TTM Consulting (Vic) Pty Ltd

9th August, 2013

Paul Bolster
P. Guinane Pty. Ltd.
PO Box 1990,
KINGSCLIFF NSW 2487

Dear Paul,

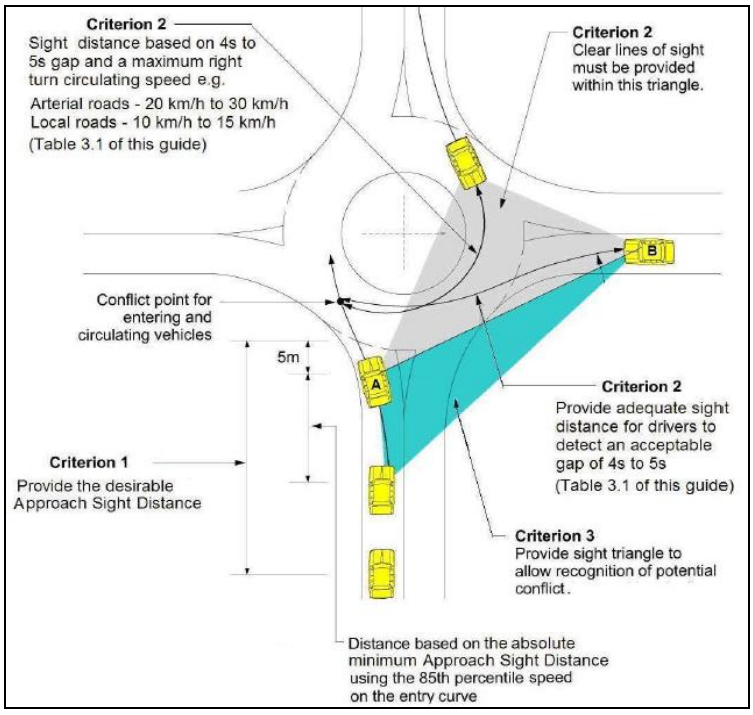
PROPOSED SERVICE CENTRE DEVELOPMENT
LOT 11 DP 1134229, LOT 1 DP1165676 AND LOT 1 DP210674,
PACIFIC HIGHWAY AND TWEED VALLEY WAY, CHINDERAH
ADDENDUM TO THE TRAFFIC IMPACT ASSESSMENT

The following letter addresses sight distance requirements at the proposed roundabout on Tweed Valley Way and the likelihood of traffic using the service centre as a short-cut.

The letter forms an addendum to the traffic impact assessment (7064R6787B) prepared by TTM Consulting (Vic) Pty. Ltd. for the above development application.

Review of Sight Distance at Roundabout

AustRoads 'Guide to Road Design Part 4B : Roundabouts' identifies three (3) sight distance criteria which must be applied to the combination of vertical and horizontal geometry at roundabouts. These criteria are reproduced in the diagram below :-



AUSTROADS GTRD PART 4B - FIGURE 3.1

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Criterion 1 requires that adequate approach sight distance (ASD) be provided from the driver of a approaching vehicle to the holding lines of the roundabout. Given that the roundabout will service a considerable volume of larger vehicles, the more conservative 'truck stopping sight distance' (TSSD) is desirable.

RMS has recommended the approaches to the roundabout on Tweed Valley Way be reduced to 60kph. Based on a design speed of 70kph (10kph above the proposed posted speed limit), the TSSD value for vehicles approaching the roundabout on Tweed Valley Way is 105 metres.

The roundabout has been appropriately located towards the southern boundary of the site and the above sight distance requirement will be met on both the northbound and southbound approaches.

Criterion 2 requires that a driver stationary at a holding line have clear line of sight to an entering vehicle on the approach to the immediate right. Given the roundabout has 3 legs, this requirement is applicable to the site egress and the northbound approach.

Vehicles entering the roundabout to the right of the site egress will be in a 60pkh zone. Vehicles entering the roundabout to the right of the northbound approach will be exiting the service centre at relatively low speed (approximately 20kph). These speeds generate sight distance requirements of 105 metres and 44 metres respectively, which should easily be achieved.

The sight triangle requirements outlined in **Criterion 2 and 3** will require that suitable landscaping be provided on the central island and around the kerb return radii. Trees should be located outside of driver sight lines.

These requirements will be designed for and assessed during the detailed design stage.

Likelihood of 'Short-Cut' Traffic through the Site

Whilst the Service Centre will create a more direct route from the Pacific Highway northbound carriageway to the Tweed Valley Way southbound carriageway, it will not be a more convenient route.

The ramp into the site has been designed with an exit speed of 30kph. Therefore, if a driver were to use the site as a 'rat-run' they would be required to slow significantly upon entry before proceeding to weave through the truck fueling and parking areas at a speed of around 20kph. When exiting the site at the proposed roundabout on Tweed Valley Way, the driver would then be required to give way to the traffic stream they originally departed.

By way of contrast, a regular driver would utilise the freeway exit ramp which has a posted speed limit of 80kph. They would slow to 60kph on approach to the roundabout and have right of way over vehicles exiting the service centre.

The use of the site as a short-cut would provide no obvious benefit.

Yours faithfully,
TTM Consulting (Vic) Pty. Ltd.

Matthew Duffy

TTM Consulting (Vic) Pty Ltd

PROPOSED SERVICE CENTRE DEVELOPMENT
LOT 11 DP 1134229, LOT 1 DP1165676 AND LOT 1 DP210674,
PACIFIC HIGHWAY AND TWEED VALLEY WAY, CHINDERAH
TRAFFIC IMPACT ASSESSMENT

Prepared By

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For

P. Guinane Pty. Ltd.
PO Box 1990,
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1. INTRODUCTION AND SCOPE

TTM Consulting (Vic) Pty. Ltd. has been engaged by 'P Guinane Pty. Ltd.' to prepare a traffic impact assessment for a proposed service centre development on land located on the south-western side of the Pacific Highway and Tweed Valley Way interchange, Chinderah.

The following report addresses the traffic implications of the proposal, including the adequacy of the on-site parking provision, the suitability of the site access arrangements and the likely impacts on existing proximate traffic conditions.

The report concludes that there are no traffic or parking grounds which should warrant refusal of the Development Application.

2. THE EXISTING SITE

2.1 The Subject Site

The subject site has an area of 39,003 square metres and is located on the south-western side of the Pacific Highway and Tweed Valley Way interchange, Chinderah.

Figure 1 shows the location of the site and the surrounding road network :-

FIGURE 1 : SITE LOCALITY PLAN

The Pacific Highway (northbound) to Tweed Valley Way (southbound) exit ramp forms the east, west and northern boundaries of the subject site. The 'Melaleuca Station Memorial Gardens and Crematorium' forms the southern boundaries of the site.

The following aerial photograph shows the boundaries of the subject site in respect of the abutting road reservations :-

SUBJECT SITE BOUNDARIES

The subject site is zoned for agricultural use '1(b2)' in the Tweed Local Environment Plan 2000. The subject site is vacant and no vehicular access from the abutting street network is currently provided.

2.2 Street Network

Pacific Highway is a motorway under the care and control of Roads and Maritime Services (RMS).

At the location of the subject site, Pacific Highway comprises dual carriageways which are separated by a median of approximately 8 metres width. Each carriageway comprises two (2) travel lanes that are approximately 3.5 metres in width and an outer emergency stopping lane. The existing speed limit along Pacific Highway in the vicinity of the site is 110kph.

The following photographs show the existing configuration of Pacific Highway to the east of the site.

LOOKING NORTH

LOOKING SOUTH

PACIFIC HIGHWAY CONFIGURATION

Tweed Valley Way is an arterial road under the care and control of Tweed Shire Council.

Tweed Valley Way in the vicinity of the site comprises dual carriageways that are separated by a median of approximately 8 metres width. Each carriageway typically comprises two (2) travel lanes and an outer emergency stopping lane. The existing speed limit along Tweed Valley Way adjacent to the site is 80kph in the southbound direction and 100kph in the northbound direction.

The following photographs show the existing configuration of Tweed Valley Way to the south west of the subject site :-

LOOKING NORTH-EAST

LOOKING SOUTH-WEST

TWEED VALLEY WAY CONFIGURATION

2.3 Tweed Valley Way / Pacific Highway Interchange

The subject site is located on land to the south-west of the Pacific Highway / Tweed Valley Way interchange. The interchange provides fully directional access between the two roads.

The Pacific Highway (northbound) to Tweed Valley Way (southbound) exit ramp passes along the east, north and western boundaries of the site which provides for a single lane of travel.

The exit ramp diverges from the Pacific Highway to the south-east of the subject site and has been designed in accordance with the 'preferred treatment' criteria outlined in AustRoads Guide to Road Design Part 4C : Interchanges. The exit ramp merges with the Pacific Highway (southbound) to Tweed Valley Way (southbound) exit ramp along the western boundary of the subject site. The two (2) lanes currently merge into one (1) lane so that a channelised u-turn treatment can be provided opposite the entrance to the 'Melaleuca Station Memorial Gardens and Crematorium'.

3. THE PROPOSED DEVELOPMENT

'P. Guinane Pty. Ltd.' proposes to construct a Service Centre upon the subject land.

A development plan for the proposal has been prepared by 'Cadway Projects', which indicates the following inventory of uses on the site :-

Use	Inventory
Service Station - Car Filling Positions - Truck Filling Positions	 16 no. 4 no.
Service Station Convenience Store	190 sqm
Convenience Restaurants with Drive-Thru	2 no. (189 sqm)
Commercial Tenancies	3 no. (235 sqm)
Communal Dining Area	184 sqm
On-Site Car Parking Spaces - Staff Car Parking - Customer Car Parking - Bus / Caravan Parking	 20 no. 97 no. 5 no.
On-Site Truck Parking Spaces	25 no.
Loading Bays	2 no.

The Service Station will comprise sixteen (16) car fueling positions and four (4) truck fueling positions. An air and water bay is also proposed.

A Convenience Store is proposed as the point of payment for fuel purchases, which will front the car fueling points from within a larger Service Centre building comprising the following land uses :-

- Two (2) convenience restaurants with individual drive-thru components,
- Three (3) commercial tenancies which will likely accommodate similar convenience restaurant / take-away style land uses,
- Communal amenities, dining and playground areas available for the use of Service Centre customers, and
- A Truckers Lounge area.

Two (2) delivery bays are proposed; one (1) at the western corner of the building near to the Convenience Store / Tenancy 4 and one (1) at the northern corner of the building near to Tenancy 1.

On-site car parking is provided in the following arrangements :-

- A staff parking area for twenty (20) vehicles in the south-eastern corner of the site,
- A communal car parking area for eighty-three (83) vehicles located at the main pedestrian access to the Service Centre building which are proposed for the shared use of all customers to the Centre,
- A parking area for fourteen (14) vehicles at the Convenience Store frontage of the Service Centre. These spaces are for communal use but are particularly convenient for fueling customers whom wish to make additional purchases.

In addition to the above there is adequate space for a further sixteen (16) vehicles to park at the fuel pumps.

Twenty-five (25) truck parking spaces are proposed on the western portion of the site which have been designed for the use of B-doubles. A further five (5) parking spaces suitable for the use of buses or vehicles towing caravans / trailers is provided in the northern portion of the site.

Vehicular access to the site is proposed via the construction of two (2) new access points as follows :-

- An inbound access point at the south-eastern corner of the site. The access will be designed as an exit ramp from the existing exit ramp connecting Pacific Highway (northbound) to Tweed Valley Way (southbound),
- A fully directional access point on Tweed Valley Way at the western corner of the site. The access will be designed as a two-lane arterial roundabout which will provide vehicular access to and from all directions on Tweed Valley Way and Pacific Highway.

Access arrangements are discussed in more detail in Section 6.

Copies of the site concept plan and service centre floor plan are attached in Appendix A.

4. PARKING REQUIREMENTS

4.1 Tweed Shire Council Parking Requirement

Table 4.9 of the Tweed Shire Council 'Site Access and Parking Code' outlines car parking requirements for the uses on the site as follows :-

Staff Parking Requirement

Proposed Use	Equivalent Parking Code Use	Area / No	Staff Parking Rate	Staff Parking Requirement
Service Station Convenience Store	Convenience Store	190 sqm	0.5 spaces per 100 sqm	1 no.
Convenience Restaurants with Drive-Thru	Fast Food Outlets	12 no.*	1 space per staff at peak operating time	12 no.
Commercial Tenancies	Fast Food Outlets ^	7 no ^	1 space per staff at peak operating time	7 no.
Total				**20 no.**

* It is estimated that the convenience stores with drive-thru component will have in the order of six (6) staff members on-site at any one time based on three (3) back of house staff preparing meals and three (3) front of house staff working on registers / drive-thru.

^ Given the nature of the development, likely occupants of the commercial tenancies will be take-away uses that do not require a drive-thru, such as a cafe or 'Subway'. Staffing levels at the two larger outlets during peak operating times have been estimated at 3 no. The staffing level at the smaller (25 sqm) outlet has been estimated at 1 no.

Based on the above, the statutory staff parking requirement is twenty (20) spaces. The development plan indicates twenty (20) staff parking spaces will be provided to satisfy this requirement.

Customer Parking Requirement

Proposed Use	Equivalent Parking Code Use	Area / No	Customer Parking Rate	Customer Parking Requirement
Service Station Convenience Store	Convenience Store	190 sqm	3.5 spaces per 100 sqm	7 no.
Convenience Restaurants with Drive-Thru	Fast Food Outlets	189 sqm*	Greater of 12 spaces per 100 square metres gross floor area of 1 space to every 4 seats + Queuing area for 6 cars where drive-thru provided	23 no.
Commercial Tenancies	Fast Food Outlets	235 sqm*	Greater of 12 spaces per 100 square metres gross floor area of 1 space to every 4 seats	28 no.
Dining Area	Fast Food Outlets	184 sqm*	Greater of 12 spaces per 100 square metres gross floor area of 1 space to every 4 seats	22 no.
Total				**80 no.**

* Parking requirements have been based upon floor area as seating numbers have not yet been determined. The communal dining area has conservatively been included in the analysis.

Based on the above, the statutory customer parking requirement is eighty (80) spaces and each drive-thru system must accommodate six (6) queued cars without impeding on traffic flows in the parking area.

The development plan indicates provision of ninety-seven (97) customer car parking spaces which exceeds the above requirement. In addition, five (5) spaces suitable for buses or vehicles with trailers are provided at the north of the site and a further sixteen (16) vehicles can be parked besides the fuel pumps.

