

Crescent Head Traffic Management and Parking Plan

Crescent Head Public Domain Design Project
Final Report



Prepared by: GTA Consultants (NSW) Pty Ltd for Plummer and Smith
on 10/12/19
Reference: N174220
Issue #: A

Crescent Head Traffic Management and Parking Plan

Crescent Head Public Domain Design Project Final Report

Client: Plummer and Smith

on 10/12/19

Reference: N174220

Issue #: A

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A-Dr	18/09/2019	Draft	Liam Clark	Anthony Leung	Volker Buhl	
A	10/12/2019	Final	Anthony Leung; Liam Clark	Volker Buhl	Volker Buhl	

CONTENTS

1.	Introduction	1
1.1.	Background	1
1.2.	Purpose of this Report	2
2.	Review of Relevant Documents	3
2.1.	Council Documents and Plans	3
2.2.	State Documents and Plans	6
3.	Existing conditions	8
3.1.	Overview of the Transport Network	8
3.2.	Traffic Volumes and Speeds	10
3.3.	Pedestrian Volumes	14
3.4.	Crashes	15
3.5.	Parking Occupancy	16
3.6.	Site Visit	18
3.7.	Conclusions	20
4.	Future Transport Appraisal	21
4.1.	Introduction	21
4.2.	Movement and Place	21
4.3.	Traffic and Transport	23
4.4.	Parking	25
4.5.	Walking and Cycling	27
4.6.	Summary of Mitigation Measures	28

Appendices

- A. Beachside Car Park Reconfiguration Plan

Figures

Figure 1.1:	Crescent Head Location	1
Figure 1.2:	Crescent Head Study Area	2
Figure 2.1:	Map of proposed routes for Crescent Head (2016 PAMP)	4
Figure 2.2:	Crescent Head's existing footpaths	5
Figure 2.3:	Crescent Head proposed cycleway improvements	6
Figure 2.4:	Movement and Place Framework	7
Figure 3.1:	Bus stop at Crescent Head	9
Figure 3.2:	Crescent Head town centre transport features	10
Figure 3.3:	Tube Count Locations (May 2016 and December 2018)	11
Figure 3.4:	Additional tube count locations	12
Figure 3.5:	Pedestrian volume counts (500+ ADT)	14
Figure 3.6:	Location of footbridge pedestrian counts	15
Figure 3.7:	Crash locations (2013 to present)	16
Figure 3.8:	Crescent Head town centre car parks	17
Figure 3.9:	Identified issues in Crescent Head	18
Figure 4.1:	Movement and Place in Crescent Head	22
Figure 4.2:	Potential traffic and transport solutions	24
Figure 4.3:	Proposed beachside car park reconfiguration (conceptual)	26
Figure 4.4:	Proposed formalised parking on Rankine Street	26
Figure 4.5:	Potential Walking and Cycling Solutions	27
Figure 4.6:	Summary of Mitigation Measures	28

Tables

Table 2.1:	List of proposed works	6
Table 3.1:	Automatic traffic count survey results (May 2016 and December 2018)	11
Table 3.2:	Peak period traffic volume change	12
Table 3.3:	Additional automatic traffic count survey results	13
Table 3.4:	Footbridge pedestrian volumes	15
Table 3.5:	Number of parking spaces occupied	17
Table 3.6:	Identified issues from the site visit	19
Table 4.1:	Potential Traffic and Transport Solutions	23
Table 4.2:	Potential Parking Solutions	25
Table 4.3:	Potential Walking and Cycling solutions	27
Table 4.4:	Implementation Plan	28

1. INTRODUCTION

1.1. Background

Crescent Head is located on the Macleay Valley Coast in the Mid North Coast region of New South Wales, approximately 20km southeast of Kempsey and 440km northeast of Sydney and is located within the Kempsey Shire local government area (LGA).

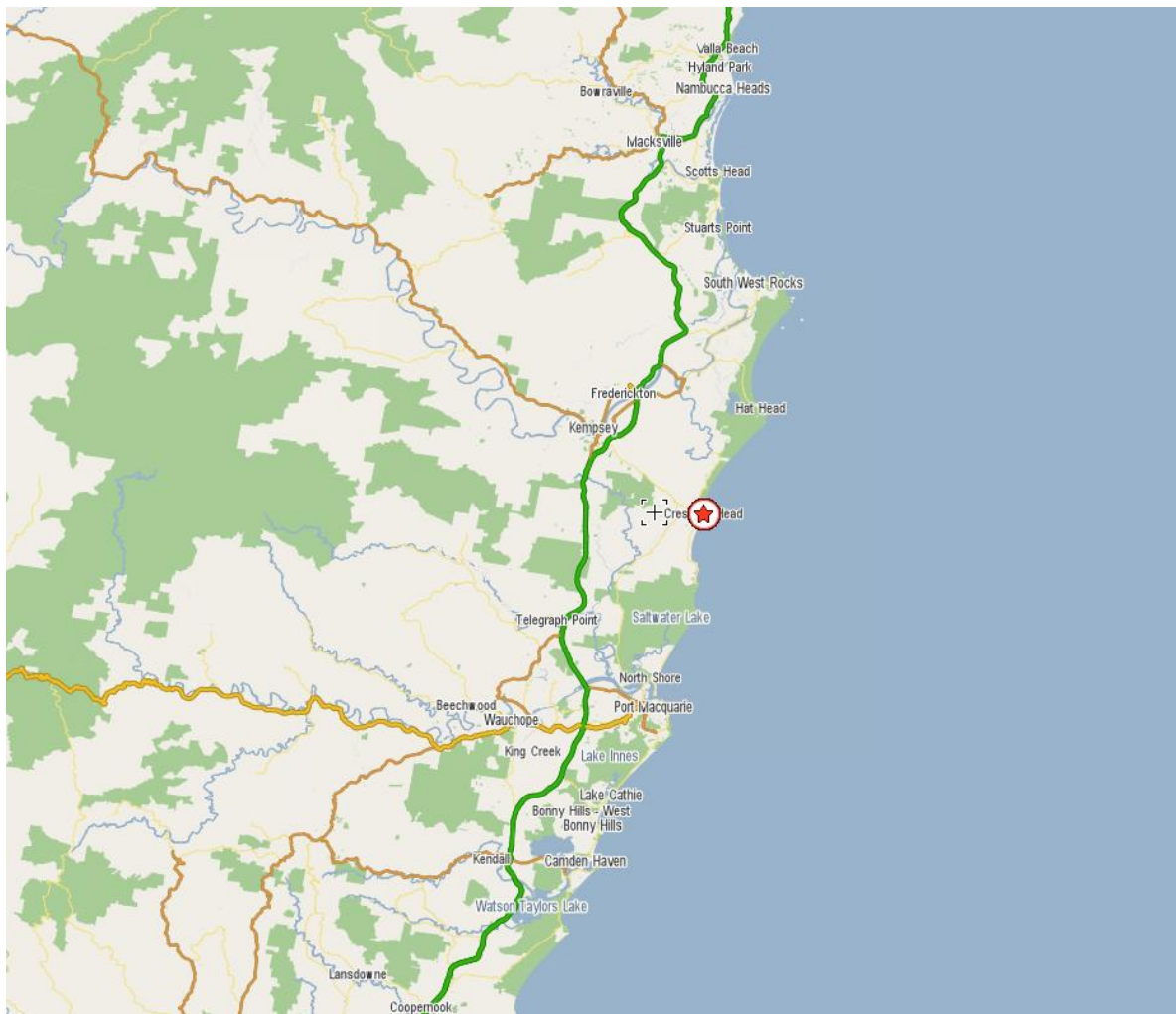
Crescent Head has a permanent resident population of approximately 900 people, however, the coastal village is also a popular holiday destination and experiences a large seasonal population, especially during the summer.

The Crescent Head Holiday Park is the village's main area of activity in peak season, containing over two-hundred separate accommodation sites for tourists.

Adjacent land uses include the Crescent Head Country Club, Killick Beach, the Kempsey-Crescent Head Surf Club as well as the nearby town centre.

The location of the beachside village within the broader geography of the Eastern seaboard is shown in Figure 1.1 below.

Figure 1.1: Crescent Head Location



Source: Sydney

1.2. Purpose of this Report

GTA Consultants (GTA) has been engaged by landscape architects Plummer and Smith to provide traffic and car parking management advice to inform the development of the Crescent Head Town Centre Urban Landscape Plan and Crescent Head Foreshore Recreation and Landscape Plan. As outlined in the Crescent Head Master Plan, the Traffic Management and Parking Plan (TMPP) has been identified as a critical input in the design outcome of the foreshore and village centre exercises, and together the combined project is titled the *Crescent Head Public Domain Design Project*.

The key objective of the Master Plan is to develop and implement a community inspired works program to upgrade the public domain facilities within Crescent Head. The scale of the anticipated change to the public realm presents an opportunity to examine and address the village's long-term traffic and transport issues, particularly regarding traffic circulation, vehicle parking, pedestrian and vehicle access, and conflicts between different user groups.

GTA's scope of work includes:

- a review of relevant background material, including Council-level strategic transport plans and documents
- an assessment of the existing traffic and transport conditions in Crescent Head based on existing transport data
- an appraisal of Crescent Head's future transport needs
- preparation of a report documenting our findings and recommendations.

For the purpose of our scope of work, our study area is generally limited to the area shown in Figure 1.2 below.

Figure 1.2: Crescent Head Study Area



Basemap Source: Google Maps

2. REVIEW OF RELEVANT DOCUMENTS

2.1. Council Documents and Plans

The Crescent Head Master Plan (CHMP) – published in November 2017 – is the initial Council document recognising the need for a Traffic Management and Parking Plan. Through a process of collaborative community consultation, local residents were able to share their vision for Crescent Head. Traffic and transport issues featured as a consistent thread throughout the consultation, resulting in its formalisation as a “community priority” to “improve parking and traffic flow”. Traffic circulation, pedestrian and vehicle conflicts, and peak period parking were identified as key issues, leading to a determination in *Objective 4* to develop a traffic management plan and vehicle parking strategy.

To effectively understand the traffic and transport issues impacting Crescent Head, it is valuable to review the other transport-related Council plans beyond the Master Plan. These include the:

- Kempsey Shire Council Pedestrian Access and Mobility Plan (PAMP) (2016)
- Kempsey Shire Bike Plan (2018).

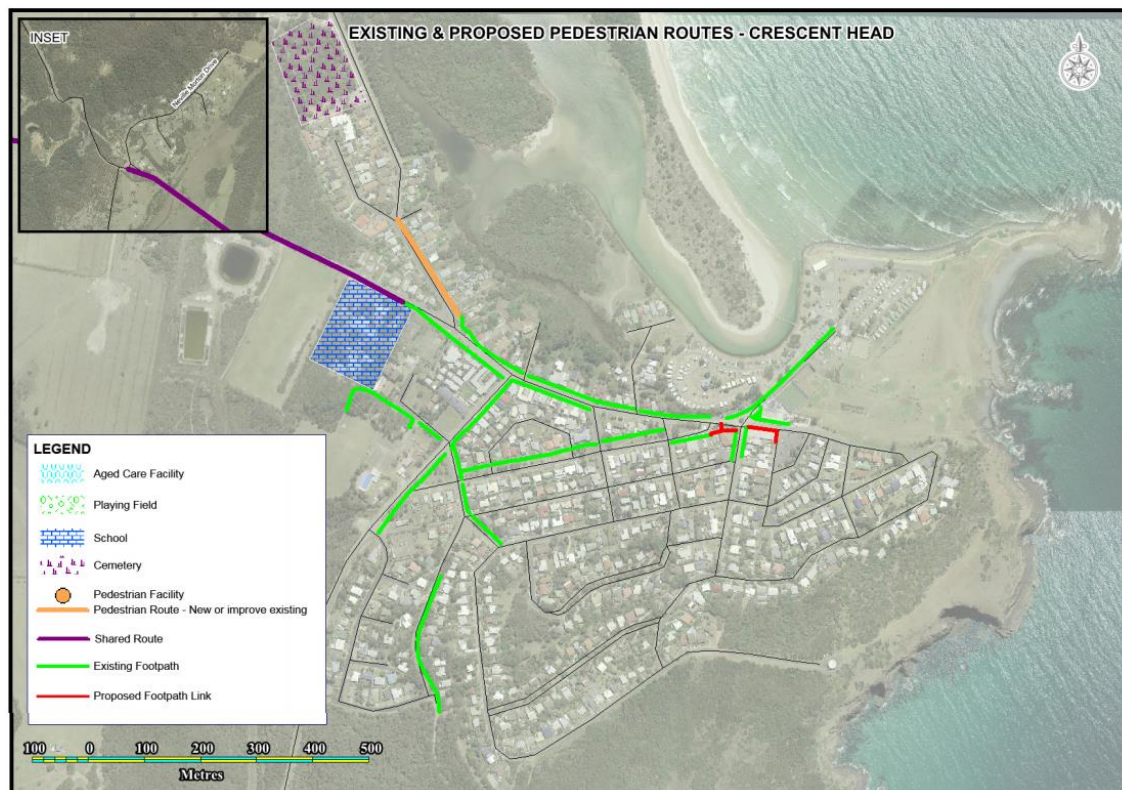
2.1.1. Kempsey Shire Council PAMP

Kempsey Shire Council's Pedestrian Access and Mobility Plan (PAMP) was released in 2016. As both a review of the Council's previous 2003 PAMP and a priority program of new routes and facilities, the recent PAMP gives Council the framework from which to invest in safe, convenient and connected pedestrian routes. Crescent Head was selected in the study area, which led to the development of a schedule of proposed PAMP treatments and a map of proposed routes for the village.

