Taupō Bus Hub Analysis

Taupō District Council

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Quality Assurance Information

Prepared for:	Taupō District Council
Job Number:	TDC - J001
Prepared by:	Matt Allan, Graduate Transportation Engineer
	Stephen Carruthers, Associate Transportation Planner
Reviewed by:	Dave Smith, Technical Director

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T +64 9 486 0898 (Akld)
T +64 3 377 4703 (Chch)
E admin@abley.com

Auckland
Level 8, 57 Fort Street
PO Box 911336
Auckland 1142
New Zealand

Christchurch
Level 1, 137 Victoria Street
PO Box 25350
Christchurch 8144
New Zealand

www.abley.com

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1. Background

Taupō's economy is heavily reliant on the tourist industry. Many tourists travel to and through Taupō by bus, either on scheduled services such as Intercity or as independently chartered tour coaches. The bus hub is the first impression a tourist receives of Taupō. Its connectivity to key locations may determine what a tourist visits and how much they spend in the local economy. A bus hub must also provide for local public transport routes that connect residents to their place of employment, or the town centre for shopping and entertainment.

The current bus hub is on Tongariro Street alongside the I-Site and Superloo in the Tongariro Domain (northbound), and between Heuheu Street and Tuwharetoa Street (southbound), in total providing around 150m of bus parking space. The current arrangement was brought into question through a master planning exercise of the domain where a potential new Civic Administration Building and Museum was mooted. The design considered that the buses along Tongariro Street created severance between the potential development and the town centre, and sparked the concept of moving the bus hub to a new location. This report investigates potential alternative locations for a new bus hub.

2. Objectives

To identify and evaluate potential bus hub locations it is important to have objectives that reflect the key outcomes that are sought by Taupō District Council from a bus hub. The following objectives have been developed based on past reviews and in consultation with Council Officers.

The bus hub objectives are: ***A centrally located bus hub which:***

1) is easily accessible and legible for users

Accessible means that the bus hub is easily able to be used by everyone. This includes providing for all ages, and for people with the full range of walking abilities.

Legible means that the location of the bus hub makes sense, and that people are able to find it with limited knowledge.

2) is well positioned for destinations and bus routes

Many of the people arriving by bus are tourists. It is therefore important that the bus hub is in close proximity to key destinations that encourage visitors to spend time and money in Taupō, and enhances their perception of Taupō.

For public transport routes it is important that the bus hub is reasonably close to centres of employment to encourage public transport use for commuter trips.

The location of the bus hub is important for routing to ensure that bus routes are as direct as possible, and provide for bus routes from the north and south without creating diversions to enable buses to face the right direction.

3) supports the safe and efficient movement of buses and pedestrians

Safety is critical, and there are various interactions that need to be considered. The safety of the bus entering and exiting the bus hub taking into account other traffic. How the bus moves around in the bus hub, and where buses are able to park for longer stays. The safety of the occupants as they exit the bus, gather their luggage and move through the bus hub toward key destinations must also be considered. The wider environment must also be considered including passive surveillance and lighting to ensure that people are safe when waiting for a bus and when they get off the bus.

4) support the movement and place function of its location

This objective seeks to ensure that the bus hub fits with the activity of the proposed location. For example, it would be inappropriate to propose a bus hub on a residential street because the activities conflict with each other and would produce a poor outcome for residents and the people using the bus hub. Similarly, it may be considered inappropriate to be on a major arterial road, as the busy traffic environment may not be a safe or pleasant place for people to get on and off the bus.

3. Information gathering

This analysis has been informed by engagement with bus operators, and an analysis of current and future bus service demand to help identify the requirements for a bus hub.

3.1 Engagement with bus operators

Abley engaged with local bus operators in order to understand the current and future demand of bus facilities in Taupō, and to understand the operator and customer perspectives. The following companies were engaged and provided operational information about the services they provide:

- Intercity Group (NZ) Limited and Skipbus Limited, who run inter city services that operate through or from Taupō as the origin/destination of the route.
- Waipawa Buses, who operate the local public transport services in Taupō.
- Multiple tour operators and coach drivers, who provided information on the coach operations of tourism operators in the area.
- Taupō District Council parking enforcement officers.

The insights gathered from the engagement are:

- Peak time is around 10am, with smaller peaks at 12pm and 5pm.
- Peak demand is three buses in the morning.
- Layover times for tour operators are inconsistent, with the smallest being five minutes and the largest being 90 minutes.
- Drivers have commented that there is not enough footpath space for waiting bus patrons and pedestrians.
- Bus patrons have commented that toilets are not close enough to the current coach stops, and that there is no café in close proximity.

A summary of the relevant information received from this correspondence is found in **Table 3.1**.

Table 3.1 Summary of bus operator engagement

Bus Type	Contact Information	Information received
Public transport	Mandy Chadderton (Waipawa Buses) 07 378 2172 info@Taupōbuses.co.nz	• Multiple bus lengths used • Longest coach is 11 meters • Bus timetables from BusIT, four bus routes (TC, TN, TW and M1), • TC connects Wharewaka to the town centre • TN connects Wairakei to the town centre • TW connects Brentwood to the town centre • M1 connects Mangakino to Taupō
Intercity	09 583 5780 'steved@tranzit.co.nz'	• Pickup/drop off only in Taupō • Goes straight through Taupō if no customers for pickup/drop off • Northbound bus stop is the busiest around 10 - 11am • Loading time of 5 - 10 minutes, longer if connecting bus is late • Complaints about toilets being far away from coach stops and the lack of cafes nearby (but in reality, both are close) • Pedestrian conflicts at the coach stops as there is not enough space for coach patrons to wait for luggage and pedestrians to pass
Skip	09 394 9180 info@skip.travel	• Three services: Wellington to Auckland, Auckland to Wellington and Taupō to Rotorua

		• Wellington and Auckland services have layover time in Taupō of 30 - 35 minutes • Taupō service has roughly 5 - 10 minute layover time in Taupō • Customers use toilets and can get food.
Tour operators	Ultimate New Zealand Kiwi Experience Intrepid Travel (All from coach stop survey)	• Southbound coach stops busiest at 9-10:30am, peak demand is three coaches southbound • Kiwi experience has a 15 – 20 minute layover. Backpackers stay in the hotel around the corner • Intrepid Travel typical layover is 30 minutes, coaches try not to use public transport stop behind the southbound coach stops • Ultimate New Zealand has a large layover of 45 - 60 minutes layover (even 1.5 hours sometimes), will use other side of Tongariro Street if the southbound stops are full
Parking enforcement officers	Face-to-face conversation	• People try to park on the southbound coach parks. We understand from Council officers that this is sometimes the adjacent shop owner

3.2 Bus stop demand analysis

The current and future demand for the bus hub has been assessed to identify the number of bus parking spaces that would be required to futureproof the facility.

Current demand

The current bus stop demand was analysed from the timetables available on the transport operators' websites and from the information received from engagement with the bus operators. From this analysis, the peak current demand was identified for both north and south movements as well as the combined demand.

The coach stop for the north bound bus movements is outside of the Tongariro Street I-site, and the coach stop for the southbound movements is outside Cobb and Co between Heuheu Street and Tuwharetoa Street. These two sites currently operate as an on-street bus hub and experience peak demands at different times. If an off-street bus hub were to be constructed, it would facilitate both north and south bound bus movements and would experience different or more peaks than the current coach stops independently.

From discussions with the transport operators, the bus layover times assumed for this analysis were:

- 2 minutes for public transport,
- 10 minutes for intercity services,
- 30 minutes for tourist operators; and,
- 30 minutes for most Skip services (5 minutes for the Taupō to Rotorua route).

The analysis found that the peak demand of the northbound coach stops is three buses, and this occurs 12 times a week. The peak demand of the southbound coach stops was two buses and it hits that peak 23 times a week. If the current bus timetables remained the same but operated through a shared off-street bus hub, the peak demand would be three buses occurring 20 times a week.

Future demand

The future demand of the bus hub has been estimated based on the following parameters:

- 46 bus services per day - current demand,
- Peak bus stop demand is for three spaces at any one time – this peak occurs three times a day,

- Services mostly operate between 8am and 6pm, the combined peak period is approximately 1 hr – or 10% of the day,
- 5% growth of scheduled bus services[1] per annum - based on Destination Great Lakes Taupō tourist growth projections,
- Forecast year 2029 - 10 years is considered a reasonable period to future proof the facility; and,
- An additional public transport route – based on statements made Waikato Regional Council (WRC) Regional Public Transportation Plan for the year 2018-2028.

The analysis projects an additional 23 scheduled service by 2029, a total future demand of 69. However, this increase in bus services does not necessarily require an equivalent increase in parking space because the bus hub is not at capacity for most of the day. The arrival time of the additional services is likely to be similar to the current demand profile where 10% of services arrive during the peak and will require additional parking space. This equates to an additional three parking spaces above the current peak:

- 23 services x 10% peak period factor = Three additional spaces (rounded up)

The remaining additional services would either lengthen the peak or fall outside of the peak when there is spare capacity.

Off-street bus hub – seven bus park spaces

An off-street facility will likely require a lower number of bus parking spaces than an on-street facility, because north and south bound services have different peaks. This means that the peak demand for parking spaces will not increase, but that the bus hub will be busier throughout the day and the space is better utilised.