Diagrams which indicate the two (2) drive-thru systems provide adequate width and length for the storage of six (6) vehicles are attached in Appendix B, confirming that the queuing requirements are met.

The proposed customer car parking provision and layout of the drive-thru systems are appropriate.

4.2 RMS Heavy Vehicle Parking Requirements

RMS have advised that a minimum of twenty-five (25) spaces suitable for the use of B-doubles are required on the site to provide rest facilities for the heavy transport industry.

The development plan indicates provision of twenty-five (25) truck parking bays which satisfies this requirement.

5. TRAFFIC GENERATION AND IMPACTS

5.1 Existing Traffic Conditions

Roads and Maritime Services (RMS) have provided the following average daily traffic volumes collected from sources in the vicinity of the Pacific Highway / Tweed Valley Way interchange :-

Tweed Valley Way

- Data collected at Stotts Island (approx. 3 km south-west of the site) from 12/10/09 to 25/10/09
- Average Daily Traffic Volume (ADT) = 10,371 vehicle movements
- 8.4% Heavy Vehicles

Pacific Highway - North of Site

- Data collected at Chinderah Safe-T-Cam (approx. 2.5 km north-east of the site) from 12/10/09 to 25/10/09
- Average Daily Traffic Volume (ADT) = 30,467 vehicle movements
- 10.8% Heavy Vehicles

Pacific Highway - South of Site

- Data collected north of Clothiers Creek Interchange (approx. 10 km south of the site) from 4/09/09 to 11/09/09
- Average Daily Traffic Volume (ADT) = 21,081 vehicle movements
- 15.7% Heavy Vehicles

The following figure shows the location of these traffic volumes :-

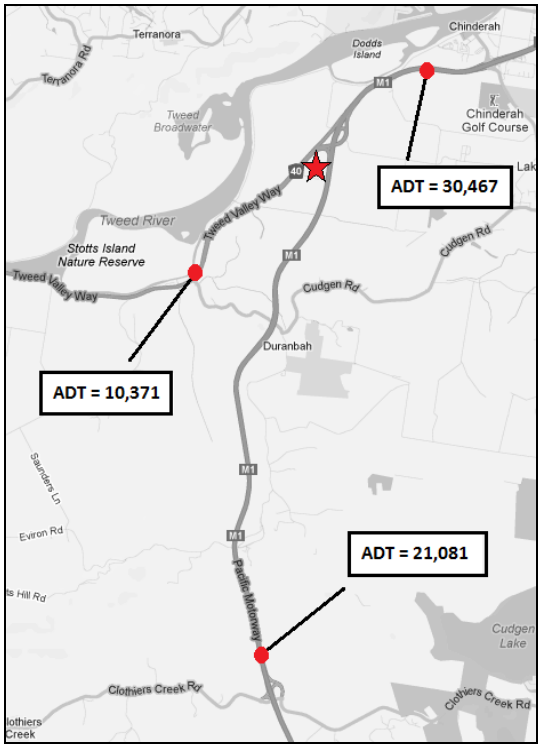
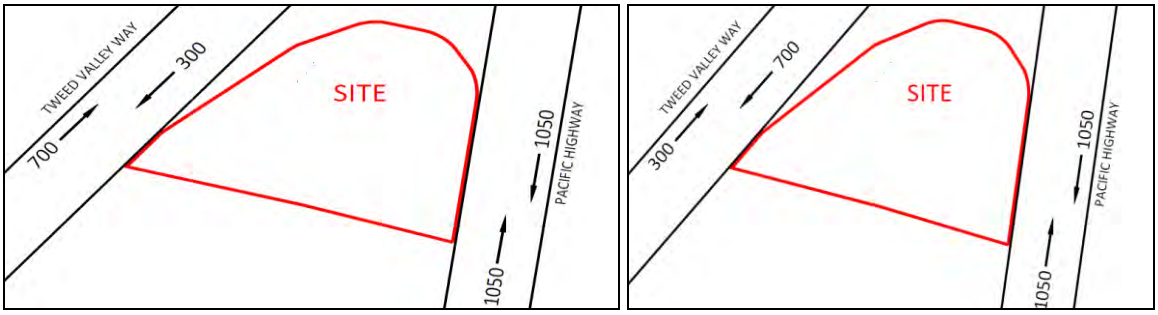


FIGURE 2 : TRAFFIC VOLUME LOCATIONS

The Pacific Highway counts presented above are from locations north and south of the Tweed Valley interchange. The difference in ADT in these locations is representative of the ADT volume on Tweed Valley Way.

Given that peak hour traffic typically accounts for around 10% of the daily traffic volume, the peak hour traffic volumes passing by the site on Tweed Valley Way and Pacific Highway are estimated at 1,000 and 2,100 vehicle movements / hour respectively.

It is reasonable to assume that vehicle movements on Tweed Valley Way will be directionally split approximately 70/30 in the peak direction (towards Chinderah) during the peak hour. Peak hour vehicle movements on Pacific Highway are likely to be split more evenly in each direction. Given the above, existing peak hour traffic conditions at the site are estimated as follows :-



AM PEAK **PM PEAK**

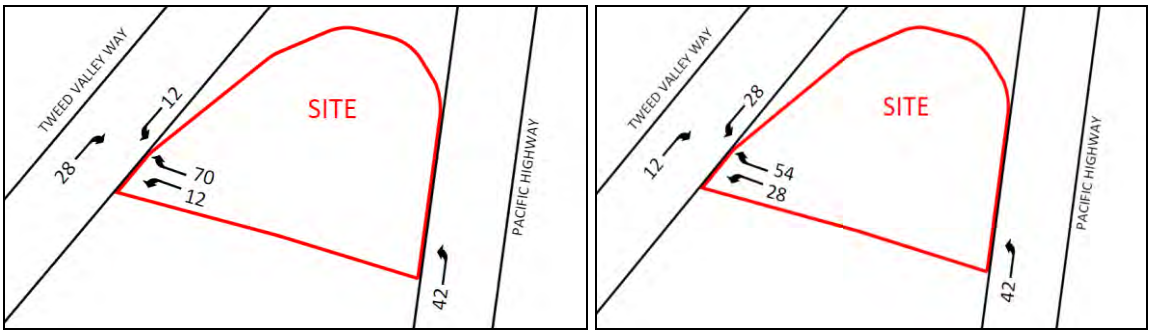
FIGURE 3 : EXISTING PEAK HOUR TRAFFIC VOLUMES

5.2 Estimated Site Generated Traffic Volume

During its peak periods of operation a Service Centre development such as this will aim to attract around 4% of passing traffic.

In this instance the subject site will not have particularly convenient access to the southbound carriageway of the Pacific Highway, so we will assume that the sought 4% of passing trade will come from the remaining three (3) streams of passing traffic.

On the basis that inbound vehicle movements arrive to the site in proportion to the existing conditions, and exit the site in the direction which they were initially heading, site-generated vehicle movements are estimated as follows :-



AM PEAK **PM PEAK**

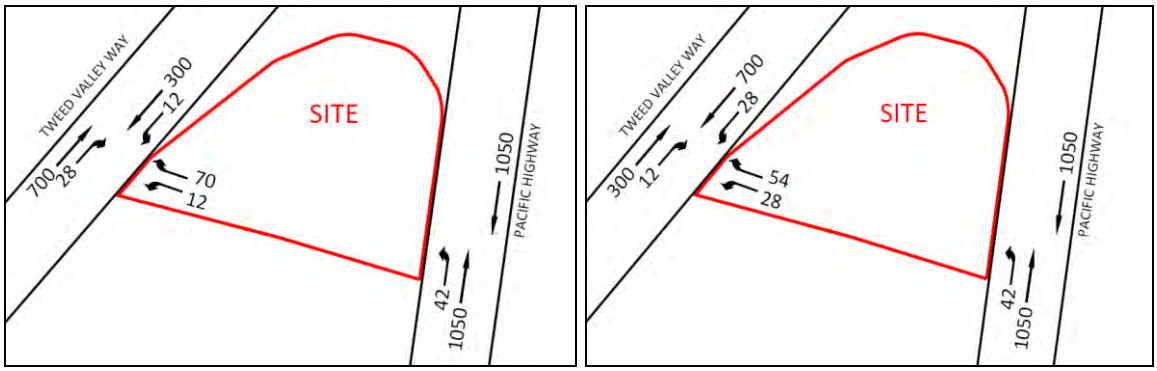
FIGURE 4 : ESTIMATED SITE GENERATED PEAK HOUR TRAFFIC VOLUMES

5.3 Combined Traffic Conditions

Most site-generated traffic will not be new to the road network, but rather existing vehicle movements redirected through the site.

However, in the interests of conservatism the ensuing analysis will assess the site access points as though site-generated traffic is additional to the existing traffic volumes.

Therefore, post-development traffic volumes for analysis are presented as follows :-



AM PEAK **PM PEAK**

FIGURE 5 : POST-DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES

5.4 Impact of Site Generated Traffic

5.4.1 Pacific Highway Access

The Pacific Highway access provides for inbound vehicle movement only and has been designed as an exit ramp from the existing Pacific Highway (northbound) to Tweed Valley Way (southbound) exit ramp.

The access has been designed in accordance with the 'preferred' treatments outlined in 'AustRoads Guide to Road Design Part 4C : Interchanges', so that all deceleration of vehicles entering the service centre will occur in the auxiliary lane parallel to the highway exit lane. Vehicles continuing along the highway exit lane to access Tweed Valley Way will be unimpeded.

As such, this design will provide more than ample capacity for the projected number of vehicles entering the site during each peak period (42 no.) to access the site without causing any negative impacts on existing traffic conditions along Pacific Highway or the existing exit ramp to Tweed Valley Way.

The Pacific Highway interchange design is appropriate.

5.4.2 Tweed Valley Way Access

A two-lane arterial roundabout is proposed a the Tweed Valley Way access which will cater for inbound vehicle movements from Tweed Valley Way and all exiting vehicle movements.

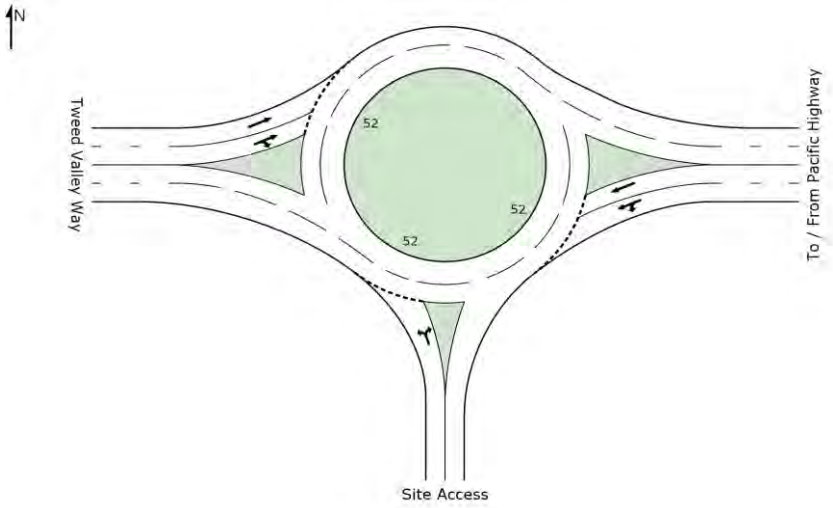
The intersection analysis package, Sidra v5.1, has been used to test the performance of the proposed roundabout under post-development traffic conditions.

The observed percentage of heavy vehicles passing along Tweed Valley Way (8.4%) has been adopted for both vehicles passing along and accessing the site from Tweed Valley Way. Conservatively, we have assumed that 20% of vehicles exiting the site are heavy vehicles, to allow for the higher percentage of heavy vehicles observed travelling along Pacific Highway.

The key outputs at the roundabout access are summarised for each peak period in the tables below :-

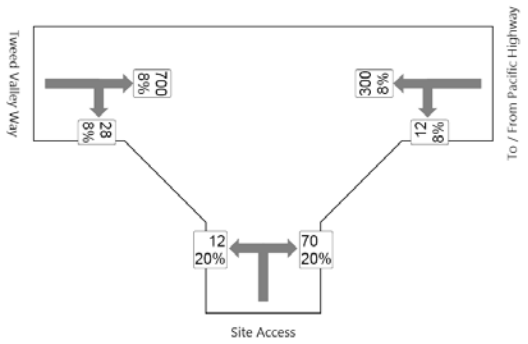
PROPOSED ROUNDABOUT INTERSECTION
TWEED VALLEY WAY, CHINDERAH

INTERSECTION LAYOUT

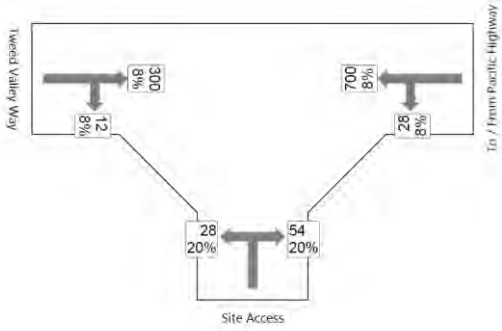


TRAFFIC VOLUME

AM PEAK

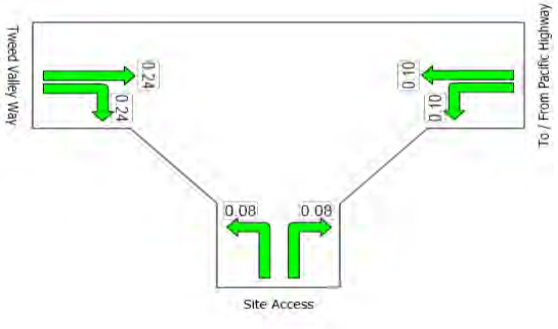


PM PEAK

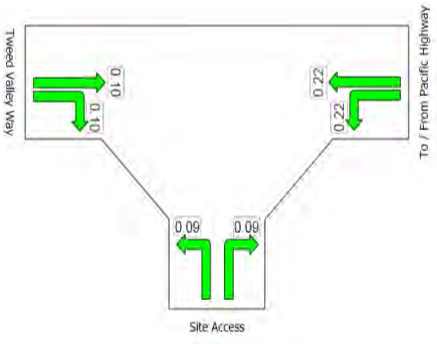


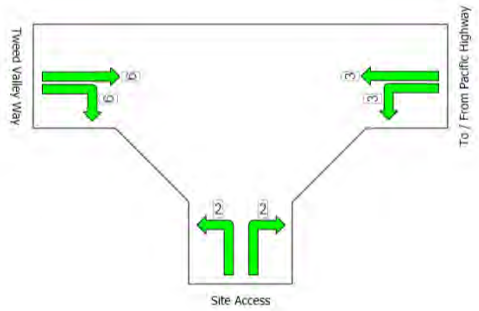
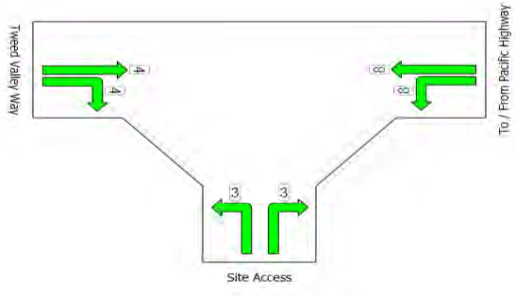
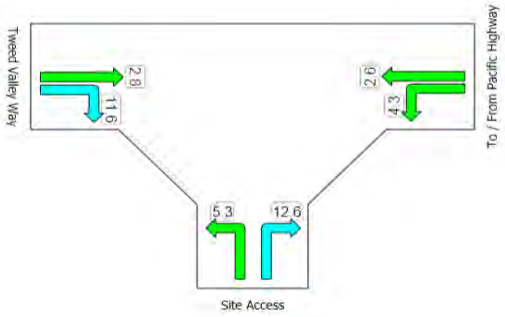
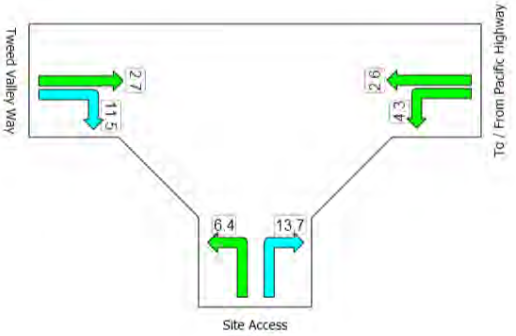
DEGREE OF SATURATION