Three treatments in Crescent Head were identified:

- Crescent Head Road (Belmore Street to Neville Morton Drive): 2.0m wide shared path to provide an interesting recreational route.
- Belmore Street (Pacific Street to Lake Street): 1.2m wide footpath to extend the existing footpath on Belmore Street.
- Main Street/ Rankine Street: 1.2m wide footpath to link gaps in the existing footpath network.

Figure 2.1: Map of proposed routes for Crescent Head (2016 PAMP)



Source: Kempsey Shire PAMP (2016)

While the Crescent Head Road and Belmore Street proposed treatments are located in Crescent Head, they are situated in a more peripheral area to the west of the main study area. These treatments will assist with facilitating walking and cycling access to the main town centre from Crescent Head's outer parts but are unlikely to make discernible differences to movements within the study area. Footpath facilities already exist in the area designated as a proposed footpath link in the town centre (in red), however the PAMP acknowledged that parts of the footpath had also sunk in that immediate area. Improvements to these footpaths will improve walking safety and amenity but will likely have a negligible impact on pedestrian movements as these footpaths are pre-existing.

2.1.2. Kempsey Shire Bike Plan

The Kempsey Shire Bike Plan (2018) is Council's strategic document for developing cycling infrastructure across the LGA. Its purpose was to comprehend the future needs of cyclists and provide a list of prioritised infrastructure improvements, with the aim of fostering safer and more attractive transport choices for residents and visitors.

As part of the existing conditions audit for the Council's main population centres, the Bike Plan mapped the footpath network of Crescent Head. It is depicted in Figure 2.2 below.

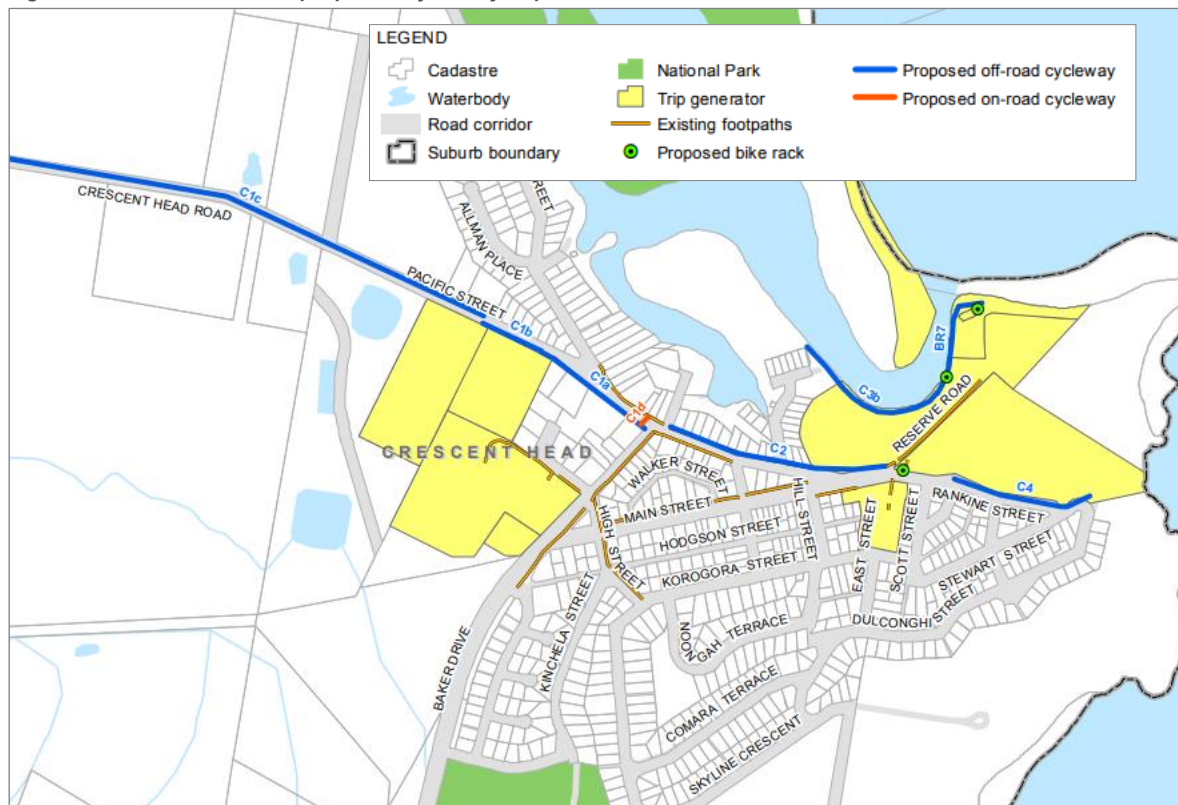
Figure 2.2: Crescent Head's existing footpaths



Source: Kempsey Shire Bike Plan (2018)

The community consultation component of the Bike Plan highlighted that most of the residents' cycling concerns related to inter-town connections and establishing more accessible recreational routes between the region's centres. Concerning Crescent Head, community support exists for better connections to Kempsey, Hat Head, Gladstone and South West Rocks. As a result, the proposed cycleway improvements for Crescent Head largely reflect the community's desire to better connect to nearby towns, as opposed to new infrastructure creating connections within Crescent Head. The predominant proposal in the Bike Plan is a 2.5m wide shared path along Pacific Street and Crescent Head Road heading towards Kempsey. This proposed shared path builds upon the 2.0m wide shared path proposal in the 2016 PAMP, however, the key differences are the path's additional width and its extension to the holiday park entrance at Reserve Road. Figure 2.3 illustrates the proposed improvements.

Figure 2.3: Crescent Head proposed cycleway improvements



Source: Kempsey Shire Bike Plan (2018)

Based on the Bike Plan's proposed cycleway improvements in Figure 2.3, cyclists and pedestrians would be able to cycle and walk on safe and separated infrastructure from the heart of the Crescent Town Centre at Reserve Road towards the outer parts of Crescent Head and beyond. Table 2.1 provides more detail on the proposed improvements as identified by the reference numbers used in Figure 2.3.

Table 2.1: List of proposed works

Ref	Road/ Description	Category of Work	Comment
BR7	Reserve Road foreshore	Off-road cycleway	Concrete shared path (2.5m)
C1a	Pacific Street – Baker Drive to School	Off-road cycleway	Widen existing pathway – concrete (2.5m)
C1b	Pacific Street – School to sports field	Off-road cycleway	Concrete shared path (2.5m)
C1c	Pacific Street – Sports field to Dulcong Heights	Off-road cycleway	Concrete shared path (2.5m)
C2	Lee Street to Reserve Road roundabout	Off-road cycleway	Widen existing pathway – concrete (2.5m)
C3b	Foreshore near caravan park	Off-road cycleway	Widen existing pathway – concrete (2.5m)
C4	Rankine Street	Off-road cycleway	Concrete shared path (2.5m)

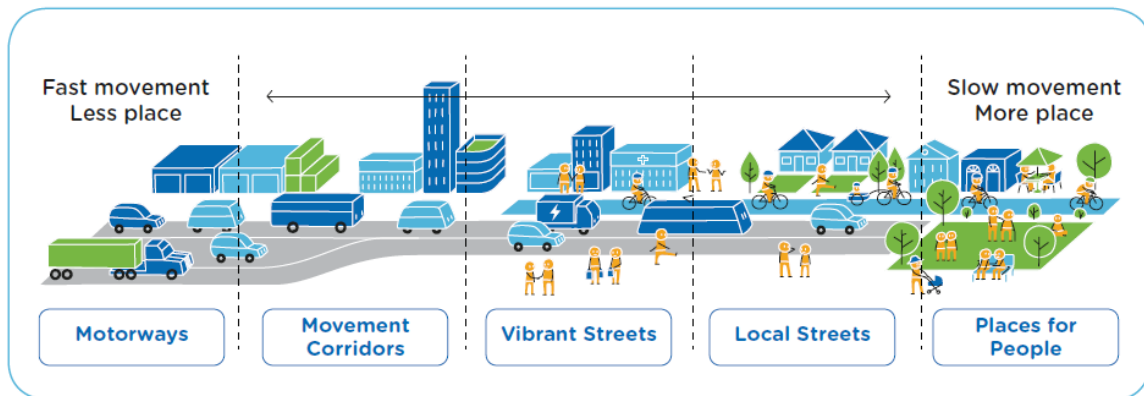
Source: Kempsey Shire Bike Plan (2018)

2.2. State Documents and Plans

Future Transport 2056 is the overarching state-level transport strategy for the whole of NSW. As part of *Future Transport 2056*, it contains a *Regional Services and Infrastructure Plan* (RSIP) that has a greater focus of strategies and outcomes for regional NSW, including locations such as Crescent Head.

While Crescent Head does not feature in any committed or planned funding initiatives under the RSIP, it nonetheless contains some strategic approaches with relevance to the present traffic and transport study. In particular, the plan makes reference to the NSW Government's 'Movement and Place' framework, which seeks to classify roads and streets into whether they are more appropriate as movement corridors to convey large quantities of vehicles at speed, as places where human activity, recreation and trade are encouraged, or somewhere in between along this spectrum. This framework is illustrated below.

Figure 2.4: Movement and Place Framework



Source: Future Transport 2056 Regional NSW Services and Infrastructure Plan

In Crescent Head's context, it is considered that the town centre and beachside area comprise principally local streets and places for people where slow vehicle movements, access by walking and cycling, and people-oriented activities such as meetings on the street and walking to the beach are anticipated. Conversely, the main road on the outer parts of Crescent Head leading into and out of the town centre such as Crescent Head Road may be considered as 'movement corridors'. Accordingly, GTA's considerations for traffic and parking related issues and solutions in the town centre will be driven by these overarching classifications.

3. EXISTING CONDITIONS

3.1. Overview of the Transport Network

3.1.1. Road Network

Road access into the Crescent Head town centre is through the three main roads of Crescent Head Road/ Pacific Street from the west, Loftus Road/ Belmore Street from the north and Point Plomer Road/ Baker Drive from the south. The Crescent Head Road link serves as the principal access road into Crescent Head as it connects with the larger towns of Kempsey and East Kempsey and provides access to other roads that connect to the Pacific Highway. Crescent Head Road is a classified 'Regional Road' and a 'tourist drive' (TD 14) as is Belmore Street and Loftus Road to the north. Crescent Head being located at the edge of the coastline and not having adjoining larger towns means that it has little through traffic; traffic towards Crescent Head therefore comprises people who want to travel there as a destination.

In terms of the town centre's street network, it is generally organised into two distinct areas situated to the north and south of the main street (Pacific Street and Rankine Street). A partially-gridded residential street network exists to the south of the main street, which rises steeply towards the south up a hill. The area to the north of the main street is largely occupied by the Crescent Head Holiday Park and Crescent Head Beach, with Reserve Road being the sole vehicular and pedestrian access into these destinations.