The demand for an off-street bus hub has been assessed as seven spaces accounting for:

- current peak demand of three spaces (for scheduled and public transport services),
- three additional spaces for future scheduled services; and,
- one additional space for public transport services.

On-street bus hub – ten bus park spaces

An on-street bus hub that provides for north and south bound services separately will need to provide for their individual peak demand and an overall higher number of parking spaces. An on-street bus hub is expected to require ten park spaces (as currently provided for on Tongariro Street), accounting for:

- current peak demand of three spaces in each direction – total of six spaces (for scheduled and public transport services),
- three additional spaces for future scheduled services; and,
- one additional space for public transport services.

This acknowledges that the peak demand only occurs for a short period of the day. The remainder of the day the space in underutilised. There is an opportunity to better coordinate schedules through engagement with operators to ensure that the bus hub is better utilised throughout the day.

4. Identification of potential sites

A long list of potential bus hub sites has been developed based on the following constraints, opportunities and key attractions.

[1] Engagement with tour operators suggests that non-scheduled services do not regularly conflict with the peak scheduled services

4.1 Constraints

The investigation for potential bus hub sites is limited by several constraints. Understanding these helps to focus the scale of the investigation. Draft constraints were tabled to Council Officers and confirmed at Workshop One. The constraints are as follows:

- Should be within the commercial zone bordered by Lake Terrace, Titiraupenga Street, Spa Road and the Domain.
- Should not be on-street along the key shopping streets; Roberts Street, Tuwharetoa Street, Heuheu Street, Horomatangi Street, Tamamutu Street (between Tongariro Street and Ruapehu Street) and Ruepehu Street itself.
- Should not impede the view of the Lake Taupō, or be along Lake Terrace.

4.2 Opportunities

There were several of opportunities identified at Workshop One that may influence the identification of a bus hub location:

- Council owns several off-street parking sites in the town centre that could be utilised for a bus hub.
- To co-locate with the development of a new Civic Administration Building (if a purpose-built building is developed).
- To utilise or improve the current location on Tongariro Street noting that the potential new arterial route on Titiraupenga Street[2] will likely reduce the traffic flow on Tongariro Street.
- The site may be either on-street or off-street.

4.3 Key attractions

The proximity of the bus hub to key attractions is also an important factor to identify the potential bus hub sites. We have assumed that a bus hub would ideally be within a five-minute walk from key attractions.

The following key attractions have been identified:

- The I-site, public toilets and the Domain
- The restaurant and café area close to the waterfront
- The '#loveTaupō' sign on Lake Terrace

Tourist operators and accommodation would also be considered a key attraction or destination, however, they are spread across the Taupō area and did not assist in the analysis.

4.4 Associated facilities

At the workshop with Council officers we discussed what facilities would be expected at the bus hub. The following facilities were agreed:

- Taxi stands nearby
- Parking for passenger pick up and drop off

[2] Identified in the Commercial and Industrial Structure Plan

- Toilet facilities
- It is expected that ticketing facilities will not be required as these are generally managed online
- Weather protection

It is anticipated that a bus hub would have WiFI, storage lockers and CCTV security at any location.

The current public transport routes were also considered. Currently, three regular services are offered in Taupō with one irregular regional connecting service offered every second Wednesday. A route map of some of these services, and particularly the central town routes, are shown in **Figure 4.1** and the frequency of the routes are described in **Table 4.1**.

Table 4.1 Taupō public transport frequency

Bus Route	Description
Taupō Central (TC)	Connects Taupō town centre to Wharewaka. Five services Monday to Friday and three services on Saturday.
Taupō North (TN)	Connects Wairakei village to the Taupō town centre. Two services Monday to Friday.
Taupō West (TW)	Connects Brentwood to the Taupō town centre. Five services Monday to Friday and three services on Saturday.
Mangakino to Taupō (M1)	A regional bus that operates every second Wednesday

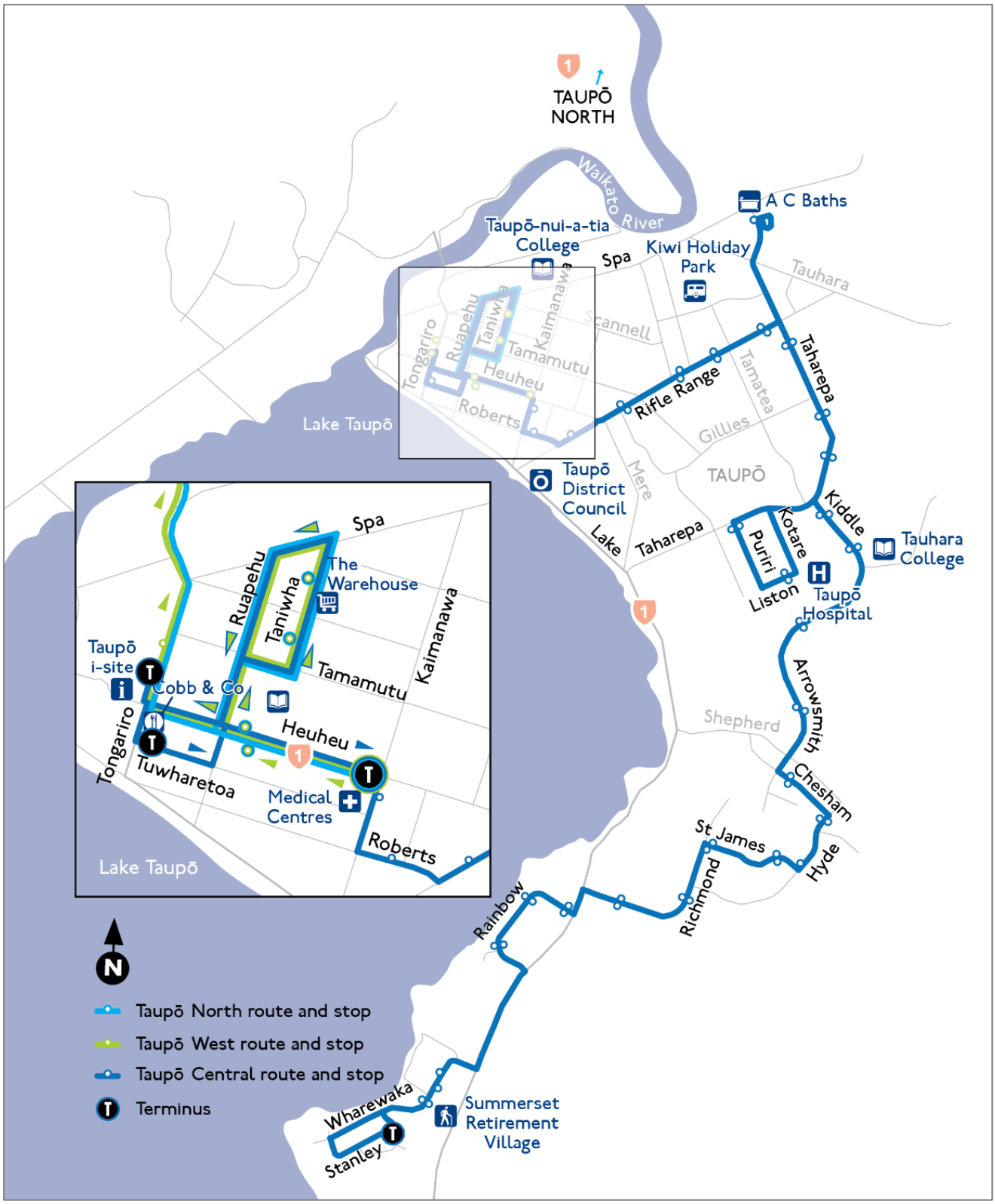

Figure 4.1 Taupō public transport routes

4.5 Long list of potential sites

The constraints, opportunities and key attractions have been mapped to help identify the long list of potential bus hub locations. Through this process, eight possible locations have been identified and mapped in **Figure 4.2**, and listed below:

1. Tongariro Street (the current site)
2. Tuwharetoa Street
3. Redoubt Street
4. Gascoigne Reserve
5. Story Place
6. Tamamutu/Titiraupenga Street
7. Heuheu Street
8. Taniwha Street

The long list of options was issued to the Council project team for feedback, and were further discussed at workshop two. It was requested that Ferry Road and Kaimanawa Road were added to the long list, noting that they did not fully align to the constraints agreed in workshop one.

Figure 4.2 Constraints, opportunities, key attractions and bus hub locations

5. Fatal flaw analysis of the potential sites

The fatal flaw analysis is a high level assessment comparing the eight sites against the objectives discussed in Section 2 to efficiently reduce the number of sites that would be subject to a more detailed assessment against the criteria in Section 6.

Each site is assessed as either having a high, medium or low alignment to each of the objectives or as having a fatal flaw. Any site that has a fatal flaw is immediately removed from further consideration.

Table 5.1 summarises the fatal flaw analysis. The full assessment for each assessment can be found in Appendix A.

