road

Bennett Road has a posted speed limit of 80km/h between its intersection with Otene Road and a small river crossing opposite 66 Bennett Road, some 400m south of the proposed school site. Hereafter the posted speed limit reduces to 70km/h due to the presence of several residential properties. The southern portion of Bennett Road is therefore primarily residential, while the northern portion is predominately serving horticultural activities.

The road carriageway has a fixed road width of 5.5m along its full 1.3km length. No road markings are currently present along its length other than a stopline marking at the intersection with SH2. At present no kerbing nor shoulders exists along its entire length. The cross section can therefore be best described as "Rural". No footpaths or cyclepaths are present along Bennett Road.

The intersection of Bennett Road / SH2 is Stop controlled with no additional road widening along SH2. Through traffic therefore have to slow down for left or right turning vehicles wishing to turn into Bennett Road.

At the northern end, Bennett Road connects with Otene Road with no control signage or roadmarkings in place.

Photographs 1 to **4** illustrate the existing carriageway provisions along Bennett Road at various locations.

Photo 1: Bennett Road looking North (near SH2)

Photo 2: Bennett Road looking North (near speed change)

Photo 3: Bennett Road looking South (near speed change)

Photo 4: Bennett Road looking North (near proposed site)

2.2.2 SH2

As has been previously reported, SH2 is classified as a National Route and therefore of regional significance. It provides direct access both to Hastings Town Centre to the west and Clive to the northeast. Given that the road's primary function is mobility, limited access points are provided along its length, and usually with other higher order roads. Rarely does it intersect with lower order roads (such as Bennett Road, which only serves to provide access to the farms and residential dwellings along its length). SH2's primary function is therefore the regional connection of towns / communities.

SH2 has a posted speed limit of 80km/h and has been constructed with a 3.5m lane width in each direction together with 2.5m shoulders either side (see **Photograph 6**). The roadmarkings vary along its length to accommodate the various intersections. No passing opportunities are available along the section of SH2 within the vicinity of Bennett Road. The road surface is sealed with an overall width of around 12m.

A footpath does exist which begins at the intersection of St Georges Road and extends along the southern carriageway, separated by a grass verge. No cyclepaths or streetlighting exist within the vicinity of Bennett Road.

The footpath along SH2 primarily serves the Te Kohanga Reo o Te Whareo Wikitoria School located to the south of the SH2 / Bennett Road intersection. No-Stopping lines have therefore been painted within the shoulder of the southern carriageway to prevent vehicles from stopping directly in front of the school. No additional roadmarkings were observed to inform motorists of the presence of a school (see **Photographs 7** and **8**).

The following photographs illustrate the existing provisions available at various locations along SH2.

Photo 5: Elwood Road looking towards SH2

Photo 6: SH2 Looking East towards Bennett Road

Photo 7: SH2 looking East towards Bennett Road

Photo 8: SH2 looking West towards Bennett Road

2.3 Public Transport Provision

There are no public bus stops on any of the roads that are expected to support transport needs for the proposed development. The existing Te Kohanga Reo o Te Whareo Wikitoria School is understood to be separately supported by school vans and occasionally one-off school bus services.

2.4 Footpaths and Cycle Routes

As has been described, there is a segregated pedestrian footpath along a portion of SH2, however none exist along Bennett Road. The extent that the proposed school can include dedicated footpaths is limited by the ability for scholars to access the school on foot. It seems unreasonable to expect the proposed school to provide a formal footpath along the entire length of Bennett Road, especially since no kerbing is currently present. Secondly, the school is intended to appeal to a wider catchment area than that of a typical local neighbourhood school. Children are therefore less likely to walk /cycle to school due to the longer travel distances. Thirdly, the nearby river bridge also limits any opportunity to extend a footpath further south along Bennett Road. **Photograph 9** below show the bridge and its physical obstruction to enabling footpath and / or cycleway facilities.

Photo 9: Bennett Road facing South with existing bridge structure

Photo 10: Northern edge of proposed footpath

Photo 11: Southern edge of proposed footpath

It is therefore recommended that a footpath be provided along Bennett Road fronting the development site extending northwards to the boundary edge where an existing accessway exists serving the adjacent property (see **Photograph 10**). To the south it is recommended that the proposed footpath extends along the frontage of the site to a point some 20m south of the site boundary where an existing accessway is present (see **Photograph 11**). The total footpath distance recommended is therefore approximately 300m in length.