AM PEAK



PM PEAK



QUEUE LENGTH – METRES (95th percentile)	
AM PEAK	**PM PEAK**
	
AVERAGE DELAY (secs)	
AM PEAK	**PM PEAK**
	

The analysis indicates that the roundabout will have minimal impact on existing traffic conditions along Tweed Valley Way.

5.5 Construction Traffic

Preliminary calculations indicate that around 62,000 cubic metres of fill will need to be imported to the site. On the basis that fill materials will be delivered to the site by trucks with capacity for 24 cubic metres, there will be around 2,580 deliveries of fill to the site.

With dozers and other machinery moving fill as it arrives, it is reasonable to assume that around 30 deliveries could be made to the site per day. Based on each delivery generating 2 vehicle movements (1 inbound and 1 outbound), these deliveries are anticipated to generate in the order of 60 vehicle movements a day.

Vehicle movements generated by workers and the delivery of plant and machinery to the site will be additional to the above. TTM Consulting estimates that the daily traffic volume generated by the site during the construction phase of the project will be in the order of 110 vehicle movements per day, which will can be managed such that it will have no impact on existing traffic conditions along the Pacific Highway of Tweed Valley Way. Construction traffic will generate less daily vehicle movements than the regular operation of the service centre once constructed.

Vehicular access to the site during the construction phase would best be provided from Tweed Valley Way. The preparation of a construction traffic management plan will identify an appropriate method of access to the site should approval for the development application be given.

Ideally the construction of the roundabout on Tweed Valley Way would occur prior to the commencement of works on the site, providing a formalised site access point suitable for use by construction vehicles.

6. SITE ACCESS ARRANGEMENTS

6.1 Pacific Highway

RMS has stated that due to the Pacific Highway upgrade works currently in progress, AustRoads (Guide to Road Design Part 4C : Interchanges) 'preferred' treatments are required in place of 'minimum' treatments.

Concept plan '706410-3B' is attached in Appendix C, which shows the proposed layout of the access from the Pacific Highway (northbound) to Tweed Valley Way (southbound) exit ramp. The design has the following components :-

- A preferred ramp treatment from the Pacific Highway northbound carriageway to the highway exit lane.

  The treatment is based on an entry speed of 120kph (10kph above the posted speed limit) and an exit speed of 80kph, allowing all deceleration of exiting vehicles to occur in the auxiliary lane parallel to the highway.

- A preferred ramp treatment from the highway exit lane into the site.

  The treatment is based on an entry speed of 90kph (10kph above the posted speed limit) and an exit speed of 30kph.

The ramp treatment from the highway exit lane into the site is located downstream of the initial ramp treatment from the Pacific Highway. Incorporating preferred treatments into the design allows all deceleration of vehicles entering the service centre to occur in the auxiliary lane parallel to the highway exit lane. Traffic continuing along the highway exit lane to access Tweed Valley Way can maintain an 80kph speed.

RMS have advised in their letter dated 15th March 2013, that it is satisfied the concept design for the ramp access to the proposed Highway Service Centre at the Oaks Avenue Interchange is suitable to safely manage traffic exiting the Highway. A copy of that letter is also attached in Appendix C.

6.2 Tweed Valley Way Access

Concept plan '706410-2B' is attached in Appendix D, which shows the proposed layout of the roundabout access to the Service Centre from Tweed Valley Way.

TTM Consulting (Vic) Pty. Ltd. has had several discussions with RMS regarding the design of the roundabout on Tweed Valley Way. The current design adopts RMS suggestion that the two southbound approach lanes have straight ahead options and continue through the roundabout. As such, the two traffic streams which form the southbound carriageway on Tweed Valley Way are no longer required to merge.

Vehicles accessing the Service Centre from the southbound carriageway of the Pacific Highway will still be required to change lanes however this movement is unavoidable.

Reducing the speed environment of the roundabout and its approaches to 60kph as suggested by RMS will greatly reduce the probability of weaving conflicts.

Several dimensions are shown on the plan to demonstrate the roundabout will be of sufficient size to cater for heavy vehicles.

A central island of 26 metres radius is provided, which exceeds the 'desirable' requirement for a two lane roundabout as per AustRoads (Guide to Road Design Part 4B : Roundabouts) requirements. Similarly, a circulating carriageway width of 9.6 metres has been provided to cater for a car passing along the outside of the 25 metres 'B-Double' design vehicle.

It is proposed that the roundabout pavement be constructed in concrete to accommodate the heavy vehicles expected to utilise the roundabout.

Swept path diagrams demonstrating a 26 metres long B-Double undertake all turning movements at the roundabout have been prepared with the turning template software AutoTrack v10.21 and are also attached in Appendix D. The diagrams indicate that an arterial roundabout can provide an adequate form of access to the Service Centre.

Assessments of sight distance and grades/superelevation as well as lighting, line-marking, landscaping, drainage and signage plans will be prepared as part of the detailed design phase on survey base.

It is also acknowledged that these works will be required to be constructed under traffic. Staging plans that comply with the requirements of the Pacific Highway Traffic Impact Guidelines and Traffic Control Plans will be prepared as part of the detailed design phase.

7. PARKING, CIRCULATION AND LOADING CONSIDERATIONS

7.1 Parking

7.1.1 Car Parking Layouts

The development plan indicates provision of 117 on-site parking spaces.

Each space is 2.7 metres wide by 5.4 metres long and accessed from an aisle of minimum 6.2 metres width. These dimensions satisfy the design criteria outlined for short-term high turnover parking at shopping centres as per AS2890.1:2004 - Table 1.1.

Two (2) spaces for 'accessible' use have been located at the front entrance to the Service Centre. These spaces will be located adjacent to a shared area of 2.4 metres width, which satisfies the design criteria outlined for 90-degree disabled parking spaces as per AS2890.6:2009.

The layout of the car parking areas is appropriate.

7.1.2 Parking for Vehicles with Trailers

Five (5) parking spaces to the north of the site have been designated for the use of vehicles with trailers and buses.

Swept path diagrams have been prepared using AutoTrack v10.01 to demonstrate both vehicles accessing the parking spaces. The 12.5 metres long 'Heavy Rigid Vehicle' from AS2890.1:2002 has been used as the design vehicle as it is representative of a typical bus.

The diagrams are attached in Appendix E and confirm that these spaces have been located appropriately.

7.1.3 Truck Parking

Twenty-five (25) truck parking spaces are proposed, each of which is 5 metres wide by 26 metres long and designated for the use of B-Doubles.

Swept path diagrams have been prepared for several 'end' spaces using AutoTrack v10.01, to confirm that adequate maneouvering space is provided for vehicular access to these spaces. The '26 metres B-double' from 'AustRoads 2006' has been used to prepare the diagrams, the dimensions of which are shown on the bottom of the attached diagrams in Appendix F.

The diagrams confirm that adequate maneouvering space is available and that the parking bays on the site layout have been designed appropriately.

7.2 Loading

7.2.1 Fuel Tanker Access

Fill points for the underground fuel tanks are proposed to the south-east of the truck fuel pumps.

A swept path diagram demonstrating vehicular access to these fill points is attached in Appendix G. The 26 metres long B-Double from AS2890.2:2002 has been used as the design vehicle.

The diagram confirms that an appropriate fueling service can be provided.

7.2.2 Loading Bays

Two (2) loading bays are proposed on the site; one (1) at the western corner of the building near to the Convenience Store/Tenancy 4 and one (1) at the northern corner of the building near to Tenancies 1, 2 and 3. These bays are located adjacent to the bin stores of the service centre building and will also be used by refuse collection vehicles.

The local waste contractor for the Chinderah region is Sulo Resource Recovery, which has advised that their industrial collection vehicles are 12.3 metres long with a kerb to kerb turning radius of 10.715 metres.

Swept path diagrams demonstrating the Heavy Rigid Vehicle from AS2890.2:2002 gain forward and reverse entry to both loading bays have been prepared using AutoTrack v10.21 and are attached in Appendix H.

The Heavy Rigid Vehicle as 12.5 metres long and has a larger kerb to kerb turning radius (12.5 metres) than the refuse collection vehicles used by Sulo, which confirms that the loading bay arrangements proposed are adequate.

7.3 Site Circulation

7.3.1 Tweed Valley Way and Fuel Pump Access

Vehicles that enter the site from Tweed Valley Way and wish to access the fuel pumps will need to first circulate around the site.

A swept path diagram demonstrating a B-Double vehicle undertake this maneouver and access both the 'end' truck fueling pumps has been prepared using AutoTrack v10.21 and is attached in Appendix I, confirming the layout is appropriate.

Sixteen (16) car fueling points are proposed which are conveniently located for vehicular access.

7.3.2 Convenience Restaurant Drive-Thru Systems

Two (2) convenience stores have attached drive-thru components accessed from the customer car park. Both drive-thru systems have a single point of entry and exit.

The diagrams presented in Appendix B demonstrating adequate storage length for queued vehicles also demonstrates the swept path of a B85 vehicle accessing each of the drive-thru units.

The diagrams indicate that the drive-thrus have adequate width and are aligned appropriately to allow a vehicle pass to pass through the systems whilst maintaining appropriate clearance from fixed objects.

The drive-thru layouts are appropriate.

7.4 Queuing at Fuel Pumps

TTM Consulting has previously undertaken surveys of queuing at existing Shell and Mobil Petrol Stations located on the corner of Stud Road and Heatherton Road, Dandenong, on Wednesday 21st October 2009 from 3:00pm to 7:00pm.

The number of vehicles at each of the service stations was recorded every 2 minutes over the course of the survey period. The number of vehicles included those at the pumps and those queued waiting for the pumps.

Attached in Appendix J are graphs which show the demand generated by both Petrol Stations over the course of the four-hour survey period. The following table summarises the surveyed demand for each facility :-

	Shell (Coles) 8 Petrol Pumps 7 Queuing Spaces	**Mobil** 12 Petrol Pumps 5 Queuing Spaces
85th Percentile Demand	10	3
Maximum Demand	15	6

The variation between the two Service Station sites is quite significant and was likely caused by the discounting scheme that the Shell (Coles) site had in operation at the time.

The subject proposal provides sixteen (16) fuel pumps and adequate storage room for a further sixteen (16) vehicles to queue behind the pumps without blocking vehicular circulation within the site. In addition, there is adequate room for four (4) trucks to queue behind the four (4) truck fueling positions.

There is adequate room for queuing within the site.

8. BICYCLE PARKING REQUIREMENTS

Table 4.9 of the Tweed Shire Council 'Site Access and Parking Code' outlines bicycle parking requirements for the uses on the site as follows :-

Proposed Use	**Equivalent Parking Code Use**	**Area / No**	**Staff Parking Rate**	**Bicycle Parking Requirement**
Service Station Convenience Store	Convenience Store	190 sqm	2 per 100 sqm GFA up to 100 sqm GFA and thereafter at 1 per 200 sqm GFA	2 no.
Convenience Restaurants with Drive-Thru	Fast Food Outlets	189 sqm	2 per 100 sqm GFA up to 100 sqm GFA and thereafter at 1 per 200 sqm GFA	2 no.
Commercial Tenancies	Fast Food Outlets ^	235 sqm	2 per 100 sqm GFA up to 100 sqm GFA and thereafter at 1 per 200 sqm GFA	3 no.
Dining Area	Fast Food Outlets	184 sqm	2 per 100 sqm GFA up to 100 sqm GFA and thereafter at 1 per 200 sqm GFA	2 no.
Total				**9 no.**

^ Given the nature of the development, likely occupants of the commercial tenancies will be cafes or take-away uses that do not require a drive-thru such as 'Subway.

Based on the above the bicycle parking requirement is nine (9) spaces.

The location of the site on a national highway is not particularly convenient for bicycle access, however there is adequate room for the installation of a few bike racks at the entry to the service centre building if required.

9. SUMMARY AND CONCLUSIONS

The analysis of the development is summarised as follows :-

- The on-site parking provision satisfies the parking requirements outlined by the Tweed DCP Section A2 - Site Access and Parking Code,
- The Sidra analysis indicates that the roundabout access on Tweed Valley Way will operate satisfactorily under post-development traffic conditions and cause minimal disruption to existing traffic on Tweed Valley Way,
- The site access points have been designed and located appropriately to minimise impacts on existing traffic conditions,
- There is adequate storage space at the fuel pumps to accommodate the anticipated number of vehicles during peak periods,
- The site layout provides an appropriate design for this form of development and there is adequate manoeuvering space for B-Doubles to circulate throughout the site.