The main street of Pacific Street and Rankine Street, Reserve Road towards the beach and East Street which is a main street that heads south towards the residential area are all connected in the Crescent Head town centre's core by a four-leg roundabout, which serves as the principal intersection in the town centre. A zebra crossing exists on the Pacific Street leg of the roundabout and a pedestrian refuge island is available on the Reserve Road leg, the other legs do not have formal pedestrian crossing facilities. Willow Street, off Pacific Street, provides an existing pedestrian connection to the Crescent Head foreshore area and Crescent Head Holiday Park.

3.1.2. Parking

Unmarked kerbside parking occurs along the main streets of the town centre, including Pacific Street, Rankine Street and East Street. The absence of parking survey data on on-street parking means the exact quantity of kerbside parking and their associated time restrictions (if any) are unknown. An off-street car park at Rankine Street comprises 46 unrestricted parking spaces and another car park off Pacific Street beside the roundabout has a capacity of 14 unrestricted parking spaces. At the beach, a total of 110 off-street parking spaces is spread through two distinct parking areas; one at the north beside the water and the other closer towards the Holiday Park. These parking spaces have 4P time restrictions and prohibit overnight parking.

3.1.3. Walking and Cycling

Concerning cycling, there is a distinct lack of shared or separated cycling facilities in the town centre, except for a shared path beside Main Street that connects the town centre with Crescent Head Public School towards the west. Accordingly, cyclists are expected to ride on the road with other vehicles. No bicycle parking facilities are present in the town centre. Footpaths are available on most town centre streets as shown in Figure 2.2.

3.1.4. Public Transport

Crescent Head is served by Busways Port Macquarie Route 345: Kempsey to Crescent Head loop service. Starting in Kempsey, the route arrives into Crescent Head from Crescent Head Road, stopping at the bus stop located by the intersection of Pacific Street and Hill Street before turning around and heading back to Kempsey. The bus loop runs three times a day on weekdays and only twice a day on Saturday. There is no service on Sunday. As such, it is concluded that public transport services to Crescent Head are very limited, which is reflective of the low population base throughout most of the year.

Figure 3.1 shows a photograph of the bus shelter at the bus stop in Crescent Head town centre. No footpaths are leading to this bus stop along Pacific Street, which would render access by pedestrians difficult, especially vulnerable pedestrians such as children, the elderly and the mobility impaired.

Figure 3.1: Bus stop at Crescent Head



Source: Plummer and Smith

3.1.5. Summary Map

The locations of the car parks, bus stop and the main roads into and out of Crescent Head town centre are summarised in Figure 3.2 below.

Figure 3.2: Crescent Head town centre transport features



3.2. Traffic Volumes and Speeds

Automatic traffic count surveys (tube counts) have been conducted on multiple occasions and at several locations throughout Crescent Head to measure traffic speeds, vehicle volumes and vehicle classifications on roads in the village. Surveys have been carried out five times in recent years – specifically at the following times:

- March 2016
- May 2016
- March 2018
- November 2018
- December 2018

Most of the data derives from the May 2016 and the December 2018 counts. As both counts contain several common locations and were taken in different periods (off-peak vs peak tourist season respectively), there is valuable insight to be gained from their comparison. The locations of these tube counts with common locations in the peak and off-peak seasons are shown in Figure 3.3 below.

Figure 3.3: Tube Count Locations (May 2016 and December 2018)



The traffic speeds and volumes recorded from the May 2016 and December 2018 counts are summarised in Table 3.1 below and the comparisons between peak and off-peak traffic conditions are made in Table 3.2.

Table 3.1: Automatic traffic count survey results (May 2016 and December 2018)

Site	Road	Posted Speed Limit	Direction	Peak			Off-peak		
				ADT (7-day) ¹	ADT (7-day) (two-way)	Speed (85 th percentile)	ADT (7-day)	ADT (7-day) (two-way)	Speed (85 th percentile)
1	Pacific St near Hill St	50 km/h	Westbound	1653	4136	42 km/h	966	2446	44 km/h
			Eastbound	2483			1449		
2	East St	50 km/h	Northbound	351	755	32 km/h	233	481	8 km/h ²
			Southbound	440			248		
3	Rankine St	50 km/h	Westbound	911	1777	28 km/h	605	1169	30 km/h
			Eastbound	867			564		
4	Reserve Rd	15 km/h	Northbound	1324	2313	36 km/h	782	1567	38 km/h
			Southbound	990			786		

Source: Kempsey Shire Council

¹ ADT: Average Daily Traffic

² This recorded speed appears to be an outlier and may be due to a recording error or the tube counter placed in a location which recorded cars decelerating to pull over to park.

Table 3.2: Peak period traffic volume change

Site Number	Site	Change in peak period traffic volume
1	Pacific St near Hill St	+69.1%
2	East St	+57.0%
3	Rankine St	+52.0%
4	Reserve Rd	+47.6%
	Average	+56.4%

Across the five count occasions, one-time counts were conducted at several parts of the Crescent Head road network and provides an understanding of the traffic volumes in other parts of Crescent Head. These locations are indicated in Figure 3.4.

Figure 3.4: Additional tube count locations

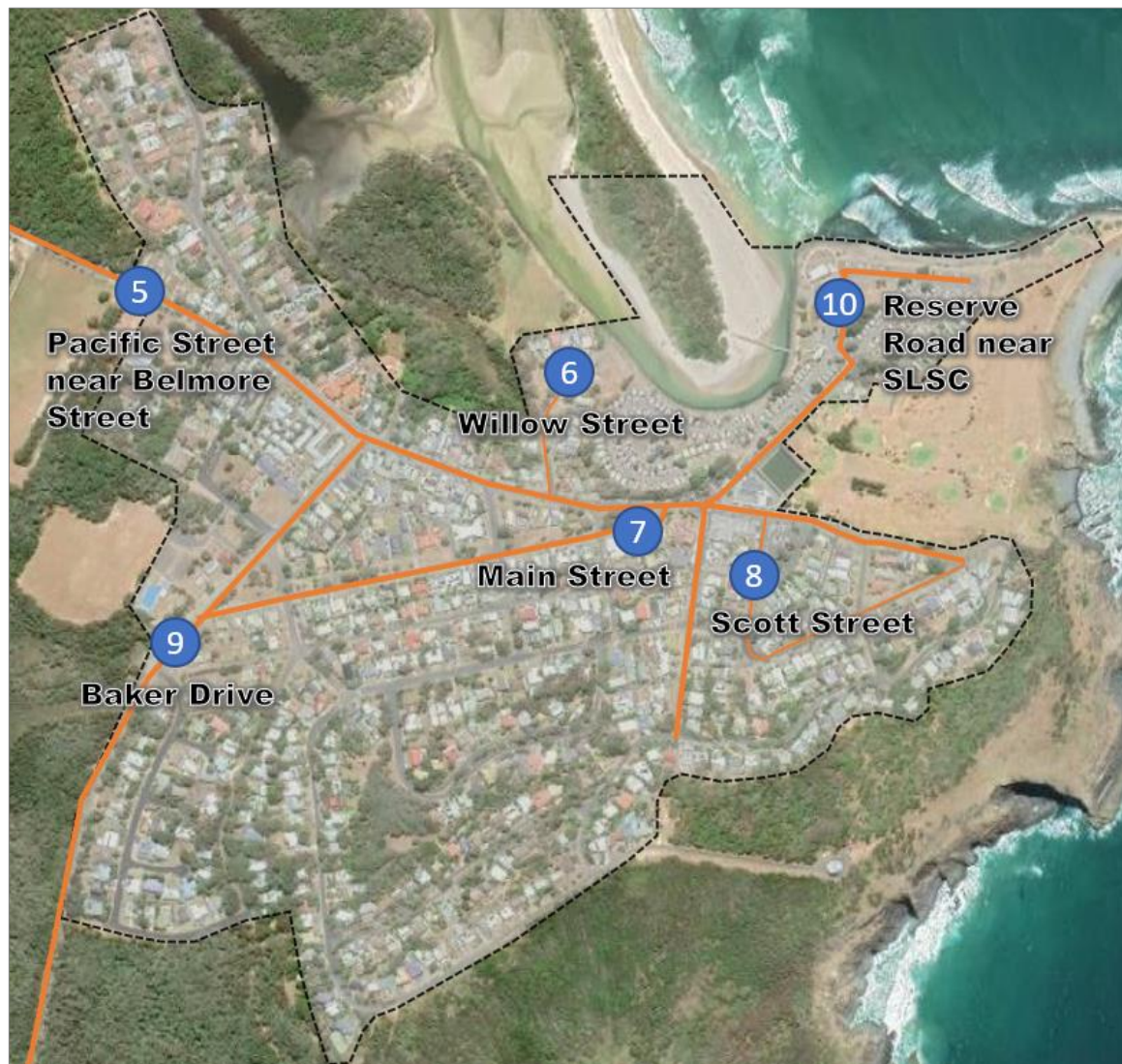


Table 3.3: Additional automatic traffic count survey results

Site	Road	Placement Date	Direction	ADT (7-day)	ADT (7-day) (two-way)	Speed (85 th percentile)	Posted Speed Limit
5	Pacific St near Belmore St	14/12/2018	Westbound	1768	3711	60 km/h	50 km/h
			Eastbound	1943			
6	Willow St	17/12/2018	Northbound	206	402	28 km/h	50 km/h
			Southbound	196			
7	Main St	18/12/2018	Westbound	452	479	24 km/h	50 km/h
			Eastbound	27			
8	Scott St	20/12/2018	Northbound	290	495	31 km/h	50 km/h
			Southbound	205			
9	Baker Dr	20/12/2018	Northbound	957	1967	57 km/h	50 km/h
			Southbound	1010			
10	Reserve Rd at Surf Lifesaving Club	05/05/2016	Northbound	553	1120	27 km/h	8 km/h shared zone
			Southbound	567			

Source: Kempsey Shire Council

3.2.1. Traffic speeds

As shown in Table 3.1 and Table 3.3, the 85th percentile traffic speeds (i.e. the speeds at which 85 per cent of the cars recorded were travelling at) range between 24 km/h and 44 km/h throughout Crescent Head's local roads and 57 km/h to 60 km/h on Pacific Street and Baker Drive leading into the town centre, which is largely compliant with the posted speed limits. However, some of the 85th percentile speeds recorded were higher than the posted speed limits. For instance, the speed limit at Site 4 (Reserve Road) is posted at 15 km/h, whereas the 85th percentile speed was 36 km/h in peak and 38 km/h in the off-peak period, more than double. This is particularly problematic on Reserve Road as it is the main pedestrian route to the beach where high pedestrian activity and regular vehicle movements create a significant conflict potential. Similarly, at Site 10 (Reserve Road beside the Surf Lifesaving Club), the 85th percentile speed recorded was more than three times the posted speed limit.

3.2.2. Traffic volumes

Table 3.1 shows that traffic volumes in Crescent Head range from an average of less than 300 vehicles per direction and day on local roads in the off-peak (e.g. East Street), to nearly 2,500 vehicles heading east on Pacific Street near Hill Street. Comparing the peak and off-peak ADT data, the Crescent Head town centre and holiday park area experiences an average two-way traffic volume increase of 56 per cent in the peak period. The increase for each specific site is shown above in Table 3.2.

This peak period increase is unsurprising due to Crescent Head's popularity for holidaymakers in summer leading to the significant increase in traffic volumes. Accordingly, considerations to manage traffic volumes need to be well-balanced and not necessarily be focused on the peak as at all other times of the year, traffic volumes are relatively low.