3. Existing Site

The existing site is located towards the northern end of Bennett Road and is bounded on all of its boundaries by 'Plains Zone' land as defined in the HDP. **Figure 3** shows the location of the development along Bennett Road. The NoR application is for the development of Area 1A only. Also shown in **Figure 3** is the residential dwelling located south of the site as well as the surrounding farmland.

The site itself is flat and grassland, the only structures being some wooden stables on the south western corner. No formal vehicular access currently exists on Bennett Road other than a farm gate located to at the southern edge of the property. The area is used for training horses as depicted by the large oval track shown in **Figure 3**.

Ref	Parcel id	Appellation	Owner	Titles	Total Area (ha)	Land Required (ha)	Balance Land (ha)
1A	4196345	Lot 2 DEEDS 566	Aorangi Maori Trust Board	HBB3/462	6.6722	3	-
1B	4196345	Lot 2 DEEDS 566	Aorangi Maori Trust Board	HBB3/462		-	3.6722
2	4234845	Lot 2 DP 11280	Aorangi Maori Trust Board	HBB3/462	2.5748		

Figure 3: Site Location

4. Travel Patterns

4.1 Traffic Volumes

For this investigation, traffic surveys were conducted at the following two intersections; namely

1. Bennett Road / Otene Road; and

2. Bennett Road / SH2.

The minor intersections along Bennett Road (i.e. Panapa Road, Apatu Road and Kauru Road as shown in **Figure 1**) were not deemed necessary to be counted as they are Local Roads serving a small number of private dwelling units and therefore carry very little traffic. The surveys were conducted on 30 May 2017 in order to measure the volume of turning traffic entering and egressing Bennett Road. Turning volumes were taken for the morning (8:00am to 9:00am) and afternoon (2:00pm to 4:00pm) peak periods to coincide with typical school peak periods. The existing turning movements are shown in **Figure 4.**

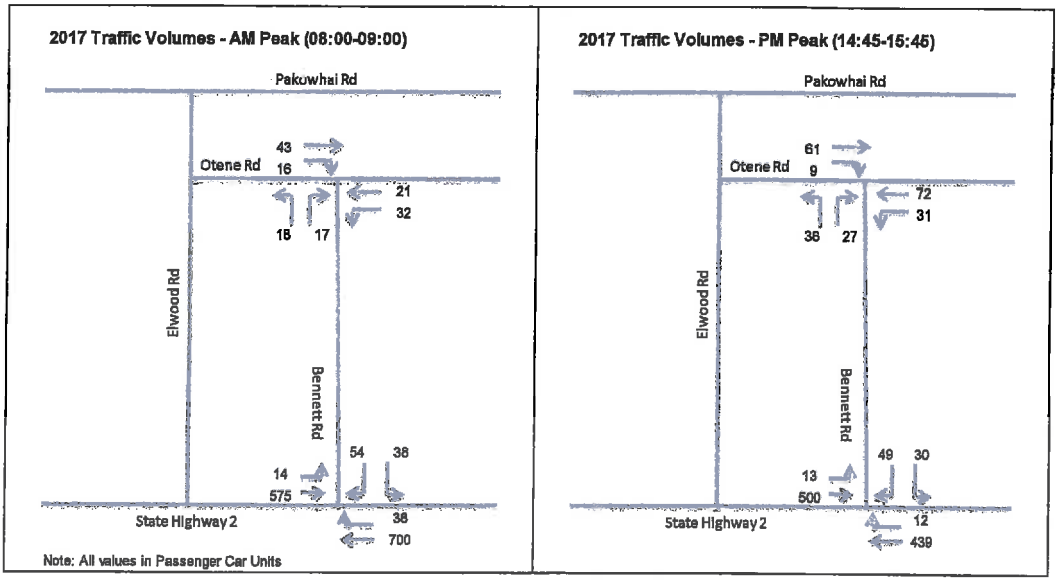

Figure 4: 2017 Existing Traffic Volumes (AM and PM)

Supplementary traffic data available on Council's webpage was also used as part of this investigation and confirmed the following:

- SH2 (between Kenilworth Road and Bennett Road) = peak hour flow of 989 at 16:00 during a weekday;
- Bennett Road (between SH2 and Kauru) = 700vpd with a peak volume of 108 vehicles per hour (**vph**) at 17:00 on a weekday;
- Bennett Road (between Otene Road and Panapa Road) = Estimated at 300vpd;
- Otene Road (between Ruahapia Road and Bennett Road) = 400vpd with a peak hour demand of 96vph at 17:00 on a weekday;
- Otene Road (between Elwood Road and Bennett Road) = 660vpd with peak hour demand of 87vph at 17:00 on a weekday;
- Elwood Road (between SH2 and Otene Road) = 4000vpd with a peak volume of 434vph at 16:00 on a weekday; and
- Elwood Road (between Otene Road and Pakowhai Road) = 3500vpd with a peak volume of 369vph at 17:00 on a weekday.