Table 5.1 Fatal flaw analysis of potential bus hub locations

Ref	Site	Easily accessible and legible for users	Position for destinations and bus routes	Safe and efficient movement of buses and pedestrians	Support the movement and place function of its location
1	Tongariro Street (current site)				
2	Tuwharetoa Street				
3	Redoubt Street				
4	Gascoigne Reserve				
5	Story Place				
6	Tamamutu/Titiraupenga Street				
7	Heuheu Street				
8	Taniwha Street				
9	Ferry Road				
10	Kaimanawa Road				

Key	Fatal flaw	Low alignment	Medium alignment	High alignment
Score				

The assessment identified a fatal flaw with five sites where it is considered of little value to undertake a more detailed assessment. The following sites are recommended for consideration by the Council to be included as part of the shortlist for detailed assessment:

- Tongariro Street (maintain/improve the current location),
- Tuwharetoa Street (as part of a Central Administration Building development),
- Story Place; and,
- Heuheu Street.

6. Council workshop on the shortlist

The recommended shortlist of bus hub locations was presented to Taupo District Councillors for their consideration. The Councillors agreed to remove Story Place from the shortlist and add in the site of the current St John Ambulance depot on Paora Hapi Street.

The Story Place option was removed as its location did not align with the place and function of the area. The Councillors did not believe there was enough space for the required number of buses, and it didn't fit the councillor's long-term vision of the area. The Paora Hapi Street option was added to the shortlist as the Councillors were aware that St Johns plan to discontinue use of the site. The Councillors noted however that they were not interested in the bus hub taking up too much green space from Gascoigne Street Reserve. It should be noted that the Paora Hapi Street option is a variation on the previous fatal flaw assessment of the Gascoigne Street Reserve, with much of this assessment still relevant to the proposed Paora Hapi Street option. The other three recommended options were retained for assessment in the shortlist.

Since the development of the recommended shortlist, Council agreed its position on the Central Administration Building confirming that it will be located on the Tuwharetoa Street carpark site, and remain open to the option of a co-located bus hub.

The agreed shortlist following Councillor consultation is:

- Tongariro Street (maintain/improve the current location),
- Tuwharetoa Street (as part of the Central Administration Building development),
- Paora Hapi Street; and,
- Heuheu Street.

7. Assessment of the short list

The short list of bus hub locations was assessed against a more detailed assessment to identify the final recommended location. A high-level concept was developed for each site to understand how the site would operate and to enable the detailed assessment. It is noted that this is not detailed design, and the concept design may change following further design. **Table 7.1** contains the assessment criteria for the detailed assessment. The bus hub location assessment for each site on the shortlist, and a high-level concept design for the bus hub, can be found in Appendix B.

Table 7.1 Detailed assessment criteria

Assessment Criteria	Reason
Operations	
1. Bus hub supports service reliability and direct routing	To avoid buses having to take significant route deviations or go around the block to be on correct side of street. Further assessment given to potential route options.
2. Bus hub must efficiently operate within the transport network	The implication on adjacent streets and intersections is to be assessed from an efficiency point of view for the operation of the bus hub, but also the rest of the transport network.
3. Can cater for existing / future demand	The bus hub will need to cater for current and future demand, up to seven bus parking spaces for off-street, and ten spaces for on-street facilities. Flexibility for additional future growth will also be considered (how easy a site can be extended).
4. Bus manoeuvres must be able to be made	Buses must be able to enter and exit with a reasonable number of turning movements. Off-street facilities will need to provide for buses from the north and south and must allow for buses to enter and exit the site in a forward-facing direction, and with minimal on-site turning manoeuvres. On-street facilities need to

	provide for both directions and have minimal interaction with passing traffic or other modes.
Safety	
5. Bus hub must provide for safe movements of buses and people	A detailed safety assessment is to be undertaken to identify any risks with the proposed site, including potential entry and exit locations, nearby intersections and for all people in the vicinity of the site. This will include assessment of the historic crash record in the area.
6. Alignment with CPTED[3] principles	Assessment of the proposed sites against CPTED principles, such as providing lighting and passive surveillance.
Road environment and accessibility	
7. The road environment (speed, geometry, gradient, distance to intersections) is suitable	Should avoid locating bus hubs on steep streets, on streets where the road features are not amenable and too close to busy intersections (as queuing can impact bus reliability).
8. Minimises impact on receiving environment: including land purchase, parking demand, impact on motor vehicle traffic	Minimise cost / land purchase, impact on parking and other road users. Further considerations will be given to the trade-offs for each of the proposed sites. Environmental impacts such as noise, vibration and exhaust fumes from buses will be considered.
9. Good pedestrian access	Easy to get to the bus hub from all directions. Assessment of existing pedestrian crossing facilities or whether it is feasible to upgrade/construct new facilities.
Facilities	
10. Assessment of existing facilities, and assessment of capability/capacity of providing new facilities	The ideal location will have parking and taxi zones nearby for transferring passengers. Ideally have nearby bathroom facilities. Provides good weather protection. Provides enough space for unloading buses, passengers and other people moving through the area. A bus hub is expected to have Wifi, storage lockers and CCTV.

The shortlist of bus hub locations was assessed against the assessment criteria with an alignment score of 1-5. An explanation of the alignment scores is as follows:

- 1 – Very poor alignment: this would require substantial investment in order to improve the site to an acceptable level.
- 2 – Poor alignment: this would require investment in order to improve the site to an acceptable level.
- 3 – Acceptable alignment: the proposed site is acceptable but may require investment to provide a higher level of service.
- 4 – Good alignment: the proposed site has a good alignment, with only some room for improvement.
- 5 - Very good alignment: there is little room for improvement for this site in terms of these criteria.

[3] Crime Prevention Through Environmental Design

8. Summary of the shortlist assessment

The shortlisted sites were assessed against the criteria outlined in **Table 7.1** with an alignment score of 1 - 5. The results of this assessment are summarised in **Table 8.1,** and the full assessments are found in Appendix B. The highest potential score is out of 50, with a possible score of 5 for each of the 10 criteria. All results are presented as percentages. The criteria groups, such as 'operations' and 'safety', were all equally weighted. This recognises that the criteria groups have varying numbers of criteria which may bias the results.

Table 8.1 Shortlist assessment results

Option	Operations	Safety	Road environment and accessibility	Facilities	Total (average)
Paora Hapi Street	50%	40%	53%	40%	**46%**
Tongariro Street	75%	50%	80%	60%	**66%**
Heuheu Street	85%	40%	67%	60%	**63%**
Tuwharetoa Street	70%	90%	53%	60%	**68%**

Table 8.1 shows that Heuheu Street, Tongariro Street and Tuwharetoa Street all scored very similar results with Paora Hapi Street scoring much lower than the other sites. While the top three sites had a very similar score, there were notable characteristics at each of the sites, these are summarised below.

Paora Hapi Street

The Paora Hapi Street option has very poor alignment with the assessment criteria in the facilities and safety criteria, and acceptable alignment with the operations and the road environment and accessibility criteria. It is unlikely that a bus hub in this location would be successful and would likely have significant road safety risks.

Tongariro Street

The existing facilities on Tongariro Street have an average alignment with the facilities criteria, and good alignment with each of the other criteria. It is noted that the site would require some investment to improve pedestrian amenity and provide additional southbound stops to accommodate future demand. The obvious benefit is that it is the existing site and requires only minimal investment to improve the level of service.

Heuheu Street

The Heuheu Street option has poor alignment with the safety criteria due to the existing poor crash record, but has good alignment with each of the other criteria. The safety failures are at the Heuheu Street and Titiraupenga Street intersection which has a high number of crashes as result of a failure to give way at the intersection. This intersection would likely require road safety interventions to ensure safe operation of a bus hub facility at this site.

Tuwharetoa Street

The Tuwharetoa Street option has acceptable alignment with the road environment and accessibility criteria and good alignment with all other criteria. For a bus hub facility to be successful at this site, improved pedestrian amenity would be required on both Roberts and Tuwharetoa Street. It should also be noted that this site does not support direct bus routing currently, but if arterial traffic is rerouted to Titiraupenga Street direct routing would be possible.

Sensitivity testing

The assessment resulted in three of the four sites receiving a very similar overall score. This result does not provide clear direction for decision making, aside from the Paora Hapi Street site producing poor alignment with the assessment criteria.

As a sensitivity test, **Table 8.2** contains adjusted weighting percentages. This has assessed the operations and safety criteria groups as 35% each. This reflects that the site must be able to operate efficiently and safely. The road environment and accessibility criteria are considered slightly less important with 20% of the weighting. The facilities criteria were weighted the lowest with 10% as the facilities can most easily be improved at all sites.

Table 8.2 Shortlist assessment sensitivity test

Option	Operations	Safety	Road environment and accessibility	Facilities	Total
Weighting	35%	35%	20%	10%	**100%**
Paora Hapi Street	50%	40%	53%	40%	**46%**
Tongariro Street	75%	50%	80%	60%	**66%**
Heuheu Street	85%	40%	67%	60%	**63%**
Tuwharetoa Street	70%	90%	53%	60%	**73%**

The sensitivity test did not lower the score of the Paora Hapi Street, Heuheu Street and Tongariro Street sites. Tuwharetoa Street was the only site to increase its total, with a 5% increase when weighted. The sensitivity test has shown that the weighting of the criteria groups has a relatively low impact on the scores, however, the Tuwharetoa Street site achieves the highest alignment with the criteria when the sensitivity test is applied.