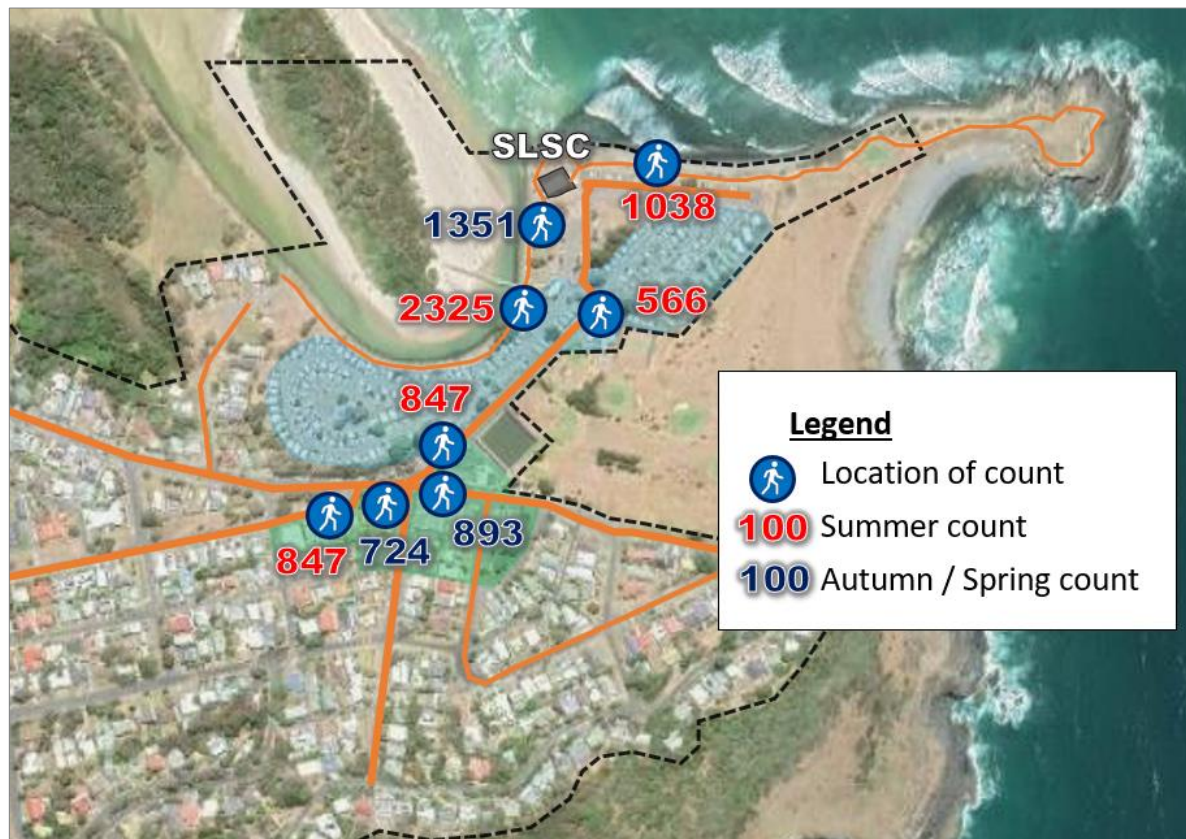
3.2.3. Vehicle classification

The tube counts also record the type of vehicle that cross each survey point. For all survey sites, the predominant vehicle classification at over 99 per cent recorded was light vehicles (e.g. a regular sedan, station wagon, SUV car or one with a trailer or campervan). This is not surprising given Crescent Head's qualities as a holiday park and coastal village with a minimal need for heavy vehicles to access it. The East Street site, however, recorded heavy vehicles at 8.9 per cent of all recorded vehicles (43 of 481 total vehicles). The heavy vehicles are likely to be large delivery trucks servicing the shops fronting East Street.

3.3. Pedestrian Volumes

The pedestrian volume data – having been collected across multiple months over a four-year period between 2014 and 2018 – does not provide great utility in trying to understand how pedestrian volumes change across peak and off-peak seasons. Referring to the broader context of the pedestrian count sites and associated volumes in Figure 3.5 below, the Crescent Head Beachside area and the Surf Lifesaving Club are evidently popular destinations within the area. On the other hand, the footbridge to Killick Beach and the entrance to the Holiday Park at the southern end of Reserve Road are not destinations, but rather the routes pedestrians are required to take to access the aforementioned destinations.

Figure 3.5: Pedestrian volume counts (500+ ADT)



Source: Kempsey Shire Council

However, one site has had three counts within metres of the others and can be used for comparison. Figure 3.6 depicts the location of these counts adjacent to the main footbridge to the beach.

Figure 3.6: Location of footbridge pedestrian counts



Source: Kempsey Shire Council

Table 3.4: Footbridge pedestrian volumes

Site	Date of Count	Season	Count
1	30/10/2018	Off-peak	959
2	05/02/2016	Off-peak	809
Off-peak average			884
3	23/12/2014	Peak	2,325

Source: Kempsey Shire Council

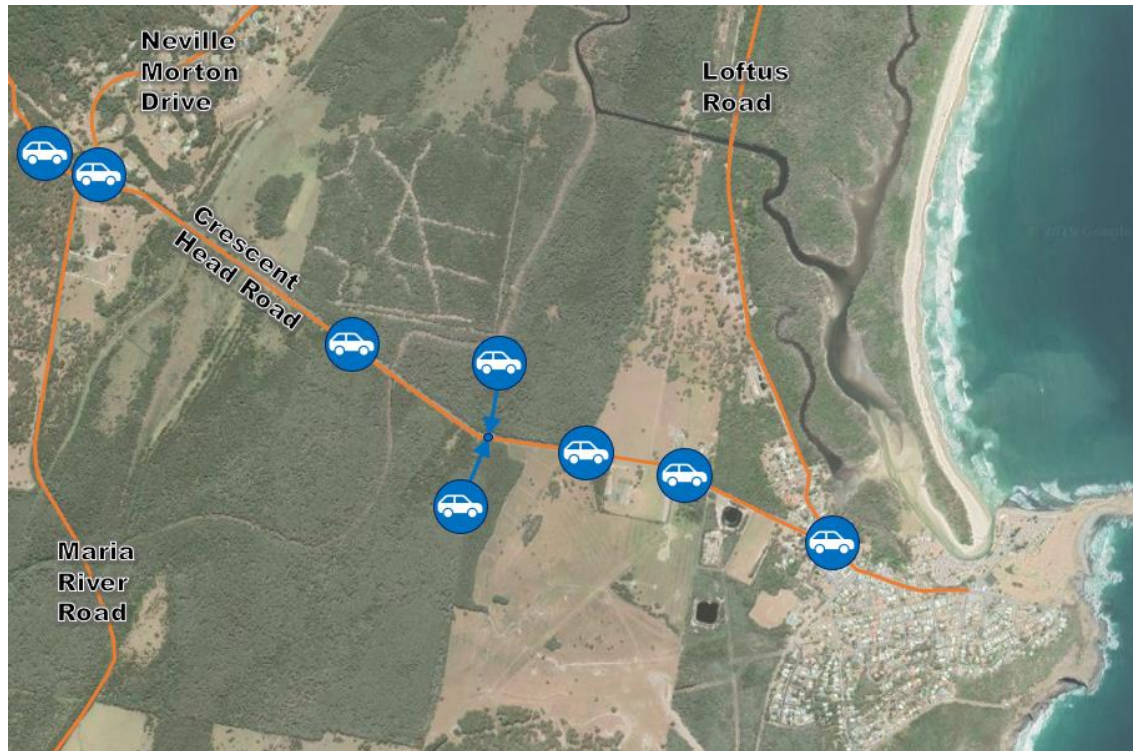
As indicated in Table 3.4, pedestrian volume in the peak season increases by 163 per cent compared to of the off-peak average. Noting this count location's proximity to both Killick Beach and the Crescent Head Holiday Park, this significant increase is unsurprising and shows Crescent Head's popularity for holidaymakers during the summer.

3.4. Crashes

An important indicator of a transport network's inherent safety qualities is the number of recorded crashes. While there has been one recorded incident on Pacific Street within Crescent Head, issues related to safety are mainly focused on the higher order Crescent Head Road (State Road). Since 2013, seven crashes have been reported between the Crescent Head town centre and the Crescent Head Road/ Maria River Road intersection, which involved six people being injured, including one serious injury.

In this context, an average of around one crash per year since 2013 is considered to be a moderate to low crash rate in relation to the recorded traffic volumes. Nonetheless, traffic speed issues that were identified above is one area that should be targeted to further reduce the risk of crashes in Crescent Head.

Figure 3.7: Crash locations (2013 to present)



Source: Transport for NSW Centre for Road Safety

3.5. Parking Occupancy

Kempsey Shire Council supplied GTA Consultants with a patchwork of parking occupancy and supply data recorded throughout 2016 and 2017. The supply data comprised information on the parking capacity at the three off-street car parks in the town centre and the beach as indicated earlier in sub-section 3.1.2, as follows:

- Beach car park: 110 spaces
- Rankine Street car park: 46 spaces
- Country Club car park (car park beside Pacific Street and town centre roundabout): 14 spaces

The overall off-street capacity in Crescent Head town centre is 170 spaces; the extent and location of these parking spaces are shown below.

Figure 3.8: Crescent Head town centre car parks



Source: Kempsey Shire Council

The parking occupancy data supplied comprised a spreadsheet of parking occupancy observations recorded intermittently between April 2016 and January 2017, typically at one-hour time points only. Unfortunately, this data did not record the locations at which the parking occupancy observations were taken. Therefore, it is unknown whether this data relates to the off-street car parks shown in Figure 3.8 only or whether it also encompasses on-street parking. Consequently, it is neither possible to attribute the parking occupancy data to any particular car park or sections of on-street parking nor relate the occupancy data to the overall supply as on some survey days, the maximum occupancy recorded exceeds the capacity of the off-street car parks (which either indicates additional parking spaces were recorded on-street for which supply data is unavailable or a counting error).

Given this data deficiency, GTA Consultants is only able to report on the number of parking spaces occupied as recorded at the following dates in Table 3.5.

Table 3.5: Number of parking spaces occupied

Date and Time	Parking spaces occupied
Wednesday 4 May 2016, 12pm	131
Saturday 7 May 2016, 1pm	153
Sunday 21 August 2016, 12pm	185
Thursday 26 January 2017, 1pm	192
Sunday 29 January 2017, 2pm	143

Source: Kempsey Shire Council

As shown in Table 3.5, while Thursday 26 January 2017 in the peak summer month had the highest number of parking spaces occupied, it is difficult to derive any discernible trends from this data due to the absence of reliable supply information from which to calculate an overall percentage occupancy.

3.6. Site Visit

To supplement the review of existing traffic and parking data, GTA Consultants conducted a site visit to Crescent Head on Friday 9 August with Dan Plummer from Plummer and Smith and Council representatives to observe local conditions and to identify any potential issues or deficiencies in the transport network. This site visit was valuable as it was able to corroborate some of the issues identified in the data above, e.g. speeding along Reserve Road. As the site visit was conducted in the off-peak season, GTA were unable to observe any peak-related traffic issues. As such, some of the issues identified were informed anecdotally by Council representatives. The high-level issues identified are reflected in the following map shown in Figure 3.9 and explained in Table 3.6.

Figure 3.9: Identified issues in Crescent Head



As shown in Figure 3.9 above, the following seven key transport issues were identified from the site visit:

Table 3.6: Identified issues from the site visit

No.	Location	Description of Issue
1	Roundabout/ entry to holiday park and car park	Tight roundabout and the boom gate entry/ exit to holiday park leads to a long vehicle queue length, which consequently leads to conflicts with pedestrians and cars trying to enter the beachside car park.
2	Car park near Bridge	Car park's central location leads to conflict with pedestrian desire lines heading to/from the bridge and people using the playground, amenities and the beach.
3	Beach car park	Although this is not a transport issue per se, Plummer and Smith and Council representatives have informed GTA Consultants that this car park when full obscures prime views towards the water and takes up valuable prime public realm right by the water.
4	Town centre roundabout	Lack of pedestrian crossing facilities, lack of information about car park capacity and availability at the beach or in the town centre - leads to cruising for parking
5	Reserve Road	Reported speeding issues, usually in the off-peak season when there are fewer vehicles. Queuing issues in the peak season. The speeding issues are corroborated by the traffic survey results in sub-section 3.2.1 above.
6	Rankine Street car park	Potential need for parking restrictions during peak seasons (e.g. 3P) to manage peak season parking demand
7	Peak parking demand issue in the peak at beach car park	Tight roundabout, the boom gate entry/exit to holiday park, high occupancy at beach car park and lack of information about car park capacity and availability leads to a long vehicle queue length, which consequently leads to conflicts with pedestrians and cars trying to enter the beachside car park as well as cruising for parking.
8	Main Street	Traffic circulation and pedestrian access issues impacting the shopping precinct fronting the eastern end of Main Street.
9	Pacific Street	Lack of safe pedestrian crossing facility at Pacific Street, between Hill Street and Willow Street.
10	Willow Street	Lack of pedestrian and cyclist connectivity along Willow Street between Pacific Street and the foreshore park.
11	Willow Street	Overflow parking in the peak season, occurring on Willow Street and the adjoining open space areas.
12	Crescent Head Holiday Park	Overflow of parking in the peak season.