The above confirms that Elwood Road accommodates approximately six times the daily traffic that Bennett Road supports.

Other than SH2, all of the local roads are assessed to have ample spare carrying capacity and operating levels of service that are proportionate with their hierarchical classification and strategic function.

4.2 Traffic Growth

An average traffic growth rate of 1% per annum has been assumed based on the NZTA Economic Evaluation Manual 2016 for the Hawke's Bay region.

It is understood that subject to gaining the necessary planning approvals, the proposed development is expected to be fully established by the end of 2019. In order to consider the potential future performance of the road network, the above traffic volumes have been factored to 2019 levels to determine the potential impact that the development may cause relative to the efficiency and operational performance of the local road network.

5. Road Safety

The NZTA Crash Analysis System (**CAS**) database was searched to determine the pattern of accidents occurring along Bennett Road including the intersections with Otene Road and SH2 (including a 50m radius). This investigation was also expanded to include the portion of Elwood Road between Otene Road and SH2 to identify any safety hazards at the existing level crossing. A full five year period was assessed from 2012 to 2016 (2017 data included).

It can be seen that no crashes have occurred on Bennett Road itself, although three have occurred at the intersection with Otene Road while five crashes at the intersection with SH2. Four crashes were captured near to the level crossing on Elwood Road. Closer inspection of the crash results reveals the following:

<u>Bennett Road / Otene Road</u>

Crash 1 – driver did not stop at intersection;

Crash 2 – driver under the influence of drugs and travelling too fast; and

Crash 3 – driver travelling eastbound on Otene road tried to overtake while passing through the intersection.

No injuries were reported for these crashes.

<u>Bennett Road / SH2</u>

Crash 1 – driver hit rear end of car stopped at intersection;

Crash 2 – driver did not see stop sign at intersection;

Crash 3 and 4 – driver hit rear end of waiting car turning right at intersection; and

Crash 5 – driver hit rear end of car slowing to turn left at intersection.

In summary, a review of the crash details along Bennett Road and the intersections with both Otene Road and SH2 do not highlight any specific safety concerns.

6. Proposed Development

MoE has investigated the relocation of the existing TKKM facility located in Albert Street, Hastings and now seeks to designate the Bennett Road site. These are understood to include:

a) New facilities to cater for year 1 to 13 year old students – 300 student capacity (initially 120 students); and

b) 50 Kohanga reo students relocated from the Arataki Road site.

It is also understood that the new TKKM would be progressively developed in stages to accommodate these facilities. The MoE also expects that around 170 students would be initially catered for at the site by the end of 2018. TKKM's school role would then progressively increase to 350 students at the conclusion of the staged development by 2019.

7. District Plan Provisions

The proposed development has been assessed against the Chapter 26.1 of the HDP. It should be remembered that the application is a NoR and as such the design will not necessarily need to comply with all of the District Plan's standards at this stage. The primary intention is to demonstrate that it will be possible to design the school in accordance with these standards. The sections of relevance are as follows:

7.1 Access

Section 26.1.6A of the District Plan states:

"(1) Access to Property

(a) Every owner or occupier shall provide a legal, safe and effective vehicular access to any activity undertaken on a site, and required parking or loading areas from an existing, formed legal road, to enable vehicles to enter the site, except where the site has Designated Retail Frontage (see Appendix 30) or where the site is within the Flaxmere Commercial Zone.

(c) The minimum legal widths for private access are contained in Table 26.1.6.1-1 below. Private access to properties shall allow the safe passage from the edge of the road to the legal boundary of the lot for a single site or household unit. For two or more sites or household units or for any Right of Way, formation of the access to the activity undertaken on the site is required in compliance with Table 26.1.6.1-1."

While it remains unclear as to the details of the accessway provisions for the development, any new vehicle crossing would be able to meet the requirements as set out above and be in excess of the 6m minimum prescribed in Table 26.1.6.1-1 to allow vehicles to enter and exit the site safely.

"(2) Distance of Vehicle Access from Road Intersections

(b) Rural Residential, Rural, Plains and Special Character Zones

Access to any property shall be sited a minimum of 100 metres from an intersection of a State Highway."