There are no traffic or parking grounds which should warrant refusal of the Development Application.

TTM Consulting (Vic) Pty. Ltd.

Matthew Duffy

APPENDIX A

SITE AREA SCHEDULE:

SITE:	39003m²
BUILDING (ENCLOSED):	1270m²
LANDSCAPING:	12334m²
PAVEMENT/CONCRETE:	26928m²
AREA UNDER CAR CANOPY/LINK:	880m²
AREA UNDER TRUCK CANOPY:	280m²

PARKING SCHEDULE:

CAR:	97
STAFF CAR:	20
TRUCK (B-DOUBLE):	25
BUS/CARAVAN:	5

REAL PROPERTY DESCRIPTION

LOT 11 IN DP1134229 PART LOT 1 DP1165676
LOCAL AUTHORITY: TWEED SHIRE COUNCIL

1 SITE PLAN
1 : 500 @ A1

0 10 30m

building designers' association of queensland inc.
Membership No. 563
QBSA Lic. No. 637576
DO NOT SCALE
COPYRIGHT © 2013

ISS	DATE	AMENDMENT	CKD
L	02.07.13	ISSUE FOR DA	JC
K	25.06.13	FINAL DRAFT ISSUE	NGR
J	12.06.13	REVISED AS PER TRAFFIC ENG. REQUIREMENTS	NGR
H	05.06.13	REVISED SITE BOUNDARY	JC
G	08.04.13	UPDATED ISSUE FOR APPROVAL	JC
F	04.04.13	ISSUE FOR APPROVAL	JC
E	28.03.13	ISSUE FOR TENANTS INFORMATION	JC
D	22.03.13	PRELIMINARY ISSUE FOR CLIENT	JC
C	08.03.13	REVISED ISSUE FOR APPROVAL	JC
B	20.02.13	REVISED ISSUE FOR CLIENT REVIEW	JC
A	19.02.13	PRELIMINARY ISSUE FOR CLIENT REVIEW	JC

ISSUED FOR
DEVELOPMENT APPROVAL

CADWAY PROJECTS
24/115 Wickham Street, PO Box 724
Fortitude Valley, QLD 4006
T (07) 3257 2755 ■ F (07) 3257 2882
www.cadway.com.au
info@cadway.com.au
acn: 106 382 227
abn: 72 106 382 227
FULL SIZE @ A1

project description
PROPOSED HIGHWAY SERVICE CENTRE

project address
CHINDERAH NORTHBOUND
PACIFIC HIGHWAY & TWEED VALLEY WAY
CHINDERAH NSW

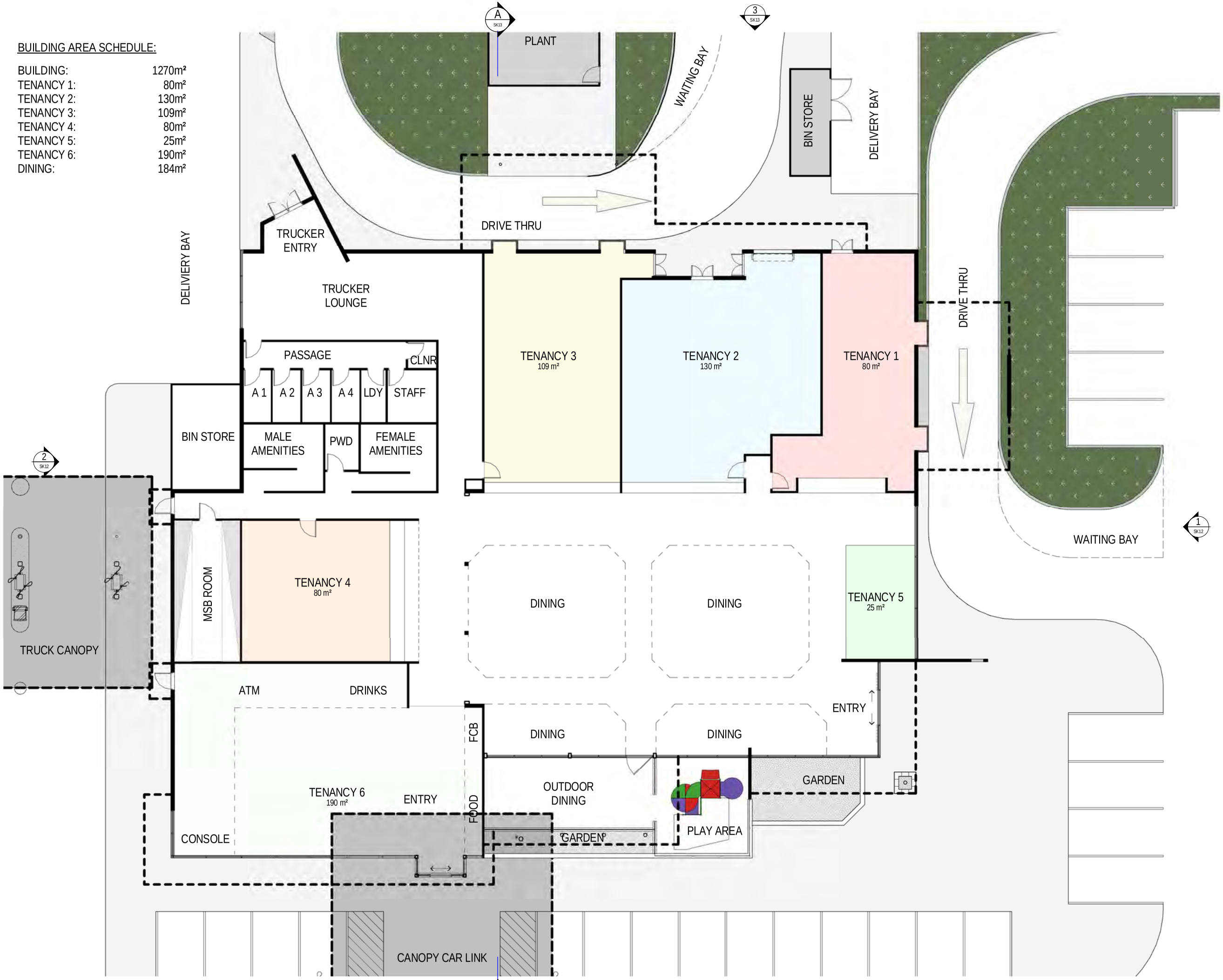
client
IMPEXON AUSTRALIA PTY LTD

drawing title
CONCEPT SITE LAYOUT

1 : 500 @ A1	scale
19.02.2013	date
JC	drawn
DA	checked
10948	job no.
10948 SK02	dwg no.
L	issue

BUILDING AREA SCHEDULE:

BUILDING:	1270m²
TENANCY 1:	80m²
TENANCY 2:	130m²
TENANCY 3:	109m²
TENANCY 4:	80m²
TENANCY 5:	25m²
TENANCY 6:	190m²
DINING:	184m²



1 FLOOR PLAN
1 : 100 @ A1

building designers' association of queensland inc.
Membership No. 563
QBSA Lic. No. 637576

ISS	DATE	AMENDMENT	CKD
M	02.07.13	ISSUE FOR DA	JC
L	25.06.13	FINAL DRAFT ISSUE	NGR
K	10.05.13	ISSUE FOR TENANT INFORMATION	JC
J	30.04.14	FOR CLIENT DISCUSSION	JC
H	08.04.13	UPDATED ISSUE FOR APPROVAL	JC
G	04.04.13	ISSUE FOR APPROVAL	JC
F	28.03.13	ISSUE FOR TENANTS INFORMATION	JC
E	22.03.13	PRELIMINARY ISSUE FOR CLIENT	JC
D	22.03.13	FLOOR PLAN FOR APPROVAL	JC
C	08.03.13	REVISED ISSUE FOR APPROVAL	JC
B	20.02.13	REVISED ISSUE FOR CLIENT REVIEW	JC
A	19.02.13	PRELIMINARY ISSUE FOR CLIENT REVIEW	JC

P:\Arch\Office Documents\Storage\Project Docs\P10948\Current Active\10948sk01.vwx

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20/7/2013 12:20:26 PM

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acn: 106 382 227
abn: 72 106 382 227

FULL SIZE @ A1

project description
PROPOSED HIGHWAY SERVICE CENTRE

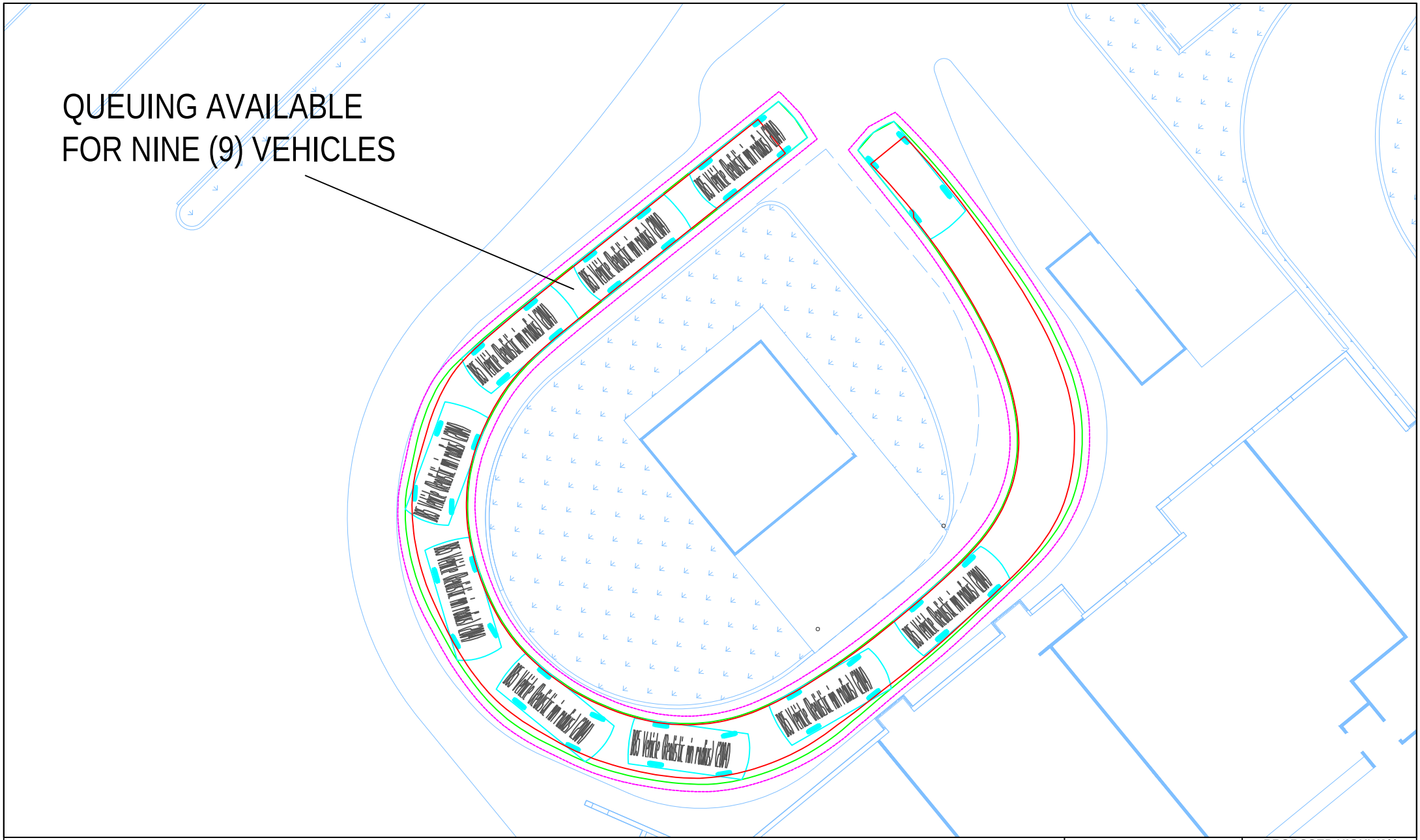
project address
CHINDERAH NORTHBOUND
PACIFIC HIGHWAY & TWEED VALLEY WAY
CHINDERAH NSW

client
IMPEXON AUSTRALIA PTY LTD

drawing title
FLOOR PLAN

1 : 100 @ A1	scale
02/19/13	date
JC	drawn
DA	checked
10948	job no.
10948 SK03	dwg no.
M	issue

APPENDIX B



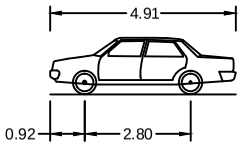
Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
A	MD	10/07/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.499m
Min Body Ground Clearance	0.120m
Track Width	1.770m
Lock to Lock Time	4.00sec
Curb to Curb Turning Radius	5.750m