Appendix A
Fatal flaw assessment

1. Tongariro Street[4]

Description of the site	Tongariro Street is the busiest arterial street in Taupō. It is a high activity road, with the domain on one side and retail and business activities on the other. The bus stops are currently on-street outside of the I-site and the restaurant Cobb and Co for north and south bound routes respectively.	
Displaced activity	No change to the northbound bus stop would be expected as it is rarely at capacity. The southbound coach stop would need expansion to three stops to provide for future demand, which would displace some on-street parking. There is a big positive that this is the existing site, and would have minimal effects (and minimal opposition). If the bus hub was moved it is likely that the space would be used for general traffic parking. Parking surveys show that there is currently little demand for the existing car parks on Tongariro Street, so there may be little benefit in providing more.	
Facilities	Improved pedestrian amenity would be required, such as a reduction in traffic volumes (which would be achieve through the proposed arterial on Titiraupenga Street), improved pedestrian crossings, wider footpaths, and extra weather protection for waiting passengers. There are already public toilets, food outlets, taxi and general parking nearby.	
Cost	Cost would be low as this is the current bus hub facility. Any expenditure would be to improve the level of service, and to provide for future demand (for southbound routes).	
Accessible and legible	There are complaints about footpath widths and conflicts between PT/coach users unloading on the footpath and passing by pedestrians. Additionally, Tongariro Street is currently a high-volume road that does not favour pedestrians (but this may change in the future). Besides this it is a central location that is very accessible and legible.	
Destinations and bus routes	The location is well located with connection a to the domain and within walking distance of popular restaurants and retail activities. It also is currently integrated into all PT routes and is the main bus hub in Taupō.	
Safe and efficient	As a very visible bus hub, and close to the I-site, bus patrons have increased security and would feel comfortable using this facility. However, Tongariro Street is a high-volume arterial which poses some pedestrian safety issues getting to and from the site. These may be able to be addressed at relatively low cost.	
Movement and place function	There are concerns that the current facilities cause severance between the town centre and the domain, however, as a main arterial a bus facility here aligns with the current movement function. It is also noted that the function may change over time when Titiraupenga Street becomes an arterial. Some buses circulate around the Domain to ensure they face the right direction at the bus stop.	

[4] Not rated as it is the existing site

2. Tuwharetoa Street

Description of the site	The Tuwharetoa Street site is a publicly owned car parking lot that is adjacent to McDonalds and Burger King close to the lake front. Other activities close to the site are a petrol service station, as well as a range of commercial and retail activities. The site is currently proposed as a potential location for the new Civic Administration Building (CAB). The bus hub would be designed to integrate with the development as an off-street facility if it was to go ahead.	
Displaced activity	The proposed CAB would displace the large amount of free all-day parking on the site. It is understood that some parking may be provided as part of the development, but for staff parking rather than public parking. However, the bus hub concept may conflict with that intent. Access to the site may also have a minor impact on on-street parking.	
Facilities	The site has average pedestrian facilities and connections due to the large amount of accesses and on-street parking on Tuwharetoa Street. There are no public toilet facilities (but may be provided as part of CAB), although there is an abundance of café /food and beverage activities close by.	
Cost	Cost would be high as this site would require an off-street bus hub facility with some additional facilities, and may require an additional level for the development of the CAB, if it were to be on the ground floor.	
Accessible and legible	Access to and from Tuwharetoa Street is controlled by priority intersections at Ruapehu Street and Titiraupenga Street. At both intersections, Tuwharetoa Street does not have priority. Tuwharetoa Street is accessible by large vehicles and access is off two higher volume roads. Some changes to these intersections may be required. Legibility is good being relatively central and close to the waterfront and café/retail areas.	
Destinations and bus routes	Tuwharetoa Street is within a short walk of most popular attractions and activities. Additionally, it is located close to the restaurant area and fast food businesses. Tuwharetoa Street is not currently on any of the bus routes, though these do travel parallel to this site on Heuheu Street.	
Safe and efficient	Tuwharetoa is a reasonably busy street being in the town centre and close to the waterfront. The street has some street lighting, but it is not overly comprehensive. It is unlikely that there would be security concerns for a bus hub facility in this area. Due to the large volume of on-street parking, there may be some safety concerns as conflicts between vehicles manoeuvring into parking spaces may increase if buses use this street. This may also be an issue for pedestrians.	
Movement and place function	The site is located close to popular attractions and activities and is very centrally located. Currently the site is used for vehicle parking, so a bus hub facility would not be out of character for this area.	

3. Redoubt Street

Description of the site	Redoubt Street is at the north-west corner of the town centre and cuts through the Domain. There is relatively low activity along the street aside from providing access to recreational areas. The bus hub would be on-street.	
Displaced activity	There is relatively low activity along Redoubt Street. There are not expected to be major effects from displaced activities. The exception to this is the Saturday market, and the loss of some on-street parking. However, parking demand is relatively low in this area.	
Facilities	Improved footpath connections would be required, along with a new weather protection shelter. There is space for nearby taxi stands and parking. There are public toilets, but they may need to be upgraded. However, there is plenty of space to provide for new facilities.	
Cost	Costs would be moderate - low to provide the additional facilities. It is not expected that any major infrastructure improvements to the road are required. Costs would be incurred from providing the supporting facilities.	
Accessible and legible	There are currently relatively poor footpath connections that may be difficult for some users. The area does not feel connected to the town centre and has no attraction itself, and therefore has poor legibility and access.	
Destinations and bus routes	The location is relatively distant from key attractions such as the waterfront and restaurant area. There is no right turn access into Redoubt Street from the north, buses would have to use the already busy Spa Road/Tongariro St roundabout to enter Redoubt Street. Traffic is unable to exit Redoubt Street to the south, and will result in buses using Ferry Road which will have a negative effect on the area adjacent to the river where there are many tourists.	
Safe and efficient	There are safety concerns with the access for buses and also for pedestrians getting to and from the site. There is also little passive surveillance and may be uncomfortable for people waiting for buses in the dark. We also expect negative efficiency impacts from extra buses circulating the Tongariro Street/Spa Road roundabout.	
Movement and place function	As there is little activity along the street there would be relatively low impact on the place function of the street, although it may have some impact on the Domain.	

4. Gascoigne Reserve

Description of the site	Gascoigne Reserve is a green space adjacent to the Countdown on Tongariro Street. It is bordered by Spa Road, Gascogne Street, Paora Hapi Street and Ruapehu Street. Activities on the reserve currently are St Johns and a cemetery. Activities surrounding the site are a bakery, a Repco and substantial on-street parking. Spa Road and Ruapehu Street carry very high traffic volumes. The bus hub would be an off-street facility.	
Displaced activity	An off-street bus hub facility at the site should be able to function without impeding on the other activities on the site. A small amount of on-street parking may need to be displaced to allow bus access to the site. However, the loss of green space for a bus hub is likely to be considered a poor outcome, and also being located close to a cemetery.	
Facilities	Current pedestrian amenity is high and there is a cycle lane on Spa Road next to the reserve. A pedestrian crossing across Spa Road would improve this further, as Spa Road has high traffic volumes. However, this would have an efficiency impact for general traffic on Spa Road. The location is well-served by retail activities although there are no public toilets in the area, which would need to be provided along with weather protection waiting facilities.	
Cost	Cost would be high as this site would require a new off-street bus hub facility with additional weather protection and toilet facilities.	
Accessible and legible	Access to Spa Road is controlled by a roundabout on Tongariro Street and priority-controlled from other streets in which Spa Road has priority. No on-street parking is provided on Spa Road so an off-street bus facility would be very accessible and unlikely to result in vehicle conflicts. The site has good pedestrian connectivity and can be considered to provide good accessibility. The site is at the northern end of the town centre adjacent to the industrial/big box retail area and is not necessarily an obvious location for a bus hub. It is also some distance away from key attractions. It therefore has poor legibility.	
Destinations and bus routes	The location is not very central and is not close to any of the popular attractions. The facility is well serviced by retail activities such as Pak ‘n Save and countdown. All three regular bus routes run down Spa Road but turn down Ruapehu before passing the reserve.	
Safe and efficient	The site borders a high-volume road (Spa Road) which would make it very visible, it is unlikely that personal safety would be of concern at this site, especially considering its proximity to St Johns. There are multiple intersections in close proximity to this site which may impact the safety of pedestrians and vehicles in the area. There may also be significant efficiency impacts with buses manoeuvring in this area. We would recommend bus access from either Paora Hapi Street or Ruapehu Street.	
Movement and place function	The location is surrounded by retail and commercial activity and is in an area with slightly less on-street parking than other parts of town. However, as it is not located close to any attractions or popular activities it is unlikely to be as successful as a coach bus hub. Removing the green space and proximity to the cemetery is also considered to be a negative place outcome.	