It is noted that the proposed development's boundaries are all positioned well clear of any intersection and / or carriageway feature that would impact on the safety or the operational performance of the TKKM's assess needs. Accordingly, subject to the application of sound traffic engineering design the proposed site is able to meet the District Plan requirements.

7.2 Safe Sight Distances

Section 26.1.6B of the District Plan states:

"(1) Intersections shall be located to ensure that Safe Sightline Distances are maintained. For vehicle accesses fronting a Local, Collector or Arterial Route (as defined in the Roading Hierarchy in Appendix 69) compliance with Austroads Standards is deemed an acceptable means of compliance."

The District Plan requires safe sight distances to be provided in accordance with Section 7.2 of Austroads Guide to Road Design Part 4: Intersections and Crossings. Based on the details provided, and noting that this section of Bennett Road permits traffic speeds of 80km/h, it is concluded that the site is easily able to provide in excess of 121m of sight line provisions along its frontage. As such, an accessway to the site can be provided along the property frontage (more than 100m from an adjacent intersection), noting also that there is a single property accessway opposite the site that will also influence the final location of any new facilities.

Notwithstanding these findings, and on the basis that the development proceeds, it is considered imperative that the existing 80km/h posted speed limit is fully re-evaluated with a view that it should be lowered to 70km/h to be consistent with the lower portion of Bennett Road. In this regard TDG is aware of several local schools in similar semi-rural / fringe urban areas, which have needed the establishment of 'school zone' speed restriction / flashing signs and the installation of a variety of supplementary speed control devices and pavement markings. Accordingly, and subject to consultation with Council roading engineers on this issue, it is considered prudent that the sight line requirements for the intended accessway(s) are based on the agreed speed environment as exists when the TKKM is established.

7.3 Loading

Section 26.1.6C of the District Plan states:

"(1) All Activities except Residential Activities

(a) Provision of Loading Spaces

(i) Every owner or occupier who proposes to construct or substantially reconstruct or add to a building on any site, or change the activity carried out on the site shall provide a loading space. The loading space shall provide for the suitable or efficient accommodation of any loading or fuelling of vehicles which are likely to arise from the use of any building or activity carried out on the site, except where a service lane is designated or provided, or where the site has Designated Retail Frontage (see Appendix 30). Separate loading spaces shall be provided for each occupier of the site if there is more than one. The Loading Space shall be additional to the parking required in Table 26.1.6.1-3.

(ii) Every Loading Space, together with access, shall be designed so that it is not necessary to reverse vehicles either on to or off the street. The Loading Space shall not be stacked or located within vehicle manoeuvring areas.

(iii) The provision of a Loading Space in respect of any site may be made as part of the side and/or rear yard space, but not the front yard space of that site.

(iv) The method of loading shall ensure that the footpath or access to adjacent properties shall remain clear at all times and ensure traffic safety is maintained on the roads.

(b) Design of Loading Spaces

The design of Loading Spaces and the layout adopted will depend on the area and shape of the land available, the purpose for which loading is required, and the functional design of the building. The layout shall be of sufficient size to accommodate the following design vehicles:

(i) Activities requiring loading facilities or servicing from heavy vehicles: A "Single Unit Bus / Truck" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" Appendix 73."

Based on the type of activity planned for the site and acknowledging that deliveries by couriers and / or other light vehicles will occur, the proposal is expected to provide at least one dedicated loading space. With this provision the site will be able to meet the intention of these rules as well as the performance standards of the District Plan.

7.4 Parking

7.4.1 Provision of On-Site Parking

Section 26.1.6D of the District Plan states:

"(1) Provision of On-Site Parking

Every owner or occupier who proposes to construct or substantially reconstruct, alter or add to a building on any site, or change the activity carried out on any land or in any building, shall provide suitable areas on the site for parking, in accordance with the requirements listed in Table 26.1.6.1-3 below.

Where more than one activity occurs on a site, the total parking requirements for that site shall be equal to the sum of individual parking requirements for each activity.

In assessing the number of spaces to be provided with respect to the floor area of any building, vehicle access and parking spaces contained within the building shall not be included in the area. Where the number of spaces is based on the person capacity or other factor not directly related to floor area, such spaces shall be assessed following receipt of a written statement from the owner, lessee or proprietor of the premises stating the number of persons which the activity or proposed activity will accommodate."

The relevant minimum parking requirements as contained in the District Plan are as follows:

- For Education Facilities - 1 space per classroom plus 1 space per five classrooms; and
- For Daycare Centre (pre-school) facilities - 1 parking space per FTE staff member.