N

TTM Consulting Pty Ltd
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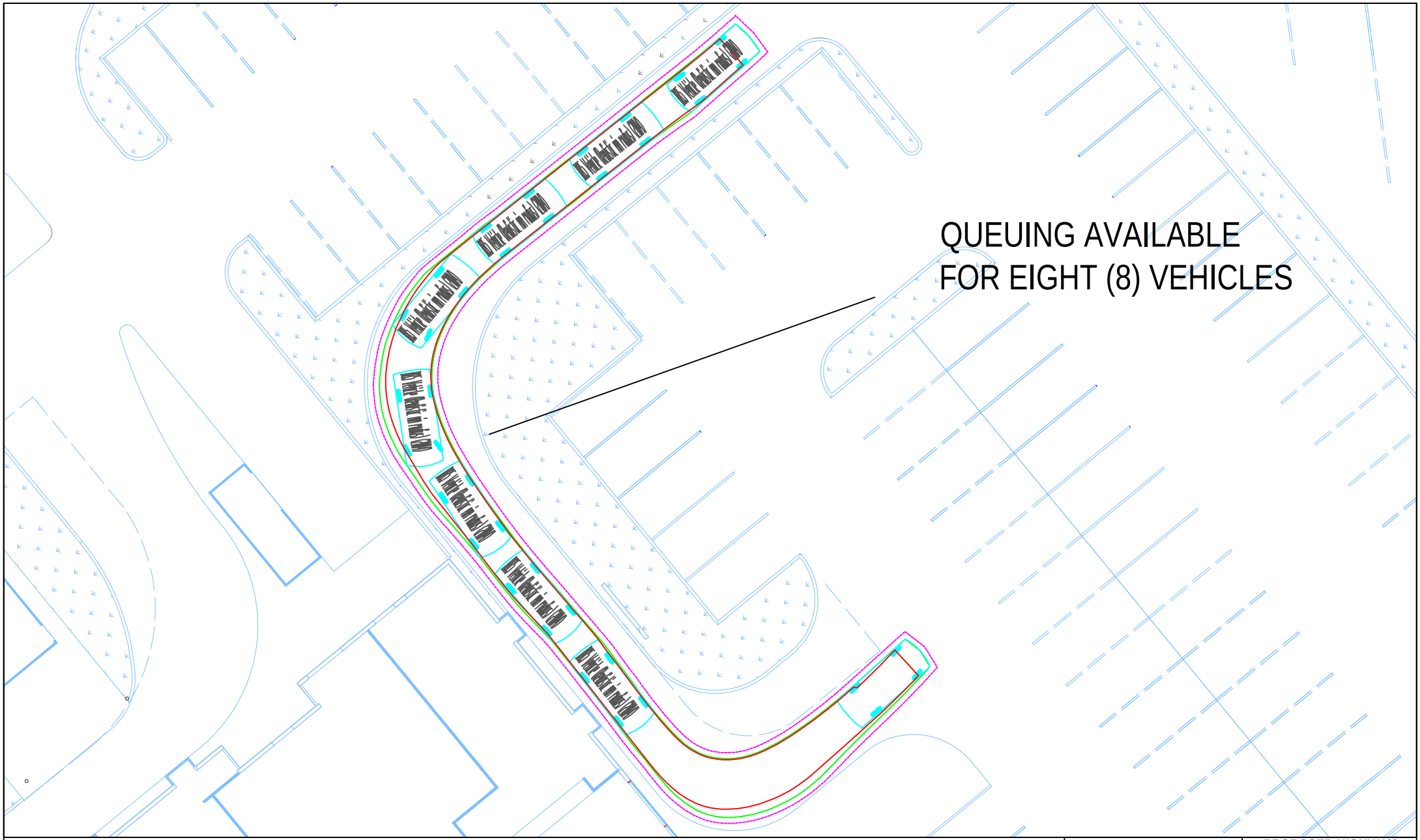
Email : email@ttmconsulting.com.au

PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH
SWEPT PATH / QUEUING DIAGRAM AT TENANCY 3 DRIVE-THRU

Scale 1:200 @ A4

Drawing No : 706450

Sheet No : 1 Issue : A



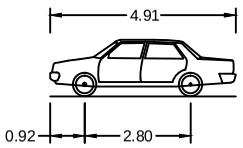
Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
A	MD	10/07/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
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N

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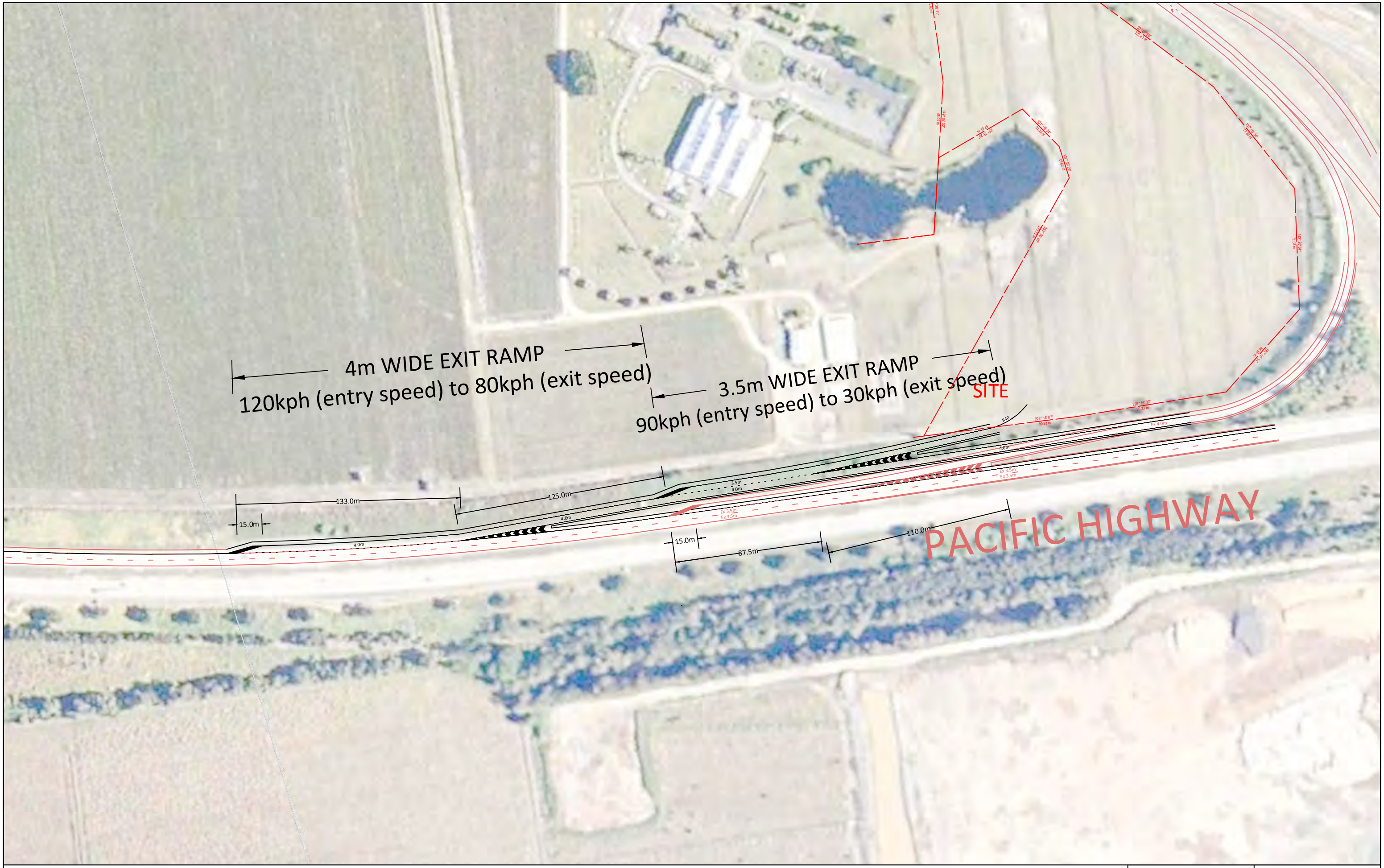
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH
SWEPT PATH / QUEUING DIAGRAM AT TENANCY 1 DRIVE-THRU

Scale 0 1 2 3 4 5 1:250 @ A4

Drawing No : 706450

Sheet No : 2 Issue : A

APPENDIX C



Issue	Appd	Date	Comments
B	MD	10/07/13	Original Issue
A	MD	14/11/12	Original Issue

TTM Consulting Pty Ltd
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CONCEPT LAYOUT PLAN
PROPOSED SERVICE CENTRE
CHINDERAH, NSW
ACCESS FROM NORTHBOUND CARRIAGEWAY OF PACIFIC HIGHWAY

Scale 0 10 20 30 40 50
1:1,000 @ A1

Drawing No : 706410

Sheet No : 3 | Issue : A

Transport
Roads & Maritime
Services

File No. NTH12/00095, CR2013/001052

Mr Matthew Duffy
TTM Consulting (Vic) Pty Ltd.
Suite 9, 70-80 Wellington Street
Collingwood VIC 3066

Dear Sir

Highway Service Centre Proposal Oaks Avenue Interchange.

I refer to your letter of 12 February 2013, Roads and Maritime Services (RMS) is satisfied the concept design for the ramp access to the proposed Highway Service Centre at the Oaks Avenue interchange is suitable to safely manage traffic exiting the Highway. Any formal approval and acceptance of the ultimate design for the ramp works will be subject to Development approval for the proposal, and the execution of a Works Authorisation Deed (WAD) with RMS for the highway access works. All works associated with access to the proposed service centre are to be at no cost to RMS.

The previous advice in the RMS letter dated 9 October 2012 (Copy attached); regarding the WAD, gazettal of access to the Freeway boundaries and rest area facilities remains the same. To assist with planning for the highway service centre, attached also is a list of service centre facilities that are required to meet the needs of highway motorists.

If you have any enquiries regarding the design report please contact Michael Baldwin on 6686 1832 or email land_use_northern@rta.nsw.gov.au.

Yours faithfully

15 MAR 2013

for John Alexander
Regional Manager, Northern Region

Roads & Maritime Services

31 Victoria Street, Grafton NSW 2460 | PO Box 576 Grafton NSW 2460
T 02 6640 1300 | **F** 02 6640 1304 | **E** development.northern@rms.nsw.gov.au

www.rms.nsw.gov.au | 13 17 82

APPENDIX D

Advance Directional Signage

To Pacific Highway Northbound

To Pacific Highway Southbound
& Service Centre

3.6m
3.6m

3.6m
3.6m

Tweed Valley Way Eastbound

4.8m
4.8m

52.0m

9.6m

47° 42' 51"
8.76 m

117° 30' 52"
50.21 m

4.8m

47.98 m

27° 30' 52"

SITE

To Pacific Highway Northbound

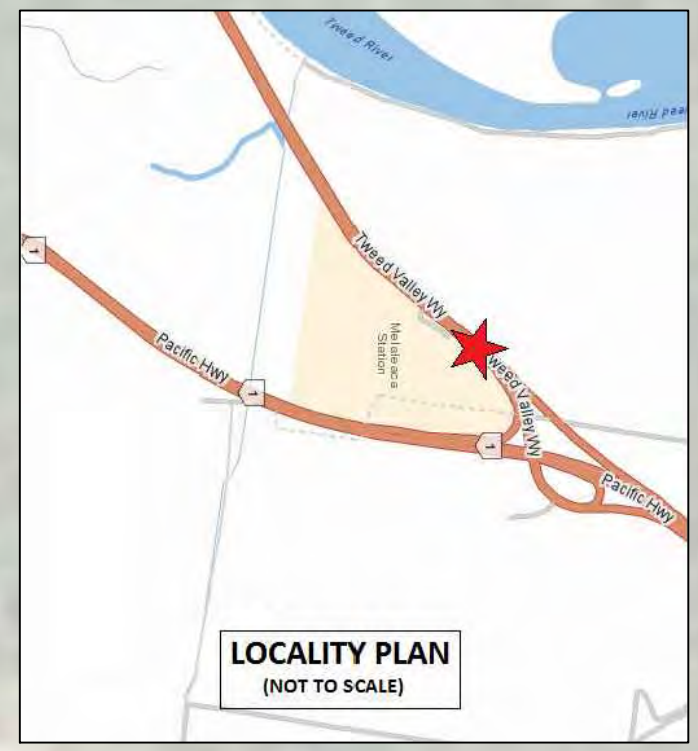
To Pacific Highway Southbound

4.0m
4.0m

3.6m
3.6m

Tweed Valley Eastbound

Tweed Valley Eastbound / Left Turn into Service Centre



N

Issue	Appd	Date	Comments
B	MD	10/07/13	New Site Boundaries
A	MD	15/11/12	Original Issue

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CONCEPT LAYOUT PLAN PROPOSED SERVICE CENTRE, CHINDERAH, NSW ACCESS FROM TWEED VALLEY WAY

Scale 0 5 10 1:500 @ A3

Drawing No : 706410

Sheet No : 2 Issue : A

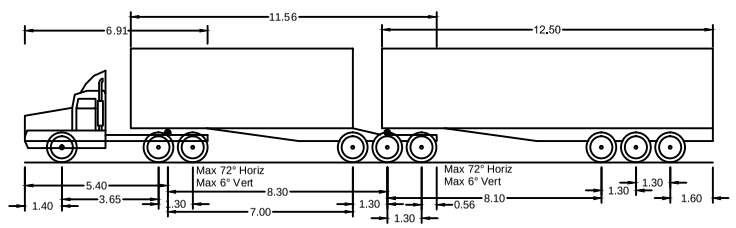
VAY

4.8m
4.8m
3.6m
3.6m
3.6m
3.6m
4.0m
4.0m
3.6m
3.6m
52.0m
9.6m
47° 42' 51"
8.76 m
117° 30' 52"
50.21 m
4.8m
47.94 m
217° 30' 52"

- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
B	MD	10/07/13	New Site Boundaries
A	MD	18/04/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

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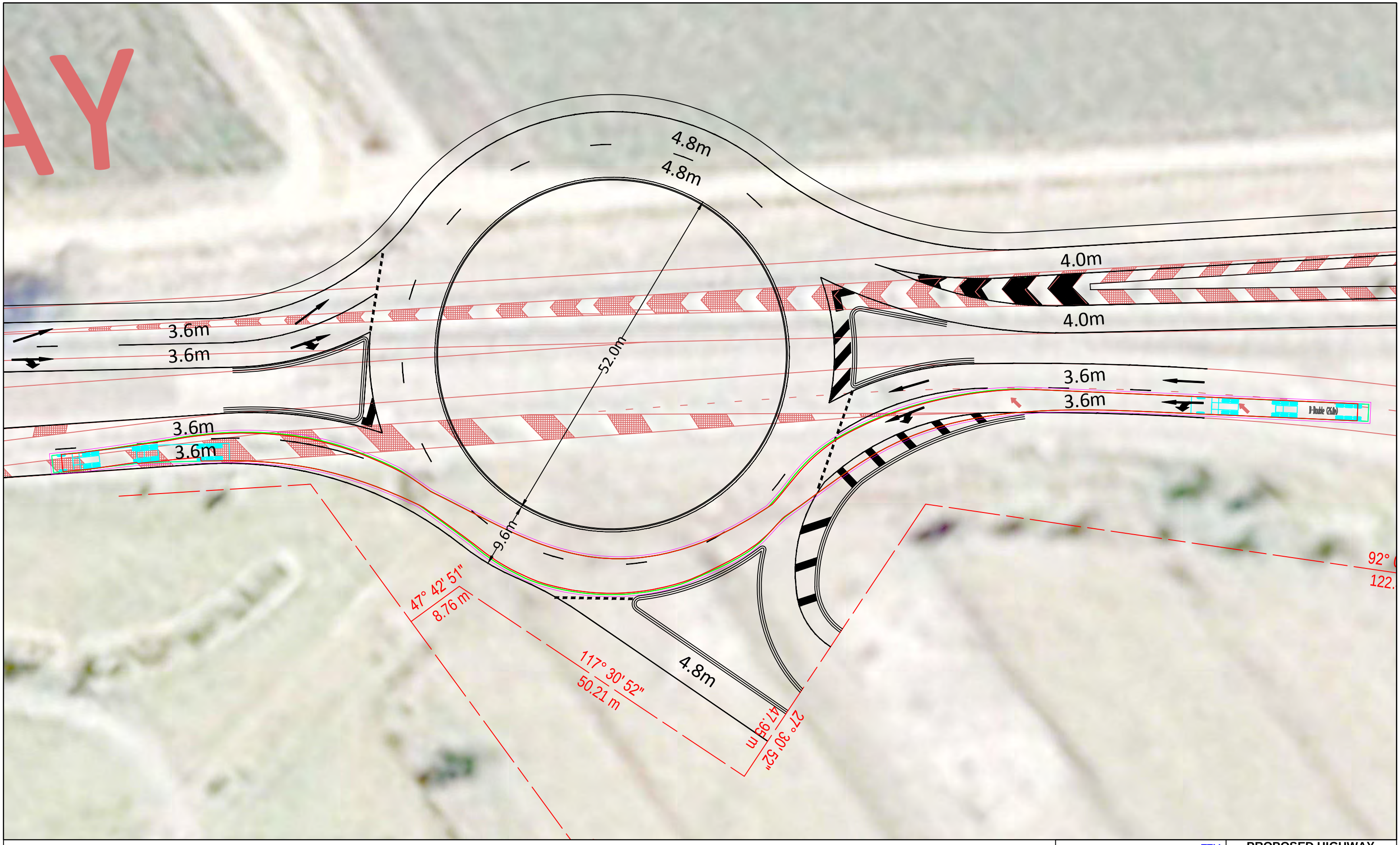
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH
SWEPT PATH DIAGRAMS AT TWEED VALLEY WAY ACCESS