5. Story Place

Description of the site	Story Place is a collector road off Tongariro Street that services a range of recreational activities such as the Taupō Museum, the Domain and the Taupō library, as well as the courthouse, I-site and Great Lake Centre. Story Place has a range of on and off-street parking spaces that service these activities. Parking spaces at the Tongariro Street end are short term, and further towards Redoubt Street parking has no time restrictions. There is currently a bus stop for two buses on Story Place.	
Displaced activity	An off-street bus hub facility at the site would displace the current off-street parking and coach stops that service the north domain. It may also require some of the green space for the supporting facilities.	
Facilities	Current pedestrian amenity is reasonably high as Story Place serves as an access to the North Domain. Some additional pedestrian priority measures would need to be introduced such as increased footpath widths and pedestrian crossings to further support this. Additional weather protection would be required. There are already good public toilet facilities.	
Cost	Cost would be moderate as this site would require alterations to the existing off-street parking and improved weather protection and waiting facilities.	
Accessible and legible	Access to Story Place is controlled by a signalised intersection with Tongariro Street. The current off-street parking is serviceable by coaches, so it is proven to be accessible by larger vehicles. Vehicles entering Story Place could either exit via the Tongariro intersection or the Redoubt Street intersection. The location has good legibility due to its central location.	
Destinations and bus routes	The locations are reasonably central and within an appropriate distance to popular attractions and activities. Current bus routes turn right onto Tongariro Street at the Tongariro/Story Place/Heuheu intersection. All three routes pass close to the Story Place site.	
Safe and efficient	The location is not very visible nor well-lit which is a security issue and may not be attractive to users. The Story Place site may be safer than the Tongariro Street site as it reduces potential bus and vehicle conflicts and the site is serviced from a lower volume road, although there are potential conflicts with parking cars and pedestrians through the Doman. The site would result in more cross movements through the signalised intersection which may impact on the efficiency of the intersection.	
Movement and place function	The site location is surrounded by recreational, tourism and public service activities and would therefore be appropriate for a bus hub that services both coaches and public transport. However, there will be an impact on the place function by the presence of more buses in the Domain area.	

6. Tamamutu Street / Titiraupenga Street

Description of the site	The Tamamutu Street/Titiraupenga Street site is located adjacent to the Taupō Primary school and is located east of the town centre. It is close to various retail and commercial activities.	
Displaced activity	An off-street bus hub facility at the site wouldn't displace any current activity on the site but would likely displace five established on-street parks and a stretch of unmarked on-street parking.	
Facilities	Current pedestrian amenity is moderate though no pedestrian priority is provided at the intersection of Tamamutu Street and Titiraupenga Street. There are no facilities such as toilets or cafes that would support a bus hub site.	
Cost	Cost would be high as this site would require a new off-street bus hub facility and all additional facilities.	
Accessible and legible	The intersection of Tamamutu Street and Titiraupenga Street is priority controlled with Tamamutu street having priority. The Tamamutu Street site would have lower vehicle movements when compared to other sites in the vicinity and would therefore be unlikely to have access issues. On-street parking would need to be removed on both streets around the site for this to operate effectively. The legibility of the site is low given its location on the edge of the central area.	
Destinations and bus routes	The site is not centrally located and not within walking distance to any popular activities and attractions. Currently all three bus services run down Tamamutu road and turn onto Titiraupenga Street, so they are all close to the proposed site. School routes would be well serviced by this site due its proximity to the primary school.	
Safe and efficient	The site is reasonably visible being next the primary school and close to retail and commercial activities so personal security is unlikely to be a concern. The sites proximity to the intersection may result in unnecessary vehicle conflicts which may affect the site's safety. There is also a potential conflict with a high number of pedestrians in the area going to and from the school. The efficiency impact would currently be low, however, that may change when the route becomes an arterial.	
Movement and place function	The site is surrounded by education, residential, retail and commercial activities with low density land use. Though some of these activities would benefit from a bus hub facility, a bus facility in this location would be out of character for the location. A bus hub in this location may also create severance between the residential areas on the commercial area.	

7. Heuheu Street

Description of the site	The Heuheu Street site is a council owned parking lot and is very centrally located. It is opposite Work and Income, a backpackers, and a variety of retail and commercial activities. The parking lot is between two petrol service stations.	
Displaced activity	An off-street bus hub facility would displace a large amount of on-street and off-street parking.	
Facilities	The site is currently serviced by on-street bicycle lanes and reasonably wide footpaths for pedestrians. With service stations either side of the site the bus facility would be well serviced, though public toilet facilities and weather protection would need to be provided.	
Cost	Cost would be medium - high as this site would require an off-street bus hub facility with some additional facilities.	
Accessible and legible	Access to and from Heuheu Street is controlled by a roundabout on Ruapehu Street and a priority intersection with Titiraupenga Street. Currently, Heuheu Street has angled on-street parking on both sides of the street which would need to be displaced/reduced for an effective off-street bus hub facility. The central location provides for very good legibility for users of the facility.	
Destinations and bus routes	The Heuheu Street site is very central and currently has all three public transport routes go down the street, with on-street bus stops on either side of the road. The site is slightly more than a five minute walk from all attractions. However, the site is well serviced by retail activities such as service stations and cafes.	
Safe and efficient	Heuheu Street is a reasonably busy road in the central city with a large amount of on-street parking. As it is very central it is highly visible and is well lit, personal security is unlikely to be a problem. There are few accesses off Heuheu Street but as there is a lot of on-street parking, a lot of vehicle manoeuvres can be expected. This is likely to pose some pedestrian and road user safety issues.	
Movement and place function	The site is located in an area adjacent to two petrol service stations, as well as commercial and retail activities. Additionally, it is well situated for popular attractions and activities. An off-street bus hub at this location would fit in with the character of this street as well as its movement and place function.	

8. Taniwha Street

Description of the site	The Taniwha Street site is a publicly owned parking lot located slightly north of the town centre. Adjacent to the parking lot is The Warehouse which also has an access onto Taniwha Street. Other activities close to this site are a Rebel Sport, a backpackers and Pak'N Save.
Displaced activity	An off-street bus hub facility would displace on-street and off-street parking.
Facilities	The site is not well served by pedestrian facilities, as there is a large number of accesses and on-street parking on Taniwha Street. There are no public toilet facilities and few café /food and beverage activities close.
Cost	Cost would be medium - high as this site would require an off-street bus hub facility with some additional facilities.
Accessible and legible	Access to and from Taniwha Street is controlled by priority intersections at Spa Road and Paora Hapi Street. For both intersections, Taniwha Street does not have priority. Buses travelling from Taniwha Street would therefore not have priority when exiting that street. Legibility is low given its location at the northern end of the town centre.
Destinations and bus routes	Taniwha Street is not currently on any of the bus routes, though these do travel close to this site on Spa Road. The Taniwha Street site is not very central and is not within a five-minute walk of any attraction or activity.
Safe and efficient	Taniwha Street is not a very busy street. There would be some security concerns with this site as is not overly visible. Additionally, there is likely to be some safety concerns with this site as it has an adjacent access to The Warehouse on the street, as well as a large number of parking spaces. This is likely to result in vehicle and pedestrian conflicts.
Movement and place function	The site is located in an area with a lot of large retail activities such as The Warehouse and Pak'N Save. Though it is in the retail expansion precinct, it is not well connected to popular attractions and activities. A bus-hub facility at this location would be somewhat out of character for the rest of the road.

9. Ferry Road

Description of the site	Ferry Road is located south of the Tongariro Street Domain and it connects with Redoubt Street and intersects with Lake Terrace and Tongariro Street. Surrounding activities include those within the domain and the Lake Taupō Marina.	
Displaced activity	An on-street or off-street bus hub are both possible on this site, though either option is likely to displace some parking spaces on Ferry Road.	
Facilities	Current pedestrian amenity is high with pedestrian facilities on both sides of the road. The established crossing across Ferry Road at the Lake Terrace and Tongariro Street gives no priority for pedestrians to access the restaurant district. The location has no nearby toilet or retail facilities.	
Cost	Cost would be high as this site would require an off-street bus hub facility with some additional facilities.	
Accessible and legible	Access to Ferry road for Northbound buses would be from Lake Terrace, buses turning in can travel down Redoubt Street and exit onto SH1 to continue North. Southbound vehicles would enter from Tongariro Street and can exit southbound onto Tongariro Street from Spa Road. The intersection of Ferry Road and Tongariro/Lake Terrace is a priority intersection and the Tongariro street and Spar Road intersections are signal controlled	
Destinations and bus routes	The location is not very central though it is within 5 minutes' walk of some attractions. The facility is not well served by retail activities or toilet facilities and has no bus routes that travel down Ferry Road.	
Safe and efficient	The site is off a large volume road in Tongariro Street, though Ferry Road is relatively low volume. Pedestrian amenity is relatively high and access to and from the site is efficient. A drawback of this site is the lack of facilities around it, meaning there may be pedestrian safety concerns as it is quite segregated from the rest of the Taupō Town Centre.	
Movement and place function	The sites location is surrounded by recreational activities and is relatively close to the town centre. A bus hub facility would not be out of place in this area though its displacement from the town centre is a drawback. However, the site does impact on the amenity of both the waterfront and the domain. The presence of buses waiting in this area would significantly detract from the place function, and does not align with the desire to have no buses on the waterfront. Furthermore, this area is very busy during the summer months with the boat ramp nearby, and high number of tourists in this area.	