In the absence of building plans it has been assumed that each classroom would cater for up to 30 children. Licensed Early Childhood Centres are required to have an adult to child ratio of 1 to 5 for children under two and 1 to 10 for children over two.

Table 1 below shows a breakdown of the number of children for each of the age groups together with the associated number of FTE staff required.

Classification	Number of Children	Ratio	Number of FTE Staff required
Early Childhood (ages 0-2)	50	1 to 5 children	10
Pre-school (ages 2-5)	100	1 to 10 children	10
Primary School (ages 5-13)	150	1 to 10 children	15
Kohanga Reo (all ages)	50	1 to 10 children	5
Total	350		40

Table 1: Full Time Employee Staff Requirements

Assuming 30 children per classroom this equates to 2 classrooms for the Early Childhood, 4 classrooms for the pre-school, 5 classrooms for the primary school and 2 classrooms for the Kohanga Reo. The number of FTE has been calculated to be 40.

The associated parking requirements is summarised in below.

Classification	No. of FTE	No. of Classrooms	Ratio	Parking Spaces Required
Early Childhood (ages 0-2)	10	2	1 parking space per FTE staff member	10
Pre-school (ages 2-5)	10	4	1 parking space per FTE staff member	10
Primary School (ages 5-13)	15	5	1 space per classroom plus 1 space per five classrooms	5+1 = 6
Kohanga Reo (all ages)	5	2	1 parking space per FTE staff member	5
Total	40	13		31

Table 2: Parking Requirements

It can be seen that a total of 31 parking spaces are required in order to comply with the HDP.

Notwithstanding these minimum standards, the proposed development would be expected to provide a good allocation of car parking spaces that will address the needs of staff, visitors, parents and caregivers (dropping off and collecting their children). These provisions would be in addition to dedicated bus and / or minivan parking that is also understood to be planned to be used to collect and return enrolled children from Hastings and / or the wider community.

On this basis and also on the expectation that demands generated by parents / caregivers will require a steady turnover of spaces, it is conservatively assessed that the fully developed TKKM should provide around 40 off-street parking spaces (including spaces dedicated for the disabled as identified in the following section).

It is also expected that the car parks are allocated and sign posted for senior staff, visitors and with separated spaces for parents / caregivers dropping off and waiting to collect their children. All of these combined facilities are planned to be provided on site and not on Bennett Road. The actual level of car parking provision will be determined when the detailed design for the TKKM is undertaken and an outline plan of works lodged with the Council.

Additionally, and in accordance with current MoE practices it is also envisaged that the TKKM will introduce a school travel plan in which the new facility will look to manage parking and the behaviours of parent/caregiver's dropping off their children.

The layout and design of the final carpark area would be expected to adopt the carparking design standards as recommended in *"Austroads Manual: Guide to Traffic Engineering Practice - Part 11, Parking"*. This guideline is used extensively within New Zealand and is adopted by the Council as being the relevant standard.

It is also considered that the location of the proposed carparks will need to be carefully considered in order to ensure they are able to provide a safe and efficient environment within the site and that overspill of demands do not occur onto Bennett Road. Potential conflicts between vehicles arriving and those manoeuvring within the carparks will also need to be reduced with good levels of separation in aisle widths and the use of spare on-site space.

Directional signage should also be erected to assist with the traffic management of vehicles moving within the confines of the site and separate vehicles from pedestrians and more importantly vulnerable children. The signage will need to address circulation within the property and remove any confusion for visitors. This would be especially important if two accessways are proposed in the final design. Any TKKM signage that may be considered necessary within the site shall be placed well clear of all accessways and parking areas to ensure clear sightlines can be achieved at all times.

7.4.2 Parking Spaces for People with Disabilities

Section 14.1.8.4 of the District Plan also states:

"(3) Parking Spaces for People with Disabilities

Developers, owners or occupiers when constructing carparks, shall make provision for disabled carparks in compliance with Appendix 72 and they shall be clearly marked or signposted as such."

At this preliminary stage and based on the size of the intended TKKM development the proposal would be expected to provide at least two disabled parking spaces. Design and Construction of Parking Areas

Section 26.1.8.5 of the District Plan refers to the design and construction of parking areas.

The parking design will typically be developed using appropriate design standards which will consider the likely vehicular types and demands. All other construction requirements concerning formation, sealing, runoff provision, queuing, lighting, turning space, and pavement markings, as detailed in this section of the District Plan, can also be complied with.

8. Traffic Generation

The trip generation of the development can be separated into two distinct parts; those trips associated with the staff, and those associated with the pick-up and drop-off of the children. For the purposes of this analysis, the two components have been assessed separately.