Scale 0 5 10 — 1:500 @ A3

Drawing No : 706410

Sheet No : 4 | Issue : A



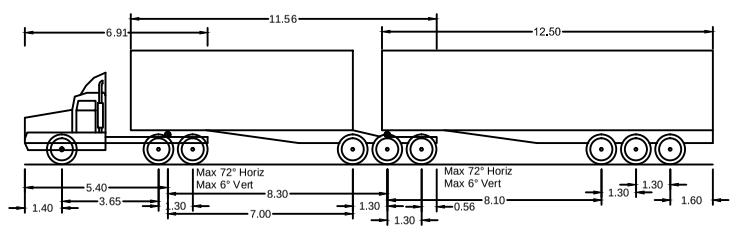
Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
B	MD	10/07/13	New Site Boundaries
A	MD	18/04/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

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Email : email@ttmconsulting.com.au

PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH SWEPT PATH DIAGRAMS AT TWEED VALLEY WAY ACCESS

Scale 1:500 @ A3

Drawing No : 706410

Sheet No : 5 Issue : A

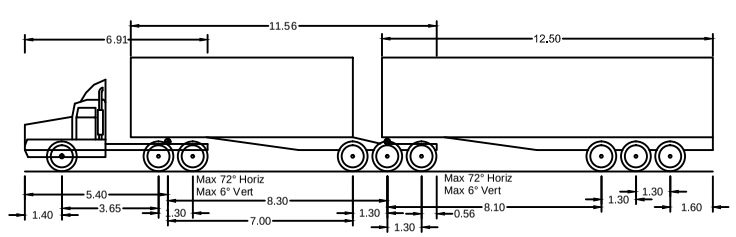
NAY

4.8m
4.8m
3.6m
3.6m
3.6m
3.6m
4.0m
4.0m
3.6m
3.6m
52.0m
9.6m
47° 42' 51"
8.76 m
117° 30' 52"
50.21 m
4.8m
4.29 m
27° 30' 52"

Wheel path
Vehicle Overhang
Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
B	MD	10/07/13	New Site Boundaries
A	MD	18/04/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

TTM

TTM Consulting Pty Ltd

Transport and Traffic Engineers

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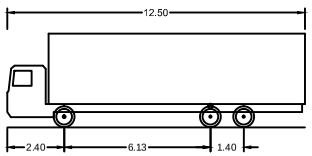
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH SWEPT PATH DIAGRAMS AT TWEED VALLEY WAY ACCESS

Scale 0 5 10 — 1:500 @ A3

Drawing No : 706410

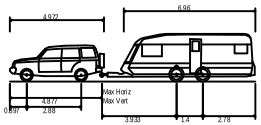
Sheet No : 6 | Issue : A

APPENDIX E



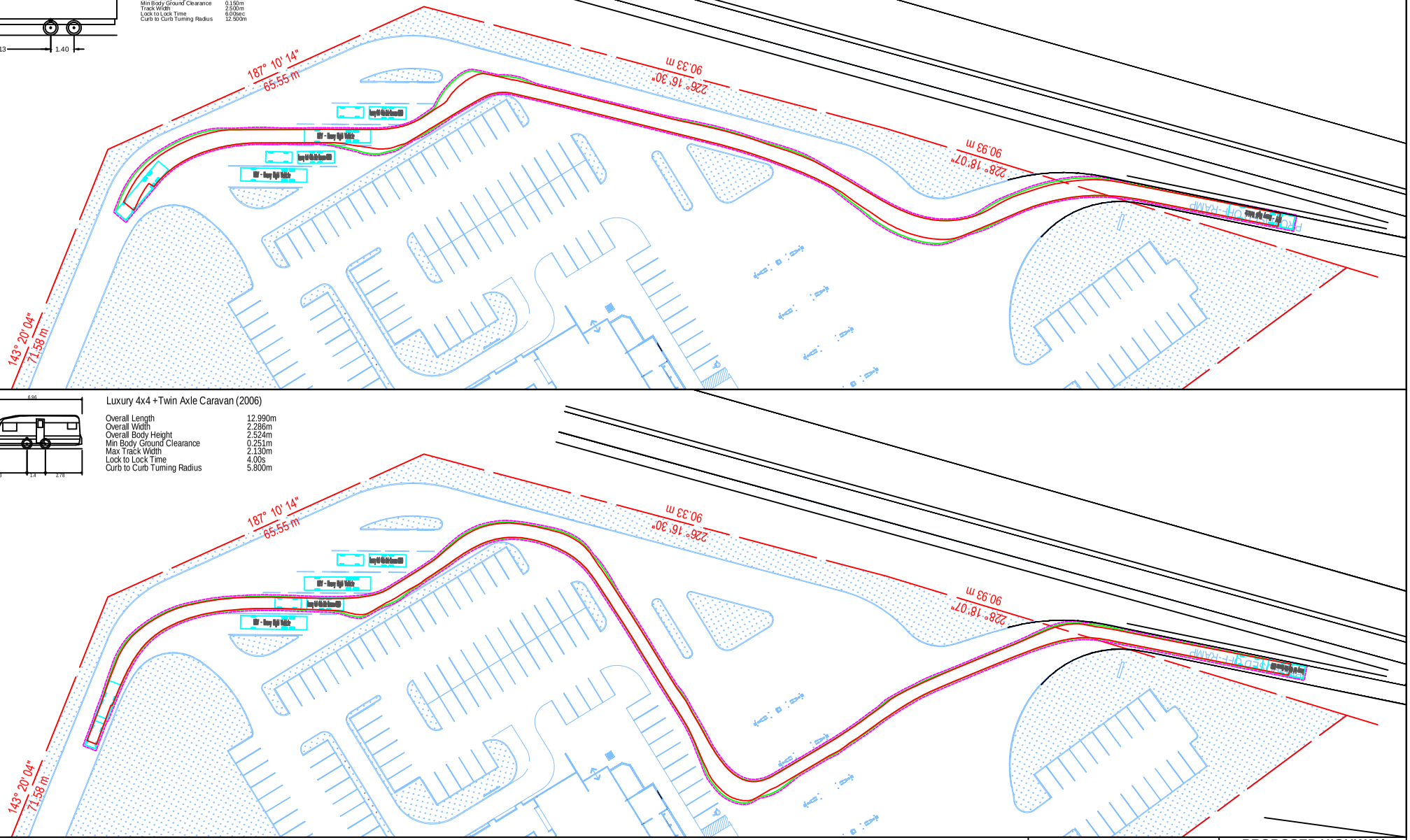
HRV - Heavy Rigid Vehicle (See Note...)

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	3.933m
Min Body Ground Clearance	0.150m
Track Width	2.500m
Lock to Lock Time	6.00sec
Curb to Curb Turning Radius	12.500m



Luxury 4x4 +Twin Axle Caravan (2006)

Overall Length	12.990m
Overall Width	2.286m
Overall Body Height	2.524m
Min Body Ground Clearance	0.251m
Max Track Width	2.130m
Lock to Lock Time	4.00s
Curb to Curb Turning Radius	5.800m



Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
A	MD	10/07/13	Original Issue

TTM Consulting Pty Ltd
Transport and Traffic Engineers
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Collingwood VIC 3066
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Email : email@ttmconsulting.com.au

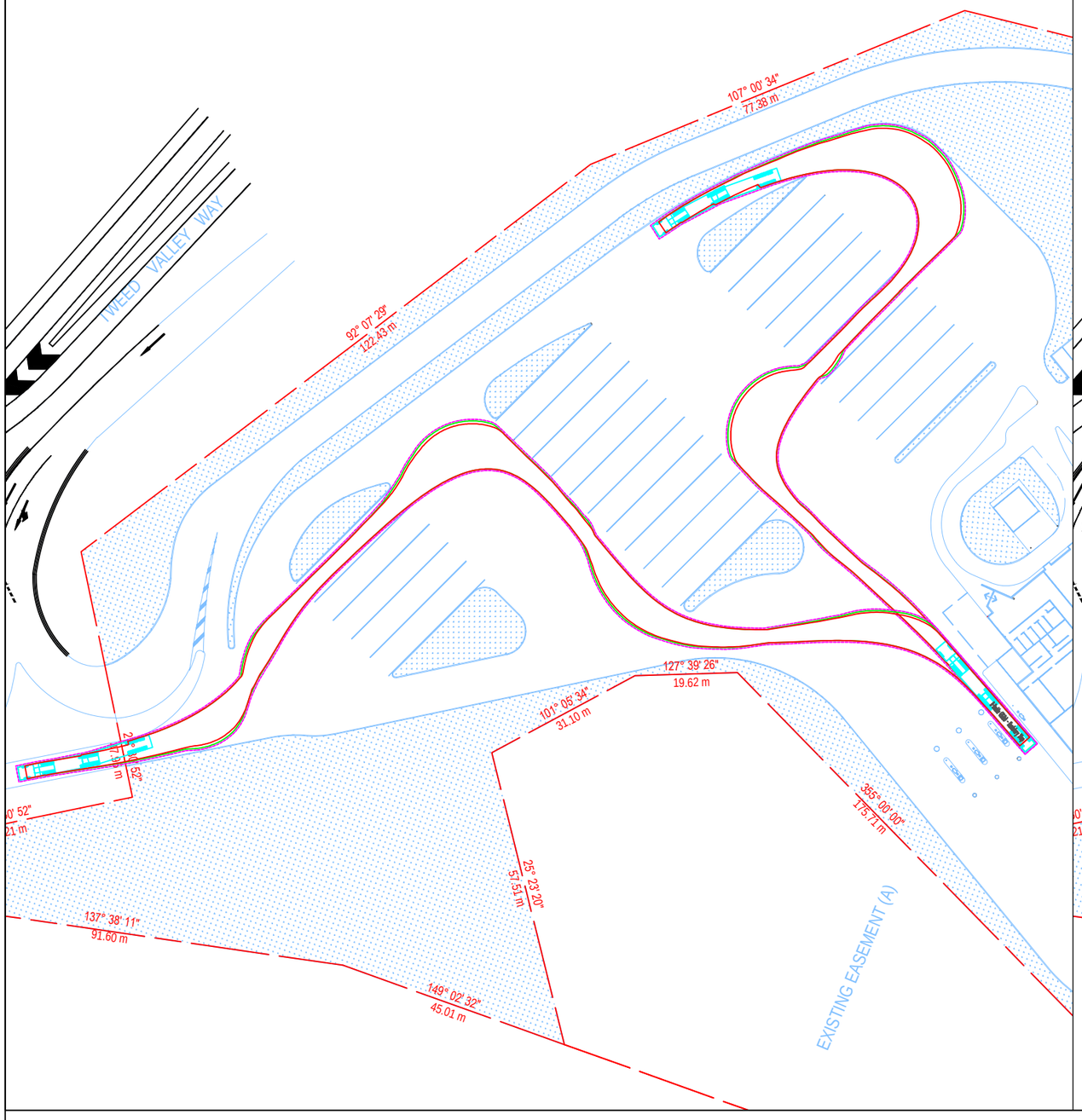
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH VEHICLES WITH TRAILERS AND BUS SWEPT PATH DIAGRAMS