3.7. Conclusions

Based on the review of the automatic traffic count data and parking survey results as well as the site visit, it can be concluded that:

- Traffic volumes are low outside of the peak summer months for the majority of the year but rises significantly by an average of 50 to 60 per cent during peak summer months.
- Traffic speeds are generally lower than the posted speed limit. However, there is a need to reduce speeds on Reserve Road towards the Crescent Head Holiday Park and beach as these were surveyed at more than double the posted speed limit. With large pedestrian volumes in the peak season, it is desirable to mitigate the risk of conflict between these two user groups by lowering vehicular speeds.
- Similar to traffic volumes, pedestrian volumes reach its peak in the summer months, especially at popular hotspots such as the footbridge to Killick Beach, the Surf Lifesaving Club and at the southern end of Reserve Road (acts as a gateway to the beach). Pedestrian counts at the footbridge were almost three times higher in the peak season than in the off-peak season.
- An average of around one crash per year was recorded in Crescent Head since 2013. This rate is relatively low given Crescent Head's traffic volumes and population but opportunities still remain to improve transport safety in Crescent Head, such as speeding issues.
- Poor data quality meant a comprehensive picture of parking occupancy was not able to be derived, however based on the data on the number of parking spaces occupied and from Council representatives' anecdotal evidence, there is a high level of parking demand in the town centre in the peak summer months, especially at the beachside car park.
- Cycling facilities are generally absent in the town centre except for a shared path between the town centre and the public school, although a shared path is planned on Pacific Street/Rankine Street that would be routed towards the outer parts of Crescent Head. In terms of walking, footpaths are generally provided on the town centre streets.
- Public transport services to and from Crescent Head town centre are limited with a service frequency of three services per day on weekdays and no services on Sunday.
- GTA's site observations and discussions with Council representatives revealed further issues including:
 - Conflicts between vehicles accessing the beachside car park, vehicles accessing the holiday park and pedestrians at the beach due to the layout of the car park, roundabout to the holiday park and vehicle queueing.
 - The car park beside the footbridge at the beach blocking pedestrian desire lines to the beach and other amenities.
 - Speeding issues on Reserve Road.
 - Crescent Head town centre's bus stop does not have footpath access.
 - The northern beachside car park obscuring views toward the water and occupying prime waterfront land.
 - Lack of information on parking availability and capacity at the entrance to Reserve Road, which leads to unnecessary cruising for parking and vehicle queueing.
 - Lack of parking demand management in the peak months.

Based on the review of existing traffic and transport conditions and associated issues provided in this section, the next section explores potential opportunities to address these issues and identifies a range of possible appropriate solutions.

4. FUTURE TRANSPORT APPRAISAL

4.1. Introduction

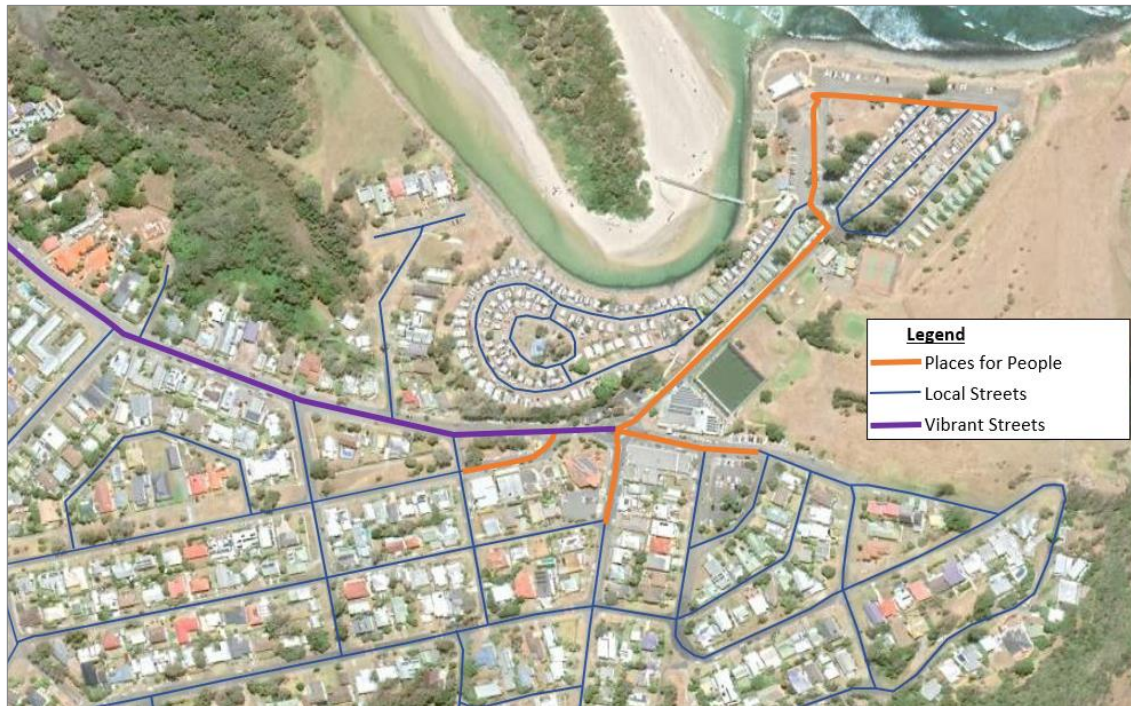
The purpose of this section is to explore and outline future potential changes in the transport network that can be implemented to target and address the transport issues identified in the preceding section. The potential changes to be explored are set within the appropriate classifications of Crescent Head's streets under the NSW Government's 'Movement and Place' framework. Identifying and classifying streets in the study area under this framework will assist in developing contextually appropriate solutions to address the prevailing transport issues.

Following this application of the Movement and Place framework, the opportunities for improvement are discussed further under the headings of traffic and transport, parking, walking and cycling before the opportunities are summarised into recommended mitigation measures.

4.2. Movement and Place

As shown in Figure 2.4 above, the Movement and Place framework defines the range of roads and streets classifications that are appropriate for road and street networks throughout NSW. In Crescent Head's context, it is considered that the town centre and beachside area comprise principally local streets and places for people where slow vehicle movements, access by walking and cycling, and people-oriented activities such as meetings on the street and walking to the beach. Conversely, the main Crescent Head Road on the outer parts of Crescent Head leading into and out of the town would be considered as a 'movement corridor'. Along Pacific Street, where movement functions mix with local residential land uses, it is GTA's view that a 'vibrant street' classification is appropriate. GTA's classification of these streets under the framework is illustrated in Figure 4.1 below and subsequently explained in the sub-sections that follow.

Figure 4.1: Movement and Place in Crescent Head



The implications for the different classifications illustrated in Figure 4.1 above are explained below.

4.2.1. Places for People

These streets are for people-oriented activities and vehicle movements are of low priority. Accordingly, solutions should be oriented toward minimising or slowing down vehicle movements and allocating more street and public space for people to enjoy, communities to be proud of and to attract visitors.

The streets listed under this classification as shown above include Reserve Road, the existing beachside car park area, and the parts of Rankine Street, East Street and Main Street with commercial shop frontage.

4.2.2. Local Streets

These streets typify quiet suburban residential streets which facilitate local access to dwellings and community facilities where traffic volumes and speeds should be minimised to a level that is commensurate with the surrounding residential environment. In this regard, the local streets in Crescent Head would generally comprise the residential streets situated to the south of Pacific Street and Rankine Street, as well as other streets off Pacific Street such as Belmore Street and Willow Street.

4.2.3. Vibrant Streets

Vibrant streets are those that have clear movement functions as well as functions that support other activities such as residential living, commercial activities and/or community functions. Solutions for such streets will need to make an appropriate balance between these competing needs. Streets in Crescent Head that fall under this classification include Pacific Street west of the town centre roundabout towards Crescent Head Public School.

4.3. Traffic and Transport

Table 4.1: Potential Traffic and Transport Solutions

No.	Issue	Potential Solution	Explanation
1	Speeding on Reserve Road	Traffic treatments to reduce speeds along Reserve Road that recognise its use by pedestrians, cars and campervans heading to the beach and holiday park. Potential treatments include: • Speed humps (amenable to campervans); • Chicanes/lane shifts, either through built blocks or planters; The proposed traffic treatments can be supported by an investigation into transforming Reserve Road into a 10 km/h shared zone in accordance with Roads and Maritime guidelines on shared zones (TTD 2016/001).	Speeds were surveyed to be problematic on Reserve Road as they were recorded at over twice the posted speed limit of 15 km/h. Moreover, the northern part of Reserve Road beside the roundabout to the holiday park is marked as a shared zone, so it is important that speeds are in keeping with this designation and with this street's proposed 'Places for People' classification. The use of gentle speed humps that are appropriate for campervans and installing chicanes/lane shifts through planters of built blocks are cost-effective ways of reducing speeds without the need for a costly reconstruction of Reserve Road to high-quality shared zone standard (i.e. through high quality paver surface treatment). Transforming Reserve Road into a formal shared zone would provide a regulatory means to formalise the low-speed environment, although it is unlikely a high quality 'Category 1' kerbless shared zone as per TTD 2016/001 could be realised given the cost implications. A 'Category 2' shared zone with kerbs may be more realistic.
2	Vehicle queuing along Reserve Road during peak periods	Implement a parking availability communication system whereby a team of two to three traffic management workers are employed in the peak months to communicate parking availability/capacity at the beachside car park to incoming drivers. One worker would be stationed at Pacific Street before the town centre roundabout. This worker would be informed of the parking availability by another worker stationed at the beachside car park via electronic means (e.g. walkie talkie, phone, etc.). Where the car park is at capacity, the worker at Pacific Street could cone off the entrance to Reserve Road and direct drivers to other car parks (e.g. Rankine Street) or to on-street parking in the town centre. Such a system will need to be subject to the development of a traffic management plan for the peak period, and the workers will need to be accredited traffic controllers.	The implementation of this system would avoid drivers unnecessarily driving down Reserve Road to look for a parking space when the car park is already full, which will reduce vehicle queuing, volumes and congestion along Reserve Road and at the beachside car park area.
3		Convert the car park beside the town centre roundabout into a pick up/drop off area for beachgoers and holiday park users during peak periods only.	A large proportion of the vehicle queuing and congestion issues along Reserve Road is comprised of cars and campervans trying to find a parking space or waiting to check in to the holiday park but being held up by the boom gate entry and exit. Providing a temporary pick up/drop off area at this car park allows drivers to pick up/drop off visitors at a convenient location near beach and holiday park without the need to drive the whole way down Reserve Road. Outside of peak holiday periods, this area will remain as a car park.