When fully established, the development is intended to cater for no more than 350 children with at least 120 being anticipated to be enrolled for the first full year (i.e. by the end of 2018). MoE rules stipulate the number of teachers required based on the number and age of the children enrolled at the facility. Accordingly, it is expected that this proposal would require around 36 full-time equivalent staff at times of maximum occupancy.

For the purposes of this assessment, based on maximum occupancy of 350 children, all of these staff are expected to travel to the site by private motor vehicles. It is further conservatively anticipated that at least 30% of the children will arrive at the school by bus and/or a minivan service. These transport options would be able to collect and drop-off children from Hastings and other surrounding communities. The remainder of the children attending the facility are therefore expected to arrive and be collected by parents / caregivers in a private motor car. It is also conservatively estimated that at least 30% of the pupils will have a sibling at the same facility[2]. Based on these assumptions the following traffic movements have been calculated:

- 36 FTE staff generating 72 trips or vehicle movements per day;
- 105 children arriving by bus and / or minivan. This would require 3 bus trips (assuming each bus can carry 35 children each) generating 6 trips; or 14 minivan trips (assuming 15 children per vehicle); and / or a combination of both transport options potentially generating around 20 trips between them; and
- 245 children travelling to and from the site via private motor vehicle. Approximately 74 of these would have siblings and therefore would share a vehicle. The total volume of movements generated by parents / caregivers of these children is estimated to be around 420 trips in the AM and PM peak periods (i.e. 08:00 - 09:00 and 14:45 -15:45 respectively).

Furthermore, previous work carried out by TDG shows that a number of staff members typically arrive early at such a facility to open it prior to children arriving. The remaining staff member(s) generally arrive shortly before the children start arriving. Similarly, at the end of the day, the majority of staff members leave soon after the children leave with a few staff remaining to undertake the final clean-up, administrative duties and to secure the buildings.

For the purposes of this review, a broad evaluation of likely traffic generation has been made on the assumption that the staff and children will follow the above anticipated travel patterns. Additionally, it has been assumed that only one staff member would be required to unlock and lock the facility while the others will arrive and depart in the same time periods as the children.

Based on these anticipated travel requirements, it is conservatively estimated that the proposal could potentially generate around 420 vehicle trips in the peak period.

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[2] *TDG conducted a survey in 2017 at an existing childcare facility in Havelock North and the results revealed that 42% of children have siblings at the same facility*

It is also noted that this estimate has purposely excluded (due to the relatively remote nature of the site) any consideration for children that could travel with their parents / caregivers to the TKKM on foot. Additionally, TDG is also aware that around 8% of the younger pupils (i.e. less than 5 years old) are typically sick or absent on any given day[3].

Nevertheless, these predicted traffic movements are considered to be a good approximation based on the information that has been provided and the expectation that a bus and / or a minivan service will be used to collect a large proportion of the enrolled children.

9. Trip Distribution

The likely distribution of the predicted traffic demands for the morning and afternoon weekday peak periods are illustrated on **Figure 5**. Their distribution has been broadly based on anticipated traffic trips occurring relative to populated areas of Hastings, Havelock North, Flaxmere and their surrounds as summarised below:

1. 70% of all school trips would be generated from areas to the west of the proposed school, i.e. Hastings, Havelock North and Flaxmere areas. The remaining 30% would be generated from areas to the east, i.e. Clive, Haumoana and Napier;

2. From the west, 40% has been assumed to travel using SH2, while 30% would use Pakowhai Road; and

3. From the east, 10% has been assumed to travel using Otene Road (i.e. from Napier and Whakatu) and 20% from Clive/Haumoana using SH2.

It has been assumed that in the AM Peak all parents drop and exit the school within the hour (i.e. a 50:50 directional split). In the afternoon peak however, a 55:45 directional split has been assumed to account for some parents who might park for longer than an hour (e.g. speaking to the teacher or arriving early and waiting for their child to finish school).