10. Kaimanawa Street

Description of the site	The Kaimanawa Street is located to the east of the Taupō Town Centre and would be located on the Kaimanawa Reserve. Adjacent activities include the cricket fields on Kaimanawa Reserve, a rest home, hotels and the Taupō Fire Station.	
Displaced activity	An off-street bus facility would likely reduce some on-street parking, take away space from the Kaimanawa Reserve and infringe on the cricket field on the Kaimanawa Reserve.	
Facilities	Current pedestrian amenity is low, with no pedestrian footpaths on the Kaimanawa reserve frontage to Kaimanawa Street or Roberts Street. There are some toilet facilities to the south of the reserve used by the cricket pitch, though these are some distance from the intersection of Kaimanawa Street and Roberts Street. There are no retail activities close to this site.	
Cost	Cost would be high as this site would require an off-street bus hub facility with some additional facilities.	
Accessible and legible	Access to the site would be from Kaimanawa Street or Roberts Street, which both intersect each other. Kaimanawa Street has priority.	
Destinations and bus routes	The location is not within 5-minutes walk of any attraction and is not serviced by any facilities. Currently the site would be serviced by the Taupō Central route and is reasonably close to the terminus of the other two PT routes.	
Safe and efficient	The site is adjacent to moderate volume roads on either side. Pedestrian amenity in its current form is low and lighting is poor. We would expect there to be safety issues arising from pedestrian conflicts with bus movements from this site. Additionally, the site is not close to the town centre and safety concerns would arise in terms of pedestrian security.	
Movement and place function	The sites location is surrounded by residential/accommodation activities and some community service activities. A bus hub in the area would be out of place in this area and is not well serviced by any attractions in Taupō.	

Appendix B
Short list assessments

1. Paora Hapi Street

Assessment Criteria	Description
Description of site	Gascoigne Reserve is a green space adjacent to the Countdown on Tongariro Street. It is bordered by Spa Road, Gascoigne Street, Paora Hapi Street and Ruapehu Street. Activities on the reserve currently are St Johns and a cemetery. Activities surrounding the site are a bakery, a Repco, countdown and substantial on-street parking. Spa Road and Ruapehu Street carry very high traffic volumes. The bus hub would be an off-street facility at the current St Johns Ambulance depot.
Displaced activity	An off-street bus hub facility at this site would be replacing the existing St Johns building on the reserve. A small amount of on-street parking may need to be displaced to allow bus access to the site. Additional green space may be required to convert this site into an off-street bus hub.

Assessment Criteria	Description	Level of Alignment (1-5)
Operations		
1. Bus hub supports service reliability and direct routing	The site is located between two priority intersections with Ruapehu/Paora Hapi Street and Gascoigne/Paora Hapi Street. At both intersections, vehicles leaving Paora Hapi Street do not have priority. Due to the site's location on the Ruapehu Street/Paora Hapi Street intersection, direct routing would not be possible as vehicles would need to enter the site from Paora Hapi Street and leave from Ruapehu Street. The site is located close to existing coach routes but is not in the vicinity of any PT routes, which would also need to rerouted to use this facility.	2
2. Bus hub must efficiently operate within the transport network	The current road layout would struggle to accommodate turning bus movements without resulting in vehicles queuing behind the bus. This is because of the provision of on-street angled parking restricting vehicles from passing turning buses. Any vehicle queuing that occurs at this site is likely to substantially affect the efficient operation of the transport network, with vehicle queuing likely to extend into the Ruapehu Street intersection. Due to the provision of on-street parking and the sites proximity to the Ruapehu Street intersection. This would require a reduction in on street parking on Paora Hapi Street.	2
3. Can cater for existing / future demand	The Paora Hapi site can accommodate the required 7 bus spaces but due to its geometry it cannot accommodate internal circulation of bus movements. To provide better bus circulation the site would need to be extended, which would require green space. This is an undesirable outcome as the site is on the Gascoigne Reserve land and further development is likely to be restricted.	3
4. Bus manoeuvres must be able to be made	The road layout of the section of Paora Hapi Street between Ruapehu and Gascoigne Streets would need to be changed to safely accommodate bus movements into and from the off-street bus hub. Bus movements would likely enter from Paoro Hapi Street and leave from Ruapehu Street due to the proximity of the site to the Ruapehu/Paoro Hapi intersection.	3
Safety		
5. Bus hub must provide for safe movements of buses and people	Due to its location on Gascoigne reserve, pedestrian amenity is relatively high, with footpaths and pedestrian refuge island adjacent to the site. A crash analysis was undertaken with CAS and identified three crashes in the	2

	vicinity of the site in the last five years. All three crashes were on the Paora Hapi and Ruapehu Street intersection. All crashes were the result of vehicles failing to give way when crossing into the intersection from the eastern side of Paora Hapi Street. This outlines the potential of an existing traffic safety issue with this intersection, which may be exacerbated by increased vehicle movements from this site. When the crash analysis is extended to include the Ruapehu Street and Gascoigne Street intersections with Spa Road, the number of crashes increases to 20. The majority of crashes occurring at the Gascoigne/Spa Road intersection, with the main crash type being failure to give way at the intersection. As both these intersections would be expected to accommodate bus movements to and from the site, it is likely that increased bus movements may worsen the current safety issues at these intersections.	
6. Alignment with CPTED[5] principles	Gascoigne Reserve is currently poorly lit and would require increased lighting to make the site more visible. Though the site is still in the town centre it isn't in the busiest section and would require some additional surveillance to align with CPTED principles.	2
Road environment and accessibility		
7. The road environment (speed, geometry, gradient, distance to intersections) is suitable	The road carriageway is currently very large, being able to accommodate high vehicle speeds which might pose a safety issue for the bus hub facility. Additionally, the site is located very close to the intersection of Paora Hapi and Ruapehu Street. As a result, queuing onto this intersection due to turning bus movements would need to be mitigated through road layout redesign and bus routing.	2
8. Minimises impact on receiving environment: including land purchase, parking demand, impact on motor vehicle traffic	The Council has identified this site with St John soon leaving the premises. The site would require very little land cost and would have low impact on current parking provision. There may be issue with this site taking potential green space if an increased site area is required. The effects of noise and vibration of this site are unlikely to be significant as the site isn't centrally located.	4
9. Good pedestrian access	Pedestrian access is moderate at this site, though there is no pedestrian priority for crossing at any of the roads and only one pedestrian shelter at the intersection of Paora Hapi Street and Ruapehu Street. As bus patrons would be expected to want to walk into the centre of town from this site, pedestrian access would need to be improved in the vicinity.	2
Facilities		
10. Assessment of existing facilities, and assessment of capability/capacity of providing new facilities	Currently no facilities exist at this location, besides a small coffee stall on the eastern side of Ruapehu Street, that would be supportive of an off-street bus hub facility. Facilities such as toilets, cafes, wifi, storage and CCTV would need to be provided for this site to be attractive to bus patrons.	2
	Total score (out of 50)	24

[5] Crime Prevention Through Environmental Design

J:\Taupo District Council (TPDC)\TPDC-J001 Taupo Parking Supply And Demand Analysis, And Bus Hub Options\DocCalcs\CAD\ATC10364.dwg

Paora Hapi Street Bus Hub Concept:

Loss of parking of approximately 6 spaces and all on-site private parking

Vehicle tracking is with a 13.5m coach.

Rev	Date	By	Chk	Description
1	2/10/2019	MA	SC	Dimensions annotations and vehicle type
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Design	MA
Drawn	MA
Checked	XXX
Issued	18/06/19
Scale	1:250 @ A3

Off-street Bus Hub Options

Paora Hapi Street

Bus Hub Concept

Project No.	TDC-J001
Dwg #	ATC10364
Sheet	1
Revision	1

50mm @ A3

2. Tongariro Street

Description of site	Tongariro Street is one of the busiest arterial street in Taupō. It is a high activity road, with the domain on one side and retail and business activities on the other. The bus stops are currently on-street outside of the I-site and the restaurant Cobb and Co for north and south bound routes respectively.	
Displaced activity	No change to the northbound bus stop would be expected as it is rarely at capacity. The southbound coach stop would need expansion to three stops to provide for future demand, which would displace some on-street parking. There is a big positive that this is the existing site and would have minimal effects (and minimal opposition). If the bus hub was moved it is likely that the space would be used for general traffic parking. Parking surveys show that there is currently little demand for the existing car parks on Tongariro Street, so there may be little benefit in providing more.	
Assessment Criteria	**Description**	**Level of Alignment (1-5)**
Operations		
1. Bus hub supports service reliability and direct routing	Tongariro Street is currently used as the major coach and tour bus stop location as well as being integrated with all current PT routes offered in Taupō. Using the existing facility is unlikely to require any significant route deviations and would be able to accommodate additional public transport routes.	5
2. Bus hub must efficiently operate within the transport network	This location currently accommodates 46 scheduled services (of which, four are public transport routes) on the busiest day. Thus, Tongariro Street can accommodate these bus movements efficiently as it provides a reasonable LOS for most of the year. Although Tongariro Street is seasonally affected by high traffic volumes, especially during public and school holiday periods, it has demonstrated it can accommodate the current bus demand of Taupo. However, when there are large events on, Tongariro Street is sometimes closed to traffic, meaning that a temporary bus stop is established elsewhere.	4
3. Can cater for existing / future demand	Tongariro Street can accommodate 3 southbound buses and 7 northbound buses. The southbound bus stops are sometimes at capacity, as raised in comments by bus drivers and operators. The northbound bus stops have not been mentioned to be close to capacity at any time. It is predicted that by 2029, the Tongariro site would need to accommodate 69 bus movements on the busiest day. Thus, additional southbound stops would be required to accommodate future and current demand.	3
4. Bus manoeuvres must be able to be made	As an on-street facility, the Tongariro Street bus stops operate with minimal bus manoeuvres as buses only need to make one entry manoeuvre and one exit manoeuvre. It has been noted in comments made by bus operators and drivers that if the southbound bus stops are at capacity, drivers would relocate to the northbound bus stops. This would likely require rerouting using Ferry Road and Story Place. This is not preferred and would need to be considered when accommodating future demand. Though this is an operational issue with the current facilities, it rarely occurs and can be accommodated by the transport network.	3
Safety		