Figure 4.2: Potential traffic and transport solutions



4.4. Parking

Table 4.2: Potential Parking Solutions

Issue	Potential Solution	Explanation
Beachside parking layout obstructing pedestrian desire lines and prime waterfront area	There is the potential to reconfigure the present marked parking on the northern side of the beach and the all of the marked parking near the footbridge/holiday park to a presently underutilised triangular piece of land centrally located in the beachside area (Refer to Figure 4.3 below and Appendix A for the indicative concept drawing).	Through this proposed reconfiguration, there would be no net loss of parking while significantly improving the movement outcomes for pedestrians moving to and from Killick Beach and provides substantially more space in the present car park area for other landscape improvements that would contribute to this area's proposed classification as a 'Place for People' under the Movement and Place framework. As such, this solution not only improves the parking layout at the beach but also improves the pedestrian amenity and safety outcomes in this area.
High parking demand	Proposed peak period pricing/permitting/time restriction regime that runs from December to February each year. At the beachside car park, hourly/daily pricing is proposed for visitors, while local Crescent Head residents would qualify for a permit that exempts one vehicle from the prevailing tariff. A potential regime for the beachside car park priced and permitted hours could include: Monday to Sunday, 8am to 6pm Outside of these times, parking would be unpriced or not require a resident's permit. Time restrictions are to be applied to the Rankine Street car park, with the Pacific Street car park by the roundabout being used as a pick-up/drop off area in the peak months.	High parking demand at the beachside car park and in the town centre are proposed to be managed through peak period pricing, permitting and time restrictions. At the town centre car parks, time restrictions can be implemented to encourage turnover of spaces to support economic activity in the local shops and to manage parking occupancy to around 85 per cent, which is a level which encourages parking utilisation but not so high that drivers cannot find a parking space. Pricing is recommended at the beachside car park as it is recognised that existing time restrictions have not been adequate to manage high visitor demand. Implementing a reasonable hourly and/or daily tariff will encourage vehicle turnover among visitors as there is a price disincentive to staying for long durations, which will give other visitors a chance to access the beachside car park. In recognition of the potential negative reaction among local residents to peak period pricing, an exemption permit is recommended to be issued to one vehicle per dwelling.
Formalise on-street parking on Rankine Street immediately south of the golf course between May Street and Gowing Street	Pave and mark out parking spaces on this strip of road reserve to increase the town centre's parking capacity, which will be beneficial during the peak months of high demand. (Refer to Figure 4.4 below).	This strip of land is informally being used as overspill parking from the town centre and beach during peak months. Formalising this parking will boost parking supply within walking distance to the shops and beach.
Willow Street parking	Willow Street also offers the opportunity to formalise additional parking spaces either on-street or off-street.	The provision of additional parking spaces on Willow Street would be able to cater for peak parking demand during the holiday season. Its location adjacent to a pedestrian pathway towards Crescent Head Holiday Park and the beach means this additional parking would be accessible for holidaymakers and beachgoers.

Figure 4.3: Proposed beachside car park reconfiguration (conceptual)

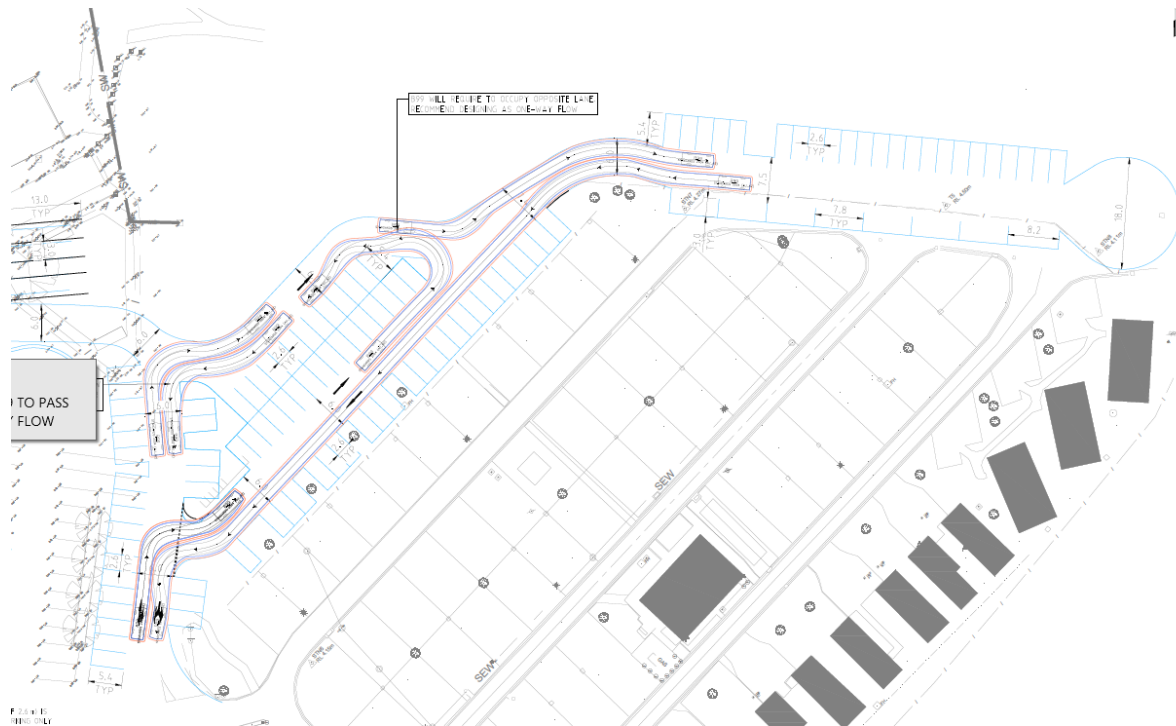


Figure 4.4: Proposed formalised parking on Rankine Street



4.5. Walking and Cycling

Table 4.3: Potential Walking and Cycling solutions

Issue	Potential Solution	Explanation
Shared path severance	Extension of existing shared path by the Hill Street/ Main Street intersection towards Pacific Street and Rankine Street in the town centre.	The existing shared path from the Public School to the town centre stops at this intersection, which severs meaningful connections to the main town centre areas along Pacific Street, Rankine Street, East Street and Main Street. Extending this shared path in the manner proposed provides safe connections between the school and the town centre and is aligned with the proposals in the Kempsey Shire Bike Plan and PAMP.
Lack of crossing facilities at town centre roundabout and midblock on Pacific Street	Add refuge island crossings (2.0m wide) at the Reserve Road, Rankine Street and East Street legs of the town centre roundabout, and on Pacific Street near Willow Street	There are no crossing facilities at these locations, which makes crossing by pedestrians and people on bicycles unsafe. The installation of these refuge island crossings will improve crossing safety. Zebra crossings have not been considered as traffic and pedestrian volumes are unlikely to be sufficiently high to justify them. While refuge islands may provide an adequate level of safety in respect of traffic volumes experienced at the roundabout for much of the year, it is acknowledged that there are safer crossing treatments available for consideration such as wombat crossings. The suitability of installing wombat crossings at this intersection will need to be the subject of further detailed investigation in terms of whether existing traffic volumes would justify their installation.

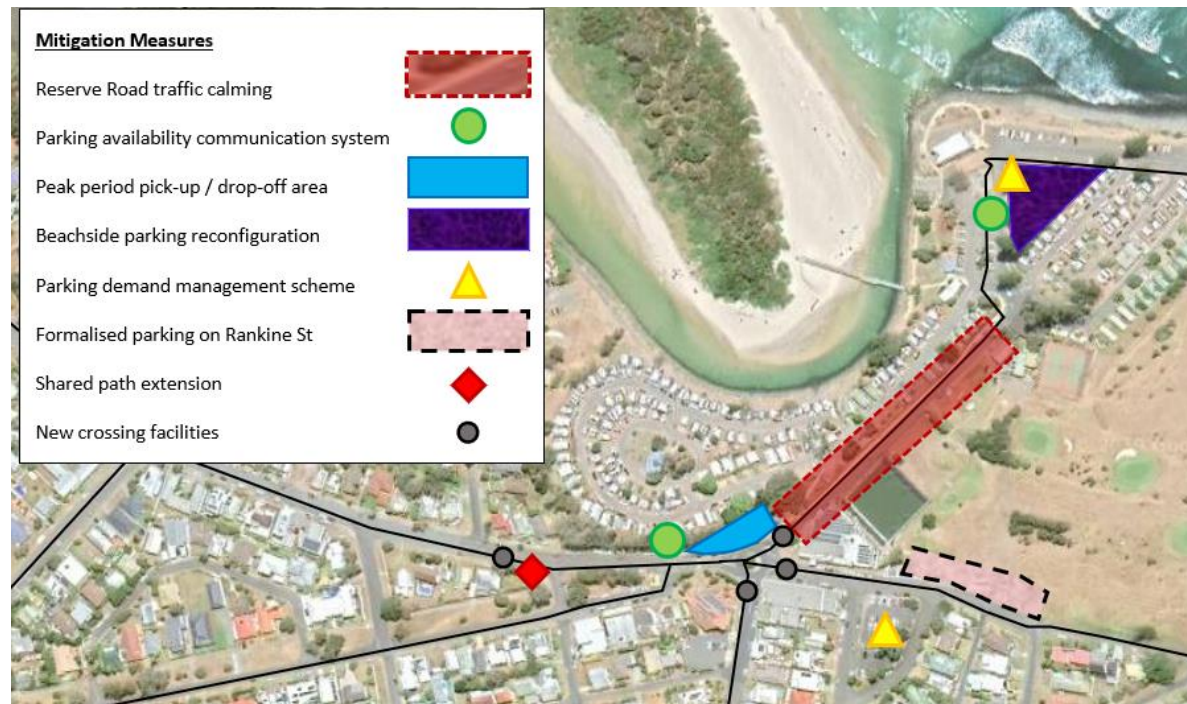
Figure 4.5: Potential Walking and Cycling Solutions



4.6. Summary of Mitigation Measures

The measures outlined above are summarised together in Figure 4.6 below.

Figure 4.6: Summary of Mitigation Measures



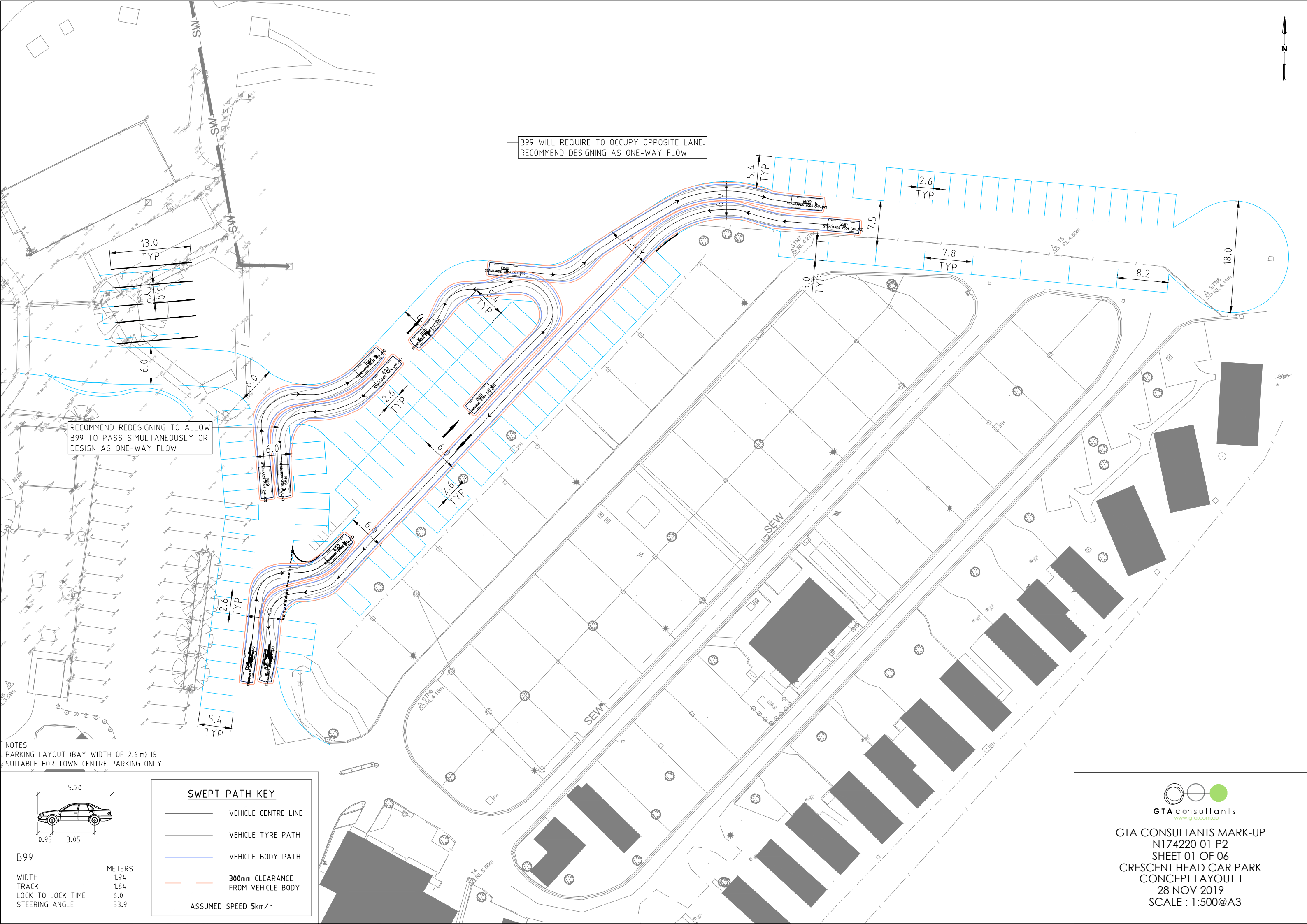
In summary, the mitigation measures outlined target the speeding, parking demand, traffic and walking and cycling safety and amenity problems identified through the existing conditions review and site visit. All the measures outlined are recommended to be incorporated into Plummer and Smith's landscape plan for Crescent Head and subsequently implemented by Kempsey Shire Council. The recommended mitigation measures are categorised into the table below which outlines their recommended timeframes for implementation which respond to their relative priority.