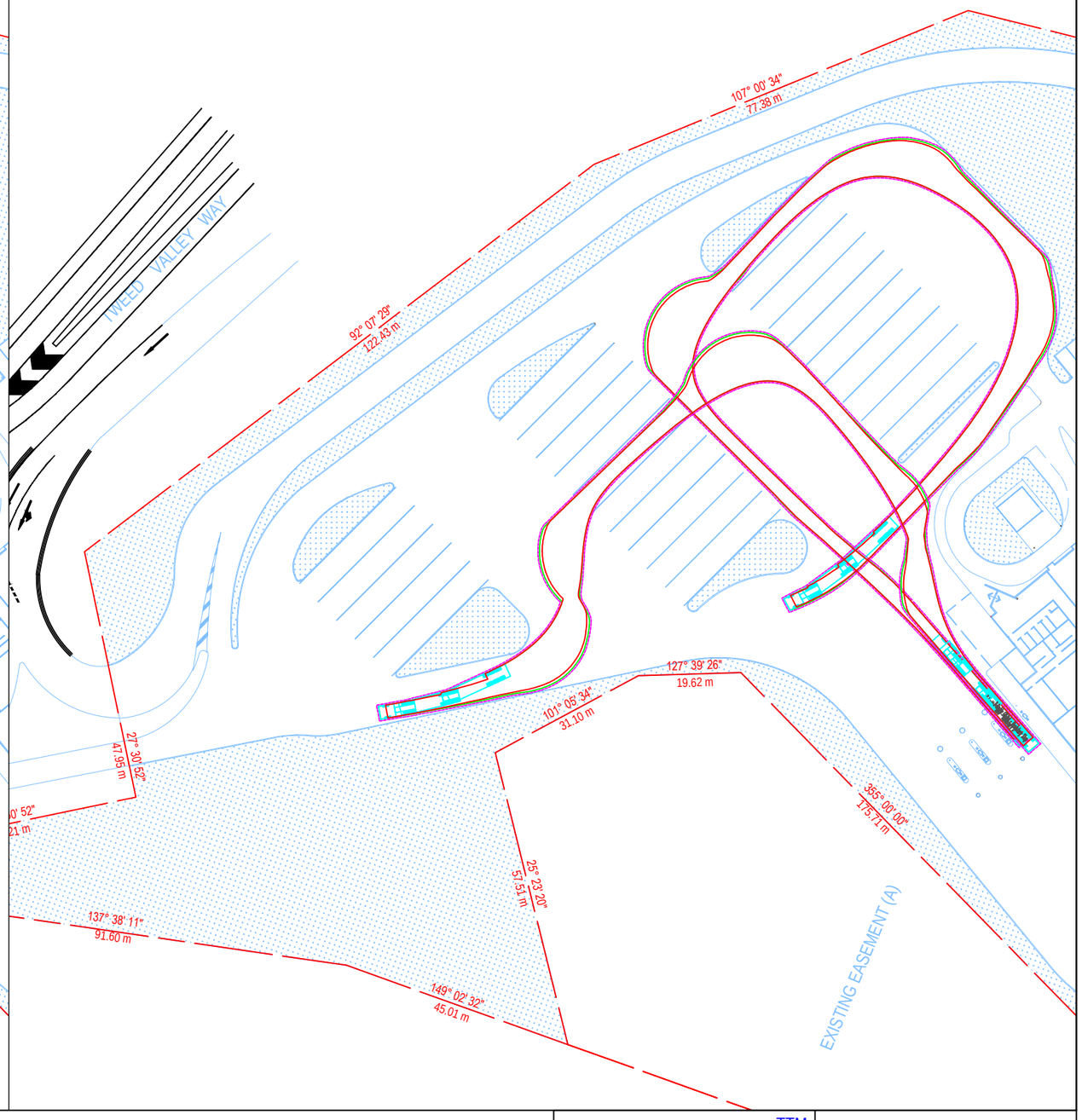
Scale 0 5 10 15 20 — 1:1,000 @ A4

Drawing No : 706450

Sheet No : 3 Issue : A

APPENDIX F

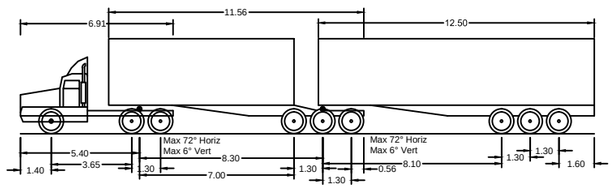




Wheel path
Vehicle Overhang
Vehicle Overhang + 300mm Clearance

A	MD	10/7/13	Original Issue
Issue	Appd	Date	Comments

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

N

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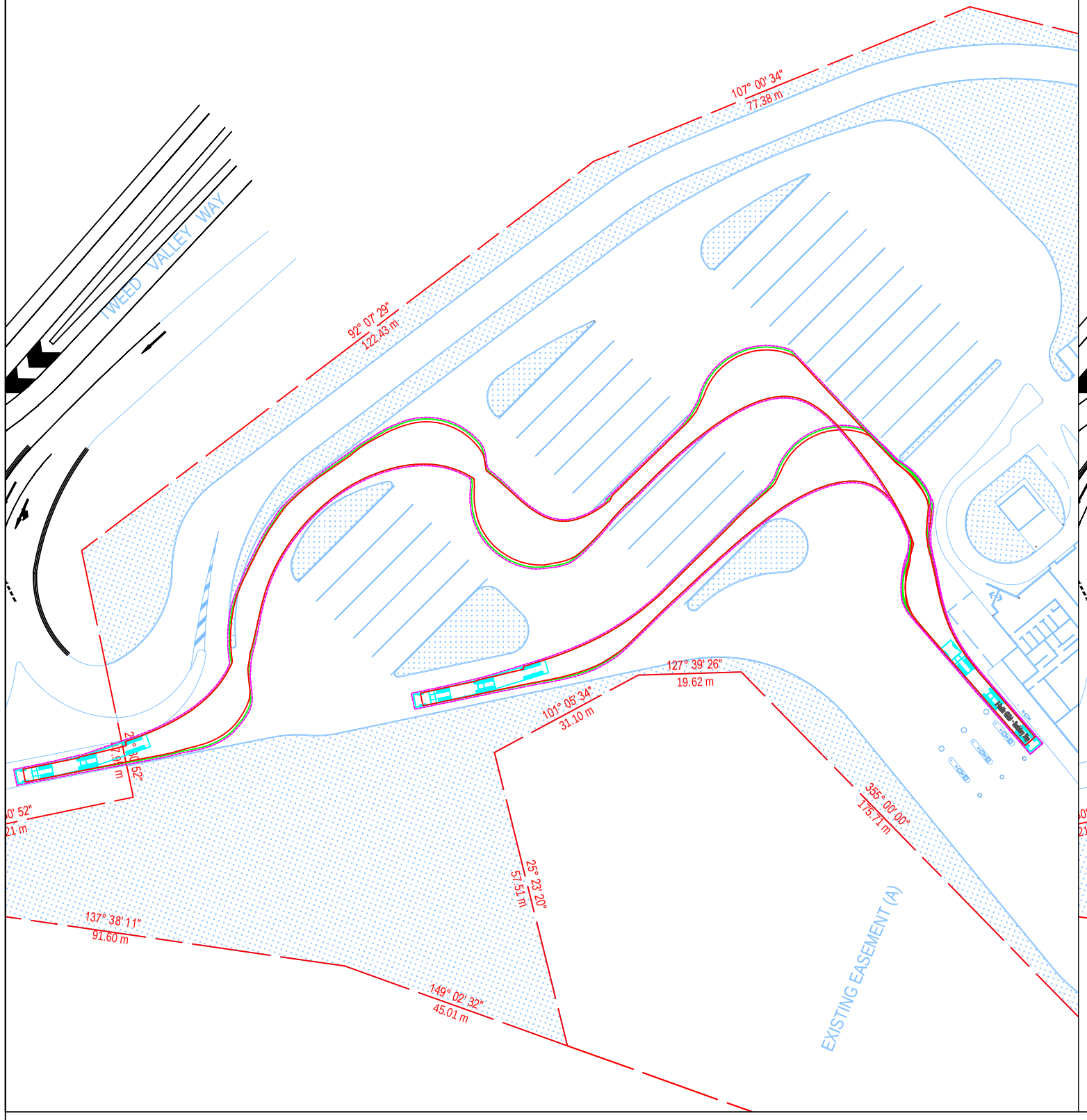
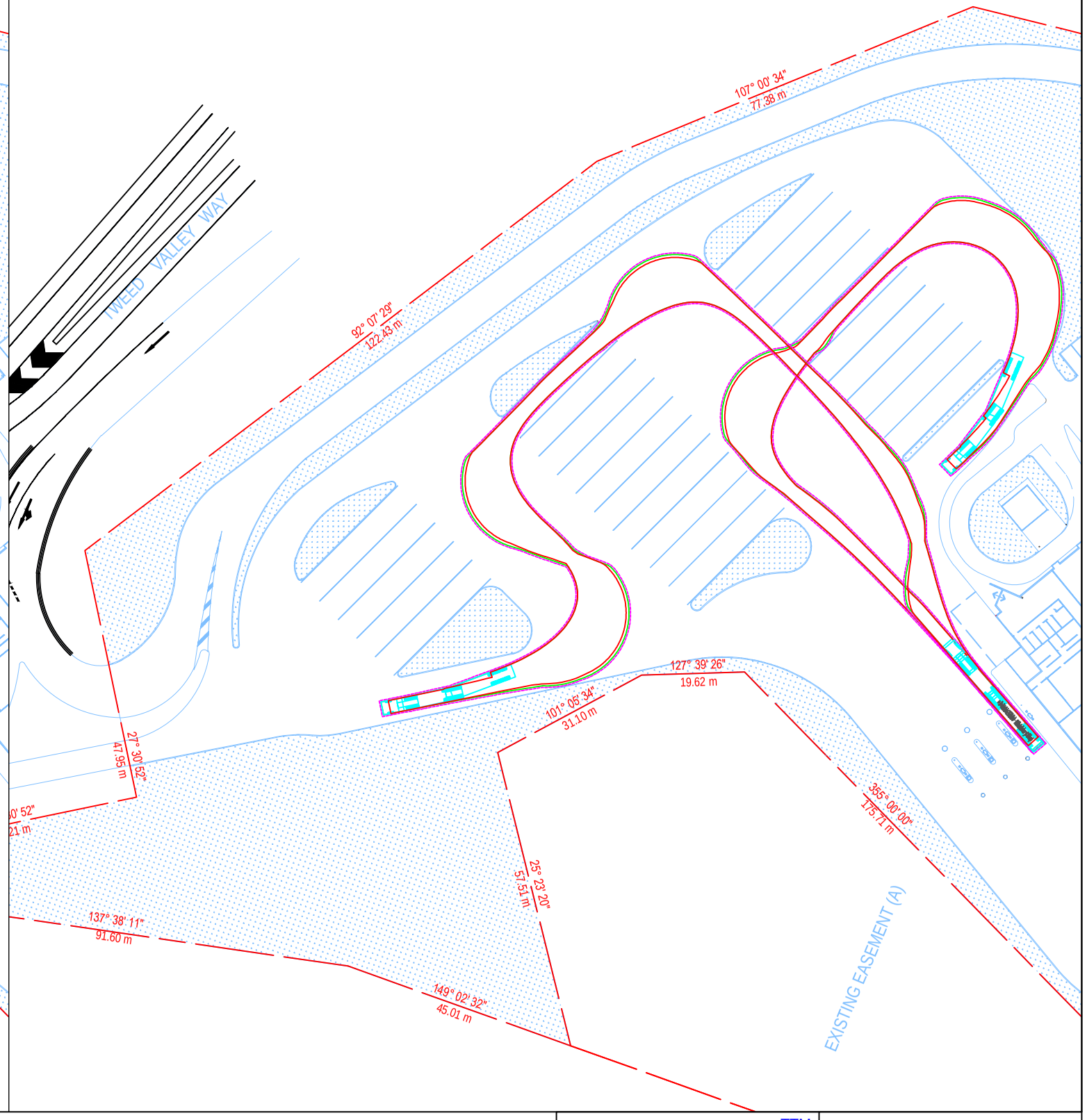
PROPOSED HIGHWAY SERVICE CENTRE, CHINDERAH B-DOUBLE PARKING SPACES

Scale 0 5 10 15 20 25
1:1,000 @ A3

Drawing No : 706450

Sheet No : 6 | Issue : A

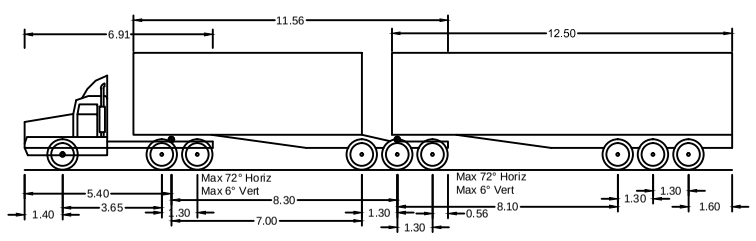




Wheel path
Vehicle Overhang
Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
A	MD	10/7/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

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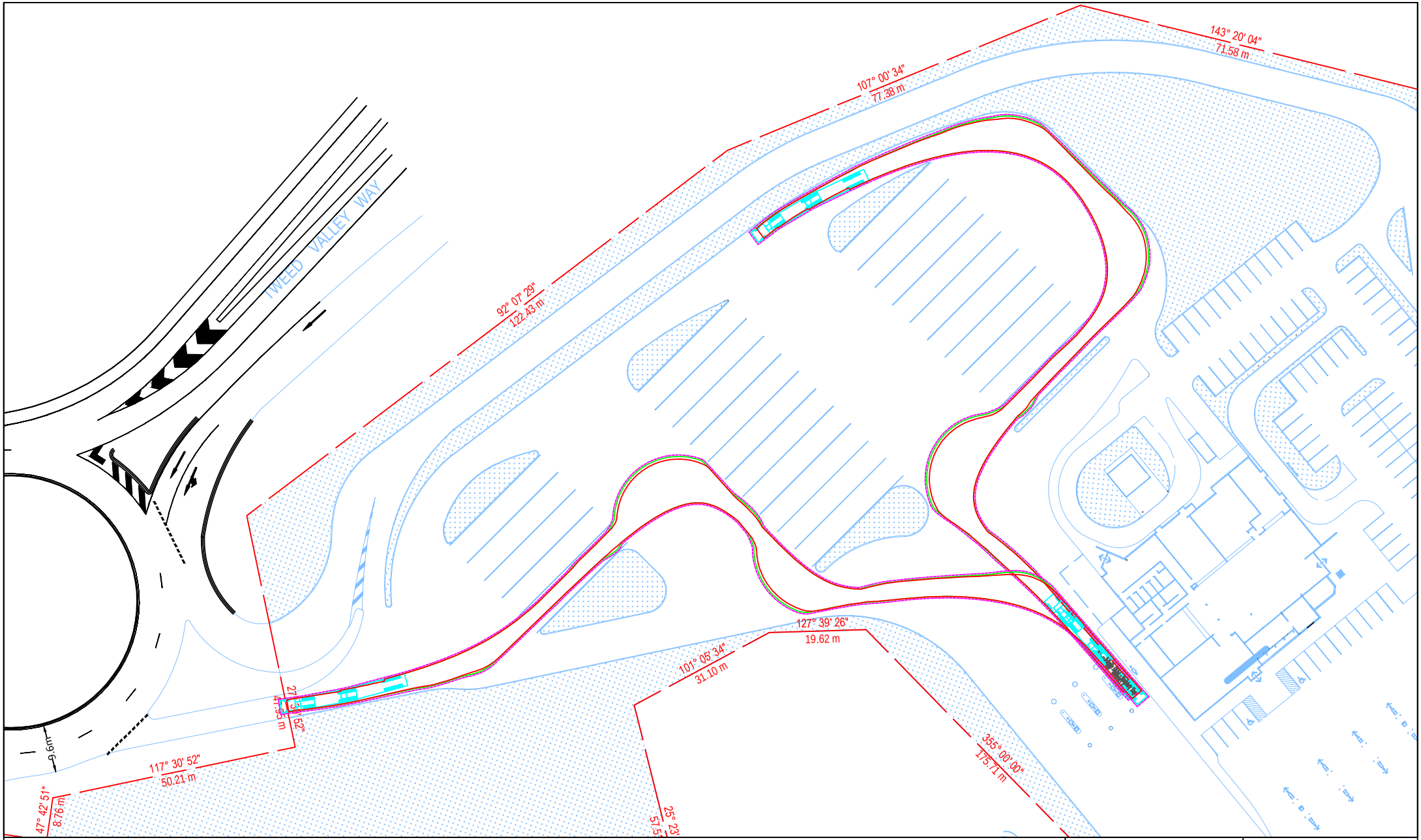
PROPOSED HIGHWAY SERVICE CENTRE, CHINDERAH B-DOUBLE PARKING SPACES