5. Bus hub must provide for safe movements of buses and people	A 5-year Crash Analysis System (CAS) assessment was undertaken of the current site to identify any existing transportation safety issues. There have been 36 crashes recorded in the last five years. Only one crash involving a bus has been reported, which occurred at the intersection of Tongariro Street and Story Place and was caused by the bus driver misjudging the distance between the bus and a car in front. It is noted that of the 36 crashes, 3 of these included pedestrians which likely suggests the need for increased pedestrian facilities at this site.	2
6. Alignment with CPTED[6] principles	The site currently has acceptable alignment with CPTED principles as it is moderately lit, is very visible being on the busiest road in Taupō and is located very close to police services. The site would benefit in this assessment criteria with more lighting in the area and in the bus stops themselves.	3
Road environment and accessibility		
7. The road environment (speed, geometry, gradient, distance to intersections) is suitable	The current road environment is very favourable for the bus facilities as the carriageway is very wide, with two lanes and an additional bus stop/parking lane. Though the current stops are located close to the Story place and Tongariro Street intersection, the intersection is signalised and vehicle queuing is unlikely to affect service reliability. With the road environment being one of the busiest arterial roads in Taupo, high traffic volumes and high vehicle speeds are not as supportive of a bus hub facility as other roads in Taupo.	4
8. Minimises impact on receiving environment: including land purchase, parking demand, impact on motor vehicle traffic	As this site is currently used as an on-street bus facility, no additional land cost and effect on the environment would occur. The site is not in the middle of the city centre, so noise, vibrations and exhaust fumes are not an issue.	5
9. Good pedestrian access	The bus facility has moderate pedestrian amenity with pedestrian signals at the intersection of Tongariro/Spa Road. There are also some additional pedestrian refuge on the grassed median that separates north and southbound traffic, though to access this pedestrians must cross one lane of bus/car parking and two live lanes which is not ideal. Ideally some additional pedestrian facilities would need to be provided to ensure pedestrian safety and efficiency.	3
Facilities		
10. Assessment of existing facilities, and assessment of capability/capacity of providing new facilities	Existing facilities are okay at the Tongariro site to support future bus movements. Bus patrons have to walk roughly 120m either direction to use toilet facilities and further to access cafes and other food and beverage retail facilities. It has been acknowledged that both public transport and coach patrons have issue with the lack of facilities at this site. The domain has some capacity to support these activities, but this would likely require the reduction of some green space which would not be ideal.	3
	Total score (out of 50)	35

[6] Crime Prevention Through Environmental Design

3. Heuheu Street

Assessment Criteria	Description
Description of site	The Heuheu Street site is a council owned car park and is very centrally located. It is opposite Work and Income, a backpackers, and a variety of retail and commercial activities. The car park is between two petrol service stations.
Displaced activity	An off-street bus hub facility would displace a large amount of on-street and off-street parking. However, it could be the ground floor of a parking which has been proposed at this site in the past.

Assessment Criteria	Description	Level of Alignment (1-5)
Operations		
1. Bus hub supports service reliability and direct routing	The site is on a stretch of Heuheu Street that intersects with Ruapehu Street and Titiraupenga Street. Vehicles exiting Heuheu Street must give way to the dominant flow on Titiraupenga Street at a priority-controlled intersection. Vehicles exiting Heuheu Street onto Ruapehu Street must give way to the dominant flow on Ruapehu Street at a roundabout priority-controlled intersection. Thus, significant route deviations are not expected. Service reliability may be become an issue at this site as traffic volumes increase, as vehicles entering the site will have to wait at priority controlled intersections where they do not have priority when entering the site from both directions.	4
2. Bus hub must efficiently operate within the transport network	Currently all bus routes travel adjacent to the Heuheu Street site and stop at PT stops opposite the car park. Heuheu Street is therefore likely to be able to accommodate the existing bus movements.	5
3. Can cater for existing / future demand	The Council owned car park is roughly 3750m^2 of land on Heuheu Street and is currently used as free all-day off-street parking. The site area is more than enough to provide for the required 7 off-street spaces and can likely provide for upwards of 20 coach parks if the entire site area is used.	5
4. Bus manoeuvres must be able to be made	Currently the road layout would allow for easy manoeuvring into the bus facility as no median is provided. It is likely that buses turning into the facility would cause minor vehicle queueing while turning into the facility. A median would provide for turning movements without resulting in vehicle queuing but would likely require some loss in on-street parking and change in lane markings.	3
Safety		
5. Bus hub must provide for safe movements of buses and people	A 5-year CAS assessment was undertaken of the current site to identify any existing transportation safety issues. There have been 37 crashes in the vicinity of the site in the last five years of which 24 have occurred at the intersection of Titiraupenga Street and Heuheu Street. The predominant crash type is a crossing crash from failing to give way at priority traffic control. Of the 37 crashes, two have involved pedestrians crossing the road and none have involved bus movements. The crash analysis shows an existing traffic issue with the intersection of Titiraupenga Street and Heuheu Street which may affect the safe movement of buses and people. The majority of crashes are involved at intersections and not in the midblock, so it is unlikely that there would be issue with entry/exit from a bus facility in	1

	the midblock. Significant investment would need to be made at this site to ensure the safety of all road users.	
6. Alignment with CPTED[7] principles	The Heuheu Street site is currently lit by street lights and is located close to the towns centre. Heuheu Street has moderate traffic flows and has quite good visibility. Increased lighting and surveillance would be required for further alignment with CPTED principles.	3
Road environment and accessibility		
7. The road environment (speed, geometry, gradient, distance to intersections) is suitable	The carriageway width of Heuheu Street, like most of Taupō streets, is quite wide, providing for on-street parking on both sides, cycle lanes and one-lane of traffic in each direction. It is likely that this road layout allows for higher operating speeds than other roads in Taupo. This may affect the accessibility of buses to a bus-hub facility on this street. The site is situated in the middle of the two intersections. It is unlikely that queuing would have an effect on bus reliability.	3
8. Minimises impact on receiving environment: including land purchase, parking demand, impact on motor vehicle traffic	The site is already Council owned, so no additional land purchase would be required to provide an off-street bus hub facility. An off-street bus facility would greatly reduce off-street parking provision depending on the area allocated to the bus facility. Additionally, some on-street parking would need to be removed to accommodate the access to and from the facility. With the high stock of on-street parking this can easily be accommodated by the transport network. As Heuheu Street currently accommodates all PT routes it is likely to accommodate further bus movements but as outlined above, some improvement would need to be made to the intersection of Titiraupenga Street and Heuheu Street.	4
9. Good pedestrian access	Pedestrian amenity is moderate on Heuheu Street. There are established pedestrian paths on both sides of the road but no pedestrian priority when crossing the road. Only the Ruapehu Street intersection provides some pedestrian refuge when crossing the road. With a large amount of off-street and on-street parking, and vehicle accesses there is a large number of pedestrian hazards which further reduces this amenity. Some improvement to pedestrian amenity would be required to enable the safe and efficient pedestrian access to the site.	3
Facilities		
10. Assessment of existing facilities, and assessment of capability/capacity of providing new facilities	As the site area is so large, there is a lot of flexibility in providing facilities for an off-street bus hub. Some short-term parking and taxi parking could be provided to service pick-up and drop-off from the facility. Additionally, the large amount of space can be further used for storage lockers. CCTV surveillance and WIFI would be expected for this facility. Currently, there are service stations either side of the site which could provide some food facilities, but it is unlikely these would allow all bus patron to use the bathroom facilities.	3
	Total score (out of 50)	34

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Rev	Date	By	Chk	Description
1	2/10/2019	MA	SC	
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Design	MA
Drawn	MA
Checked	XXX
Issued	18/06/19
Scale	1:400 @ A3

Off-Street Bus Hub Options

Heuheu Street

Bus Hub Concept

Project No.	TDC-J001
Dwg #	ATC10363
Sheet	1
Revision	1

4. Tuwharetoa Street

Assessment Criteria	Description
Description of site	The Tuwharetoa Street site is a publicly owned car parking lot that is adjacent to the Burger King and the rest of the restaurant area close to the lake front. Other activities close to the site are a petrol service station, as well as a range of commercial and retail activities. The site is currently proposed as the location for the new Civic Administration Building (CAB). The bus hub will be designed to integrate with the development as an off-street facility.
Displaced activity	The proposed CAB will displace the large amount of free all-day parking on the site. It is understood that some parking may be provided as part of the development, but for staff parking rather than public parking. However, the bus hub concept may reduce the provision of staff parking unless multiple level parking is provided. Access to the site may also have a minor impact on on-street parking.