Table 4.4: Implementation Plan

Principal Activity	Recommended Measure	Priority	Timeframe for Implementation
Traffic management	Reserve Road Traffic Calming	High	Immediately after February 2020 to minimise disruption for the impending peak season
Parking and traffic management	Peak period pick up/ drop off area for Pacific Street car park beside roundabout	High	In place for December 2019
Parking	Parking Availability Communication System	High	In place for December 2019
Parking	Beachside parking reconfiguration	High	Immediately after February 2020 to minimise disruption for the impending peak season
Parking	Parking demand management scheme	High	Immediately after February 2020 to minimise disruption for the impending peak season
Parking	Formalise parking on Rankine Street	Medium	2020 onwards
Walking and cycling	Shared path extension	Medium	2020 onwards
Walking and cycling	Adding roundabout crossing facilities	Medium	2020 onwards

A. BEACHSIDE CAR PARK RECONFIGURATION PLAN

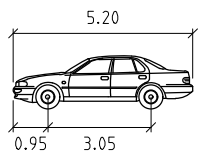




B99 WILL REQUIRE TO OCCUPY OPPOSITE LANE.
RECOMMEND DESIGNING AS ONE-WAY FLOW

RECOMMEND REDESIGNING TO ALLOW
B99 TO PASS SIMULTANEOUSLY OR
DESIGN AS ONE-WAY FLOW

NOTES:
PARKING LAYOUT (BAY WIDTH OF 2.6 m) IS
SUITABLE FOR TOWN CENTRE PARKING ONLY



B99

WIDTH : 1.94
TRACK : 1.84
LOCK TO LOCK TIME : 6.0
STEERING ANGLE : 33.9

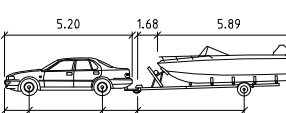
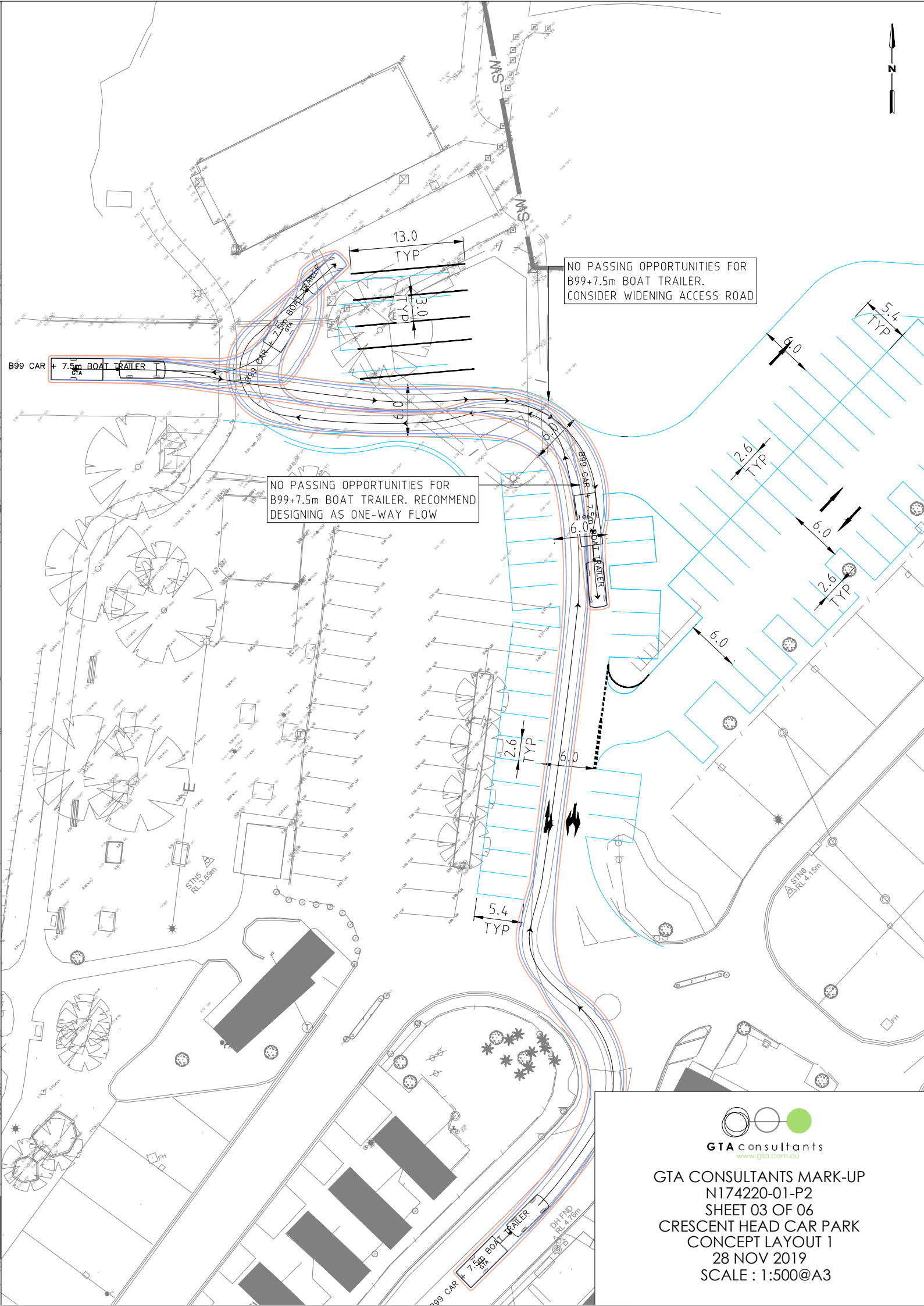
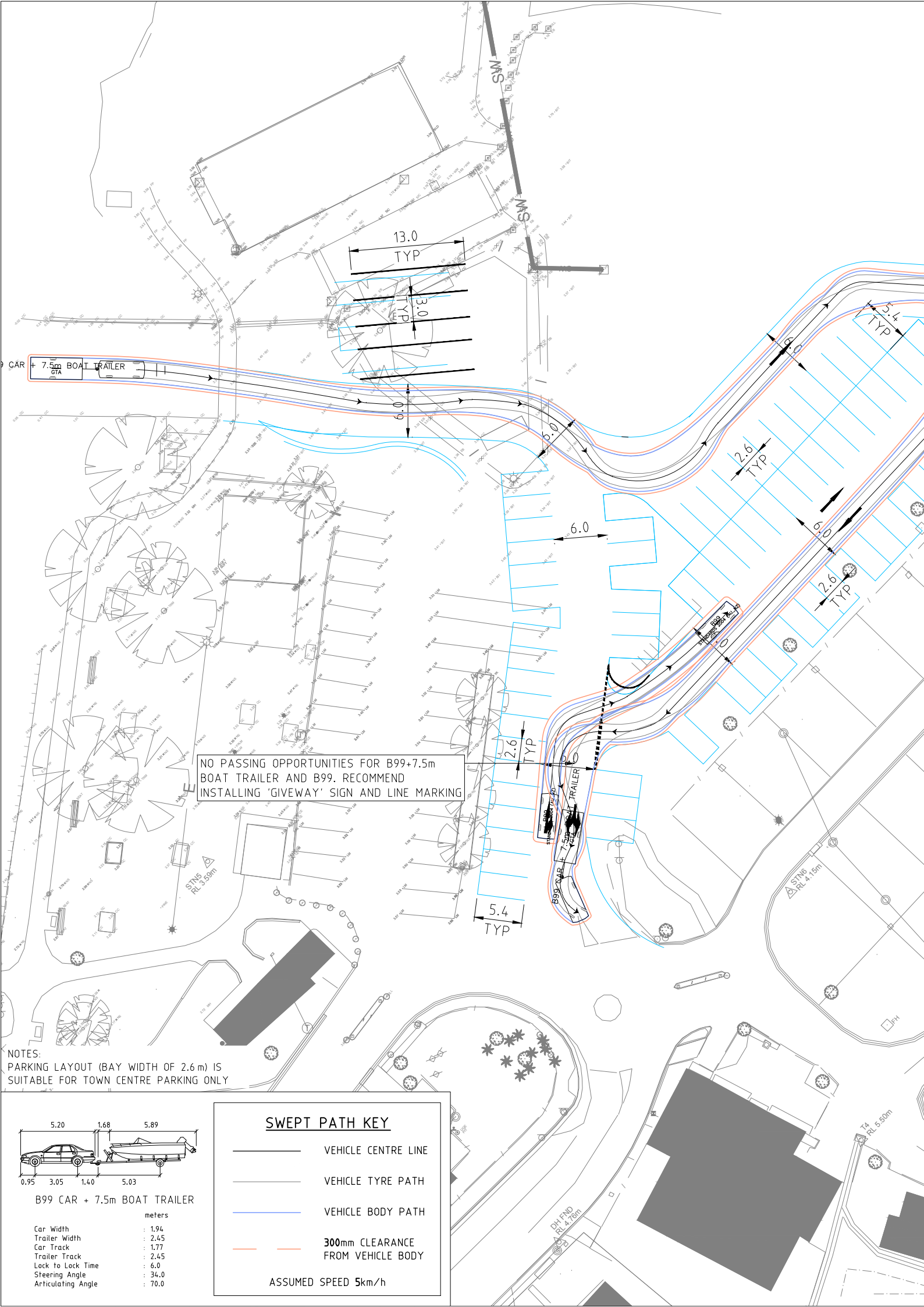
METERS
: 1.94
: 1.84
: 6.0
: 33.9

SWEPT PATH KEY

- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



GTA CONSULTANTS MARK-UP
N174220-01-P2
SHEET 01 OF 06
CRESCENT HEAD CAR PARK
CONCEPT LAYOUT 1
28 NOV 2019
SCALE : 1:500@A3