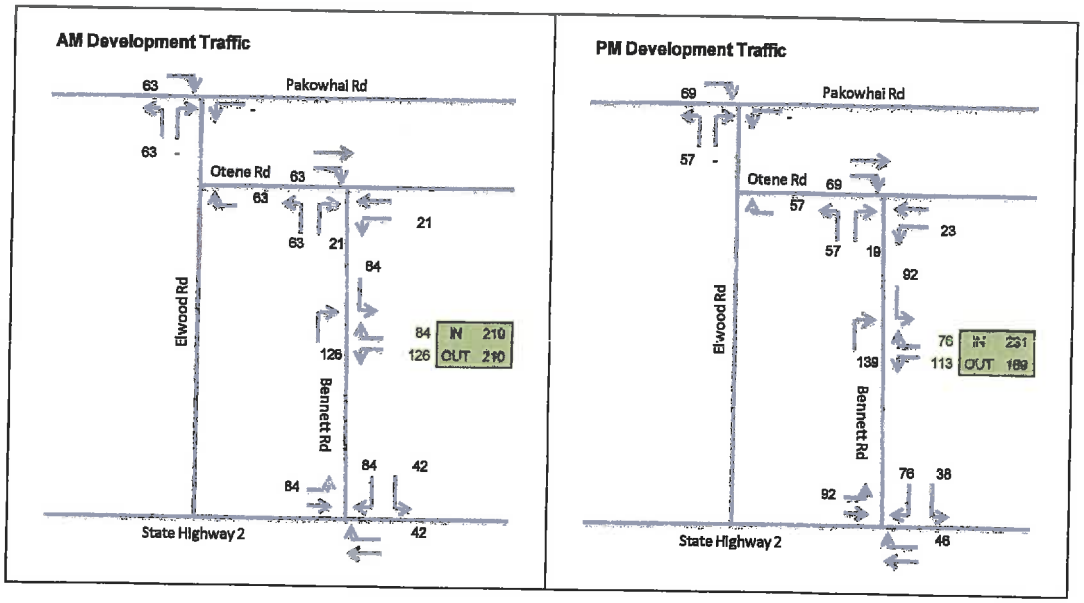

Figure 5: Trip Distribution

[3] *Survey conducted in 2017 for existing facility in Havelock North*

10. Intersection Analysis

Based on the distributions, and noting the quality of the local roading network that is expected to support the estimated flows, the intersections of Bennett Road / Otene Road and Bennett Road / SH2 were analysed for both the existing and future post development scenarios.

10.1 Bennett Road / Otene Road

An analysis of this intersection has confirmed that no improvements are required. The overall performance of the intersection remains at a Level of Service (LOS) A for both the AM and PM peak periods with and without the development in place. The available spare capacity at this intersection therefore remains high.

It is however recommended that some roadmarking and road signage be provided at this intersection to improve safety and visibility.

10.2 Bennett Road / SH2

A review of the predicted traffic volumes that are anticipated to use this intersection (particularly in the morning period) has confirmed that right turning traffic on Bennett Road will be experience substantial delays as the vehicle gaps along SH2 will be few on account of the high volumes. The initial analysis of this intersection is shown in **Figure 6** below and indicates that the LOS for the Bennett Road approach will deteriorate from LOS C to F in the AM peak period once the development becomes fully utilised. Similarly in the PM peak period the LOS decreases from LOS B to C and therefore remains within an acceptable performance.