Assessment Criteria	Description	Level of Alignment (1-5)
Operations		
1. Bus hub supports service reliability and direct routing	Currently, no PT routes go via the Tuwharetoa Street site. Additionally, the proposed one-way flow design would require substantial re-routing of existing routes with the placement of entrance and exits. This would require less then direct routing for PT routes in relation to their current routes. Northbound and southbound coach movements would require significant detours to access the site before continuing on their current route. Note that if arterial traffic rerouted down Titiraupenga Street the bus bub facility will accommodate coach and public transport routing easily.	2
2. Bus hub must efficiently operate within the transport network	Buses do not currently travel adjacent to the site. The carriageway of Tuwharetoa street has a 10m width for one-way traffic in both directions. As such the road geometry is likely to be able to accommodate bus movements effectively. Some change to the road layout such as reduction of on-street parking and additional road markings would be required to safely accommodate bus movements.	4
3. Can cater for existing / future demand	The council currently owns a large area of land currently used as free all-day parking. Indicative designs for an off-street bus facility can easily accommodate the 7 coach spaces required. There is some flexibility with how a bus hub facility would function in terms of preferred routing, but it would be expected to be able to service the existing and future demand. However, it would be difficult and expensive to extend at a future date if there was more demand.	4
4. Bus manoeuvres must be able to be made	Carriageways on both Roberts Street and Tuwharetoa Street are of sufficient width to support bus movements to and from the site. Access and egress from the site would need to be designed to accommodate 13.5m coach sweep paths. Some reduction of on-street parking would be recommended to further accommodate safe bus manoeuvres to and from the bus hub.	4
Safety		

5. Bus hub must provide for safe movements of buses and people	A 5-year CAS assessment was undertaken of the current site to identify any existing transportation safety issues. There have been 12 crashes in the vicinity of the site in the last five years. Four occurred at the intersection of Ruapehu Street and Tuwharetoa Street, three in the midblock between the two intersections and five at the intersection of Titiraupenga Street and Tuwharetoa Street. The predominant crashes at the intersections were failing to give way and there was no correlation between the midblock crashes. In all of the crashes there has been no involvement of pedestrians and one of the crashes involved a bus. As such there is likely to be no inherent safety risk with this site, but it is expected this is a function of low traffic volumes on this road.	4
6. Alignment with CPTED[8] principles	With the facility proposed next to the new council CAB, and its central location in town, it is expected that any off-street facility at this site would align well with CPTED principles. Furthermore, any off-street bus hub facility would be constructed with CPTED principles in mind.	5
Road environment and accessibility		
7. The road environment (speed, geometry, gradient, distance to intersections) is suitable	The location of the bus hub facility is proposed to be in the centre of the section of Tuwharetoa Street between the intersections with Ruapehu and Titiraupenga Street. It is unlikely that vehicle queuing would disrupt movements to and from the bus hub as a result of this. Currently Tuwharetoa Street and Roberts Street are unmarked with no lane marking separating traffic flow. Road markings would need to be provided to allow for safe bus movements and to manage vehicle conflicts. Furthermore, on-street parking on Tuwharetoa Street may result in vehicle conflicts with bus movements.	3
8. Minimises impact on receiving environment: including land purchase, parking demand, impact on motor vehicle traffic	No additional land purchase would be required to provide for an off-street bus hub facility. Some on-street parking would need to be removed as well as substantial off-street parking. However, these will likely be relocated as the CAB will also displace a large supply of parking. As the site is very central and will be next to the CAB, noise, vibrations and emissions will be an issue and will be managed.	3
9. Good pedestrian access	Pedestrian access is currently very limited, with substantial on-street parking reducing pedestrian amenity. As the site will be used for the council CAB and the off-street bus facility, pedestrian amenity would need to be increased in the form of pedestrian crossing priority, increased formed footpath widths and pedestrian routes to the CAB and bus hub.	2
Facilities		
10. Assessment of existing facilities, and assessment of capability/capacity of providing new facilities	Due to the size of the Tuwhareotoa Street car park, the provision of extra facilities like bathrooms, storage and taxi zones should be easily accommodated in the area. Additionally, the site is centrally located and close to many restaurants and retail shops	3
	Total score (out of 50)	34

[8] Crime Prevention Through Environmental Design

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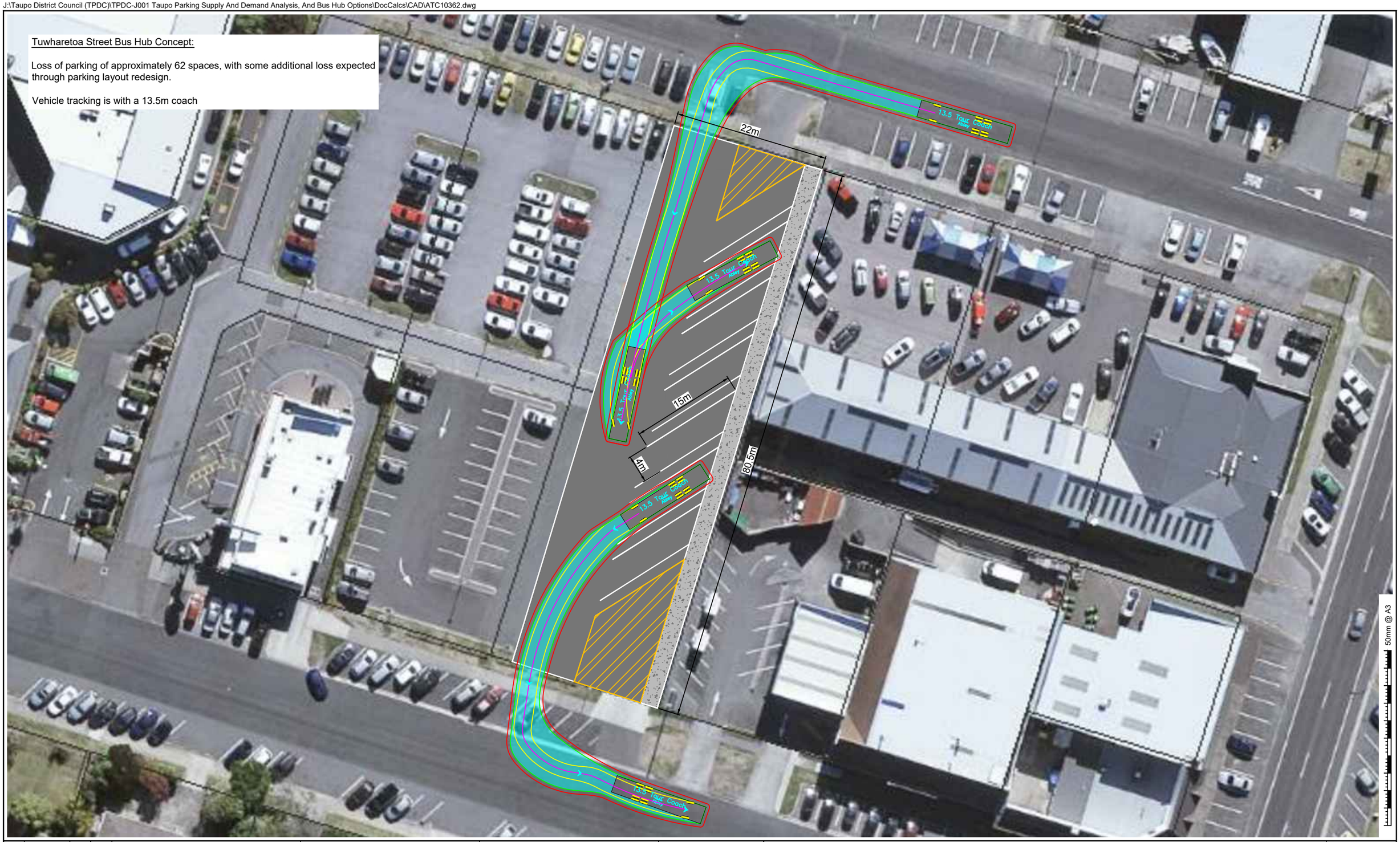

Rev	Date	By	Chk	Description
1	2/10/2019	MA	SC	Dimensions annotations and vehicle type
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Off-Street Bus Hub Options

Tuwharetoa Street

Bus Hub Concept

Project No.	TDC-J001
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50mm @ A3

T +64 9 486 0898 (Akld)
T +64 3 377 4703 (Chch)
E office@ableY.com

Auckland
Level 8, 57 Fort Street
PO Box 911336
Auckland 1142
New Zealand

Christchurch
Level 1, 137 Victoria Street
PO Box 25350
Christchurch 8144
New Zealand

www.ableY.com

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