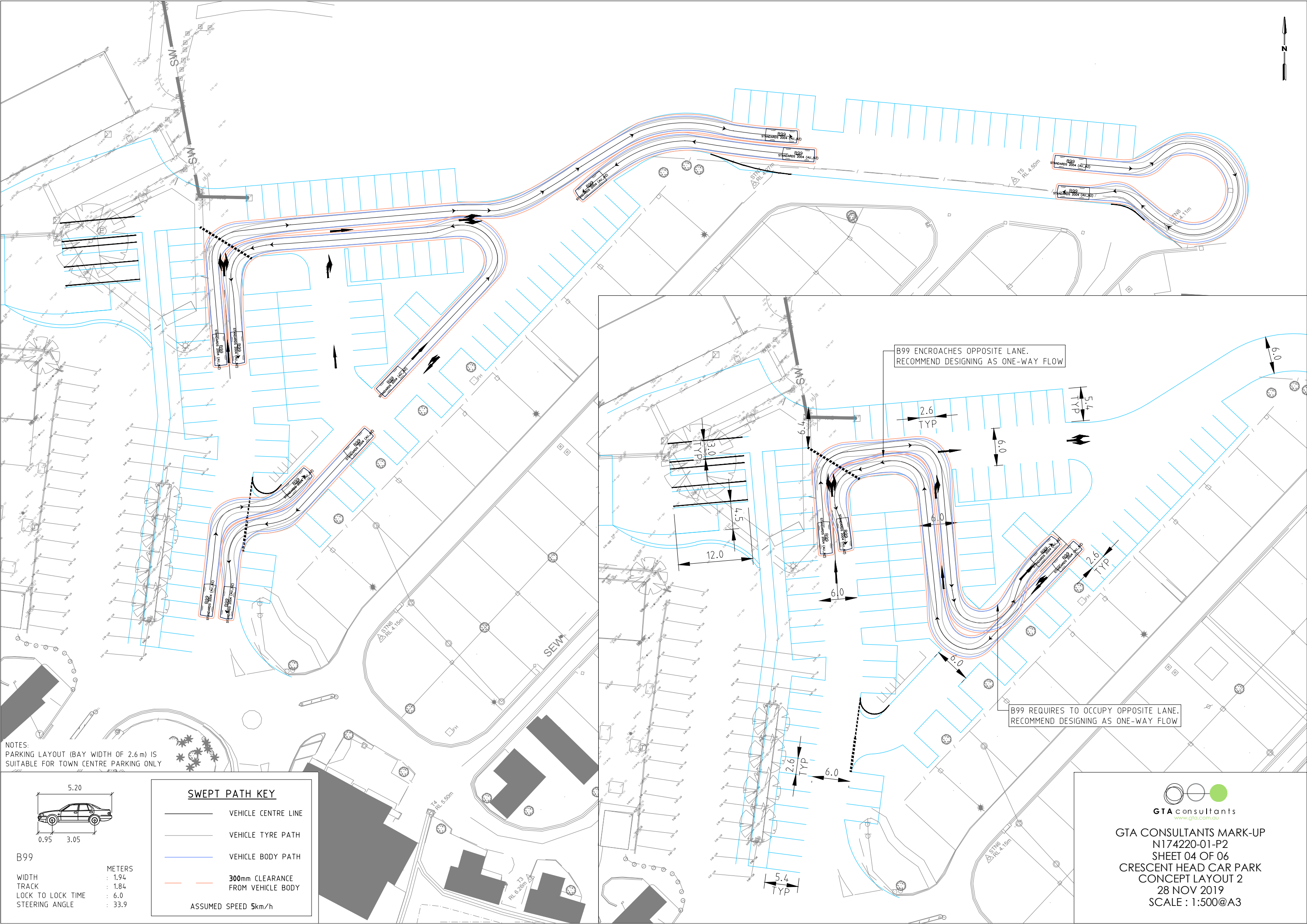


B99 CAR + 7.5m BOAT TRAILER	
meters	
Car Width	1.94
Trailer Width	2.45
Car Track	1.77
Trailer Track	2.45
Lock to Lock Time	6.0
Steering Angle	34.0
Articulating Angle	70.0

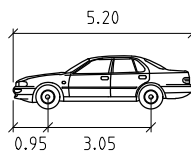
SWEPT PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	300mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	



GTA CONSULTANTS MARK-UP
N174220-01-P2
SHEET 03 OF 06
CRESCENT HEAD CAR PARK
CONCEPT LAYOUT 1
28 NOV 2019
SCALE : 1:500@A3



NOTES:
PARKING LAYOUT (BAY WIDTH OF 2.6 m) IS
SUITABLE FOR TOWN CENTRE PARKING ONLY



B99
WIDTH : 1.94
TRACK : 1.84
LOCK TO LOCK TIME : 6.0
STEERING ANGLE : 33.9

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

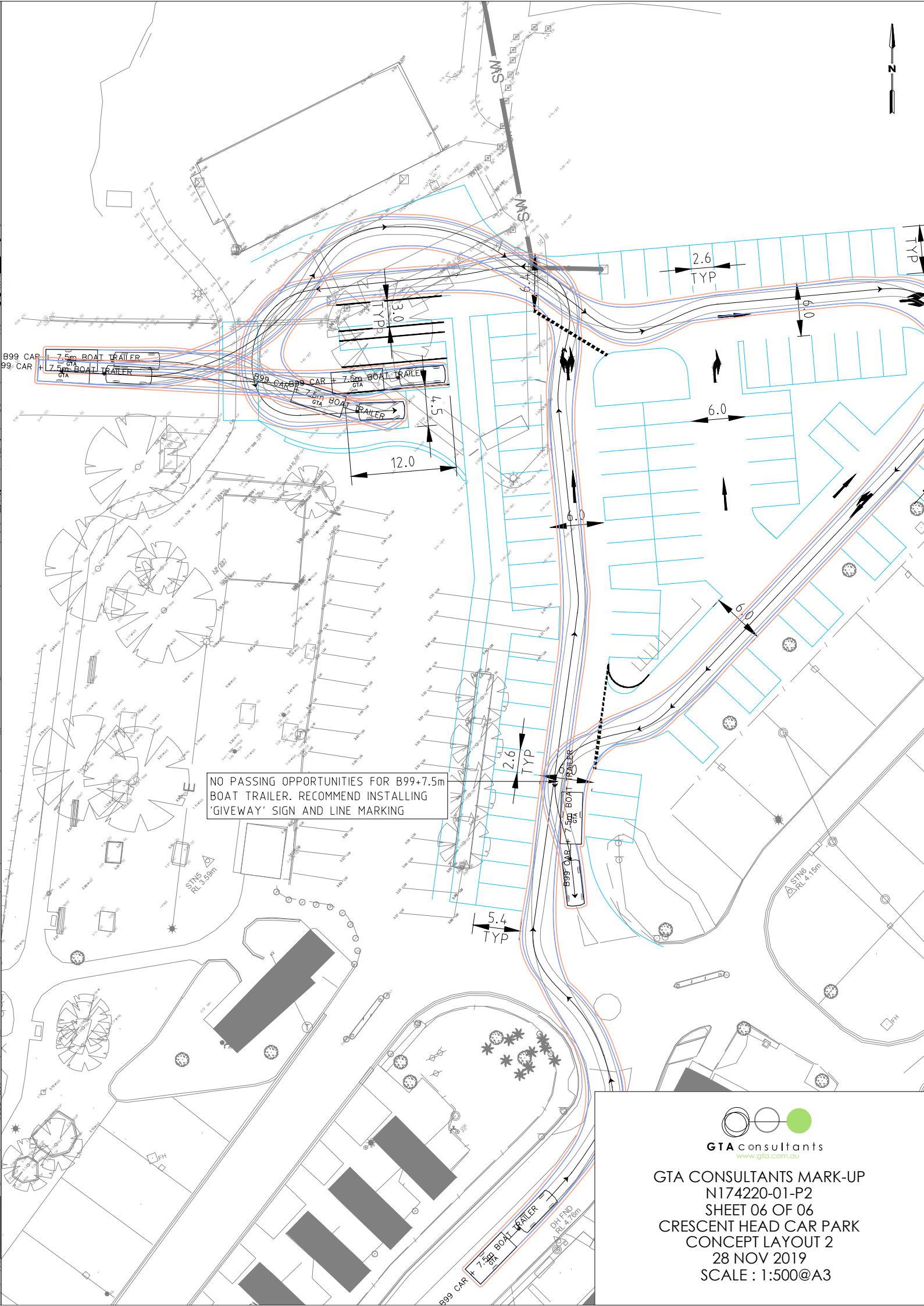
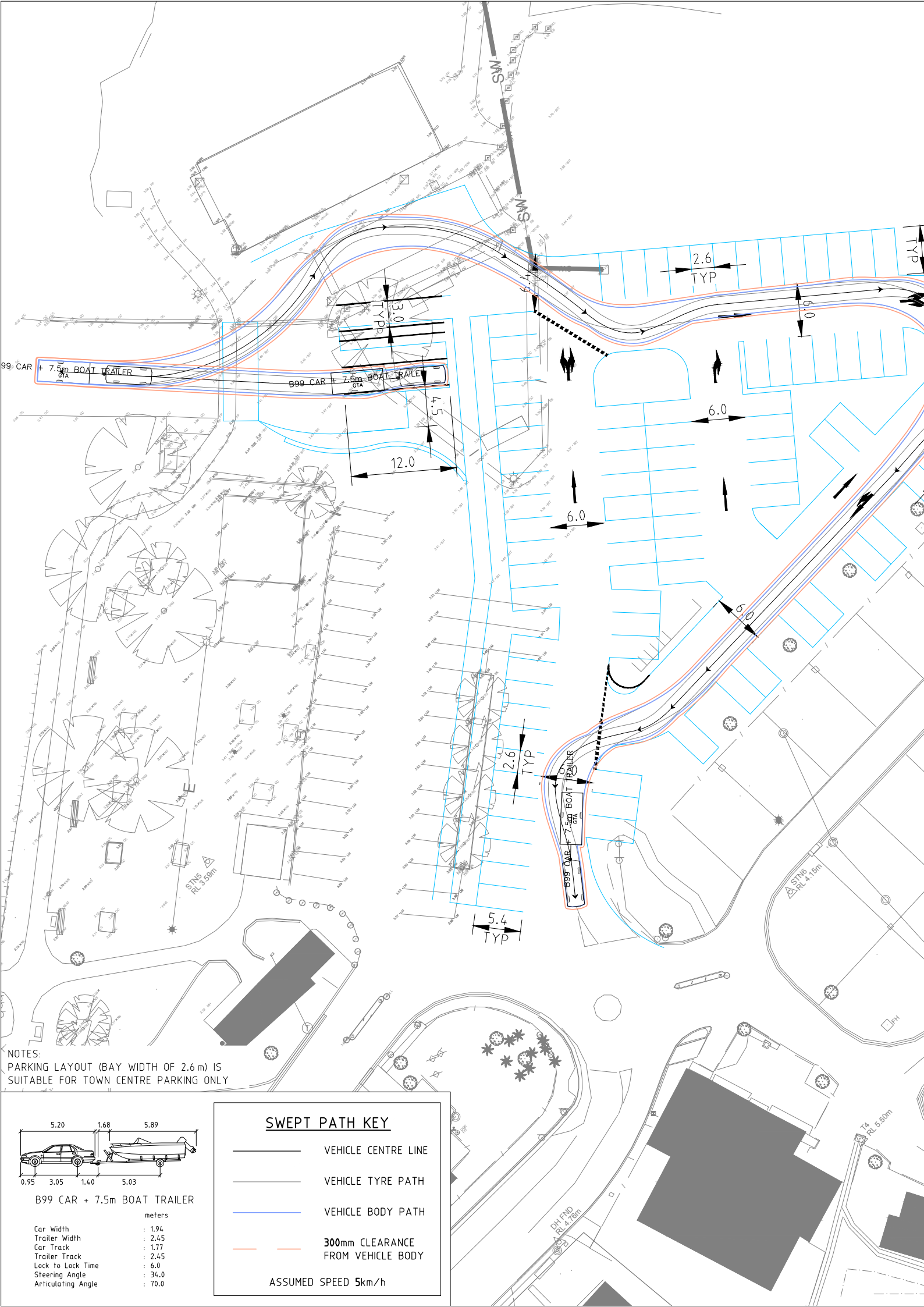
ASSUMED SPEED 5km/h

B99 ENCROACHES OPPOSITE LANE.
RECOMMEND DESIGNING AS ONE-WAY FLOW

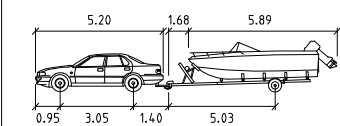
B99 REQUIRES TO OCCUPY OPPOSITE LANE.
RECOMMEND DESIGNING AS ONE-WAY FLOW



GTA CONSULTANTS MARK-UP
N174220-01-P2
SHEET 04 OF 06
CRESCENT HEAD CAR PARK
CONCEPT LAYOUT 2
28 NOV 2019
SCALE : 1:500@A3



NOTES:
PARKING LAYOUT (BAY WIDTH OF 2.6 m) IS
SUITABLE FOR TOWN CENTRE PARKING ONLY



B99 CAR + 7.5m BOAT TRAILER

	meters
Car Width	1.94
Trailer Width	2.45
Car Track	1.77
Trailer Track	2.45
Lock to Lock Time	6.0
Steering Angle	34.0
Articulating Angle	70.0

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h

NO PASSING OPPORTUNITIES FOR B99+7.5m
BOAT TRAILER. RECOMMEND INSTALLING
'GIVEWAY' SIGN AND LINE MARKING



GTA CONSULTANTS MARK-UP
N174220-01-P2
SHEET 06 OF 06
CRESCENT HEAD CAR PARK
CONCEPT LAYOUT 2
28 NOV 2019
SCALE : 1:500@A3