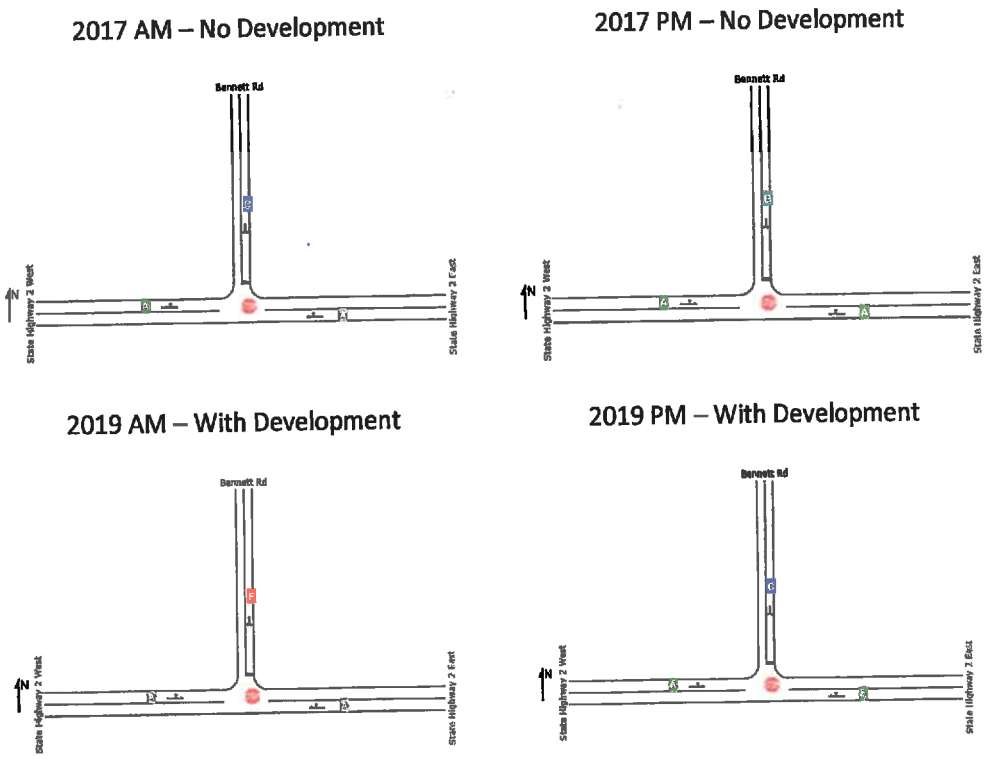

Figure 6: Bennett Road / SH2 Results

Notwithstanding this preliminary finding, it is noted that the intersection treatment at Bennett Road / SH2 may require some additional works to accommodate additional turning and / or queued vehicles. Based on the anticipated vehicle volumes, Section 4.8 of Austroads Guide to Road Design Part 4A confirms that there is a need to provide both an Auxiliary Left and Right Turn Bay and should therefore be considered.

10.3 Intersection Analysis Summary

While it is noted that other alternative access routes are available to the site, it is likely that the anticipated trip distribution for the proposed new school will require some geometric improvements at the Bennett Road / SH2 intersection.

It is also noted that the intersection and road reserve is constrained and that traffic flows along SH2 were consistent throughout any given working day. As such alternative treatments involving a roundabout and / or traffic signals could well prove to cause greater inefficiencies and road safety concerns.

Given the level of these concerns, a more detailed network analysis should be completed once the final details of the proposed development are confirmed. It should be noted that a good quality traffic management plan may alleviate the additional predicted traffic flows at this intersection and that significant geometric improvements might not be necessary.

11. Access and Egress

As has been previously stated, Bennett Road has a 5.5m wide carriageway width at the proposed development site. Given that the development will increase traffic demands on this road it is proposed that this segment of road between SH2 and the site be improved through the provision of suitable roadmarkings. Both centreline and shoulder roadmarkings should be painted in accordance with Council's road design standards.

It is also proposed that the design of property accessway(s) be undertaken in accordance with the Council's design standards. Based on the existing 5.5m sealed carriageway additional seal widening will be required at the proposed accessway(s) in order to provide appropriate turning, passing and manoeuvring space. The design of the accessways and their associated seal widening will also be expected to minimise any effects on the existing road side swales (drains) and access to other properties located opposite the site.

12. Conclusions

This investigation has broadly examined the anticipated traffic impacts related to the proposed new school development relative to the notice of requirements being sought by the MoE. The preliminary findings have indicated that the TKKM is likely to generate a demand in the order of 420 additional vehicle trips during the morning and afternoon peak periods. Generally during these times of day the surrounding road network is expected to experience lower demands than that already accommodated at other peak times. Accordingly, there are neither any apparent or known network capacity issues nor road safety concerns that would necessarily be further exacerbated by the establishment of this proposal over most of the surrounding network. It is however concluded that the Stop controlled intersection treatment at Bennett Road / SH2may experience some capacity difficulties. This will be more prominent during the morning arrival period, when right turning traffic flows entering Bennett Road from SH2 are expected to experience longer delays while they wait for an acceptable gap.

Preliminary investigations have confirmed that vehicle access and servicing arrangements can be designed in a manner that matches the requirements of such a development. This will however require consultation with Council engineers; a further review of the posted speed limit on Bennett Road; and potential mitigation measures to accommodate additional traffic and turning demands at Bennett Road / SH2 intersection.

Parking and associated pedestrian linkages will need to be carefully designed to cater for the expected demand and that no over-spill of parking occurs onto Bennett Road.

Accordingly, this transportation assessment will need to be updated once the final details of the development are confirmed.

In summary, it is concluded that the proposed development can be accommodated in this location. Subject to the implementation of roadmarking improvements along Bennett Road and appropriately managing the likely traffic related effects on the local road network, the proposal is broadly evaluated as being no more than minor.

We trust this initial Transportation Assessment is of sufficient detail to enable your design team to fully appreciate the potential traffic related issues relating to this proposal and are able to proceed in the manner intended. Please contact the undersigned should you require any further details or an explanation of any of the above.

Yours sincerely
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