Scale 0 5 10 15 20 25
1:1,000 @ A3

Drawing No : 706450

Sheet No : 7 Issue : A

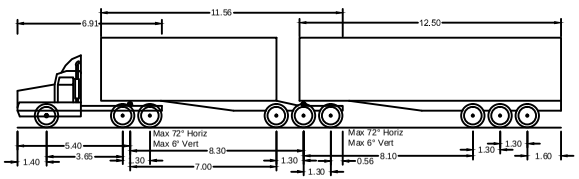


Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

N

Issue	Appd	Date	Comments
A	MD	10/07/13	Original Issue

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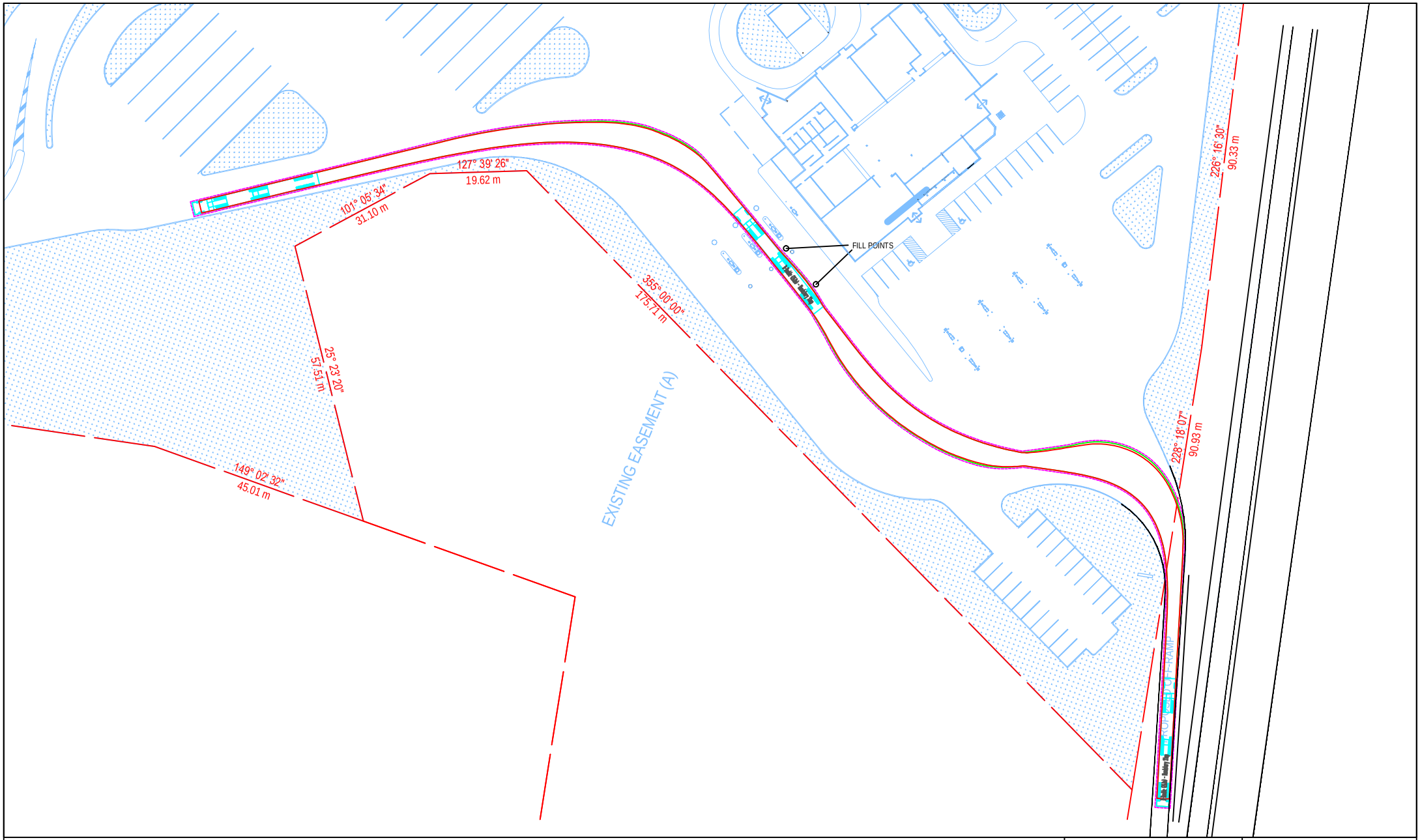
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH B-DOUBLE PARKING SPACES

Scale 0 5 10 15 20
1:1,000 @ A4

Drawing No : 706450

Sheet No : 8 Issue : A

APPENDIX G



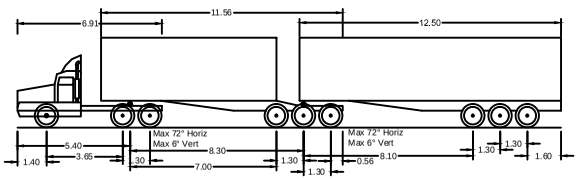
Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Issue	Appd	Date	Comments
A	MD	10/07/13	Original Issue

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

N

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PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH ACCESS TO FUEL TANK FILL POINT LOCATIONS

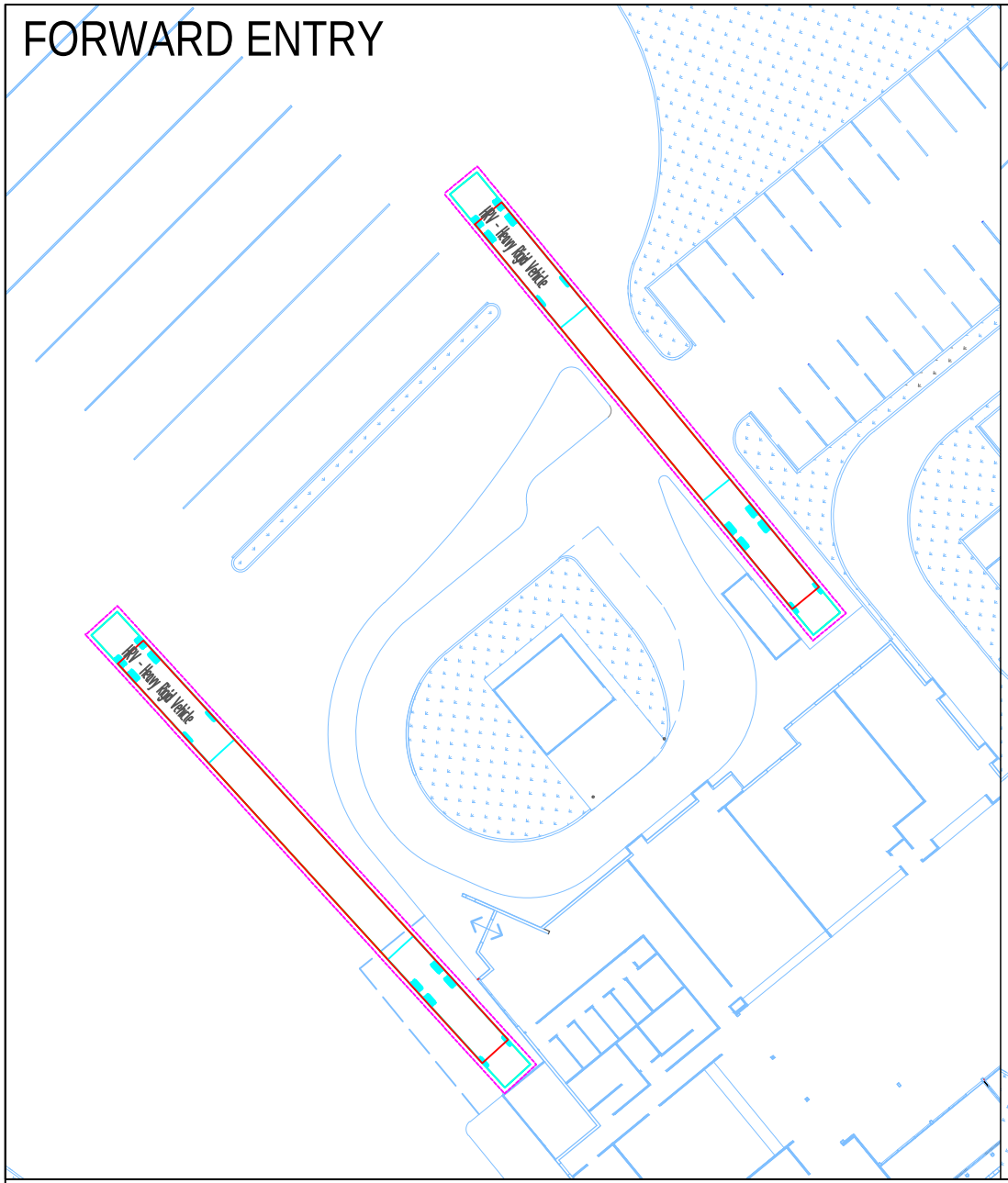
Scale 0 5 10 15 20 1:1,000 @ A4

Drawing No : 706450

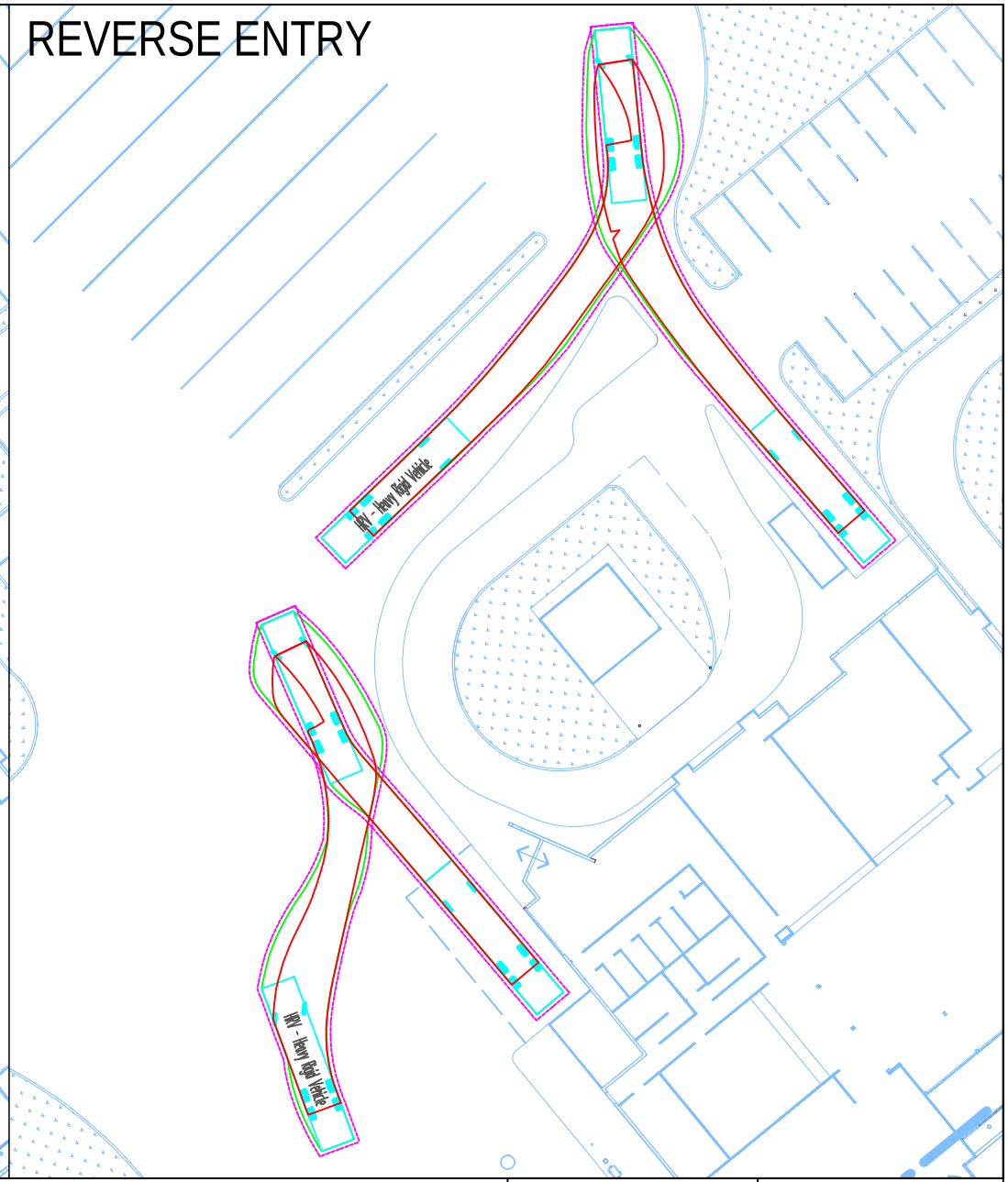
Sheet No : 9 Issue : A

APPENDIX H

FORWARD ENTRY



REVERSE ENTRY



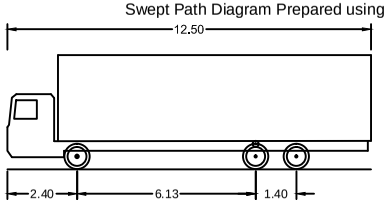
Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

A	MD	10/07/13	Original Issue
Issue	Appd	Date	Comments

Swept Path Diagram Prepared using AutoTrack v10.21



HRV - Heavy Rigid Vehicle (See Note...)

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	3.933m
Min Body Ground Clearance	0.150m
Track Width	2.500m
Lock to Lock Time	6.00sec
Curb to Curb Turning Radius	12.500m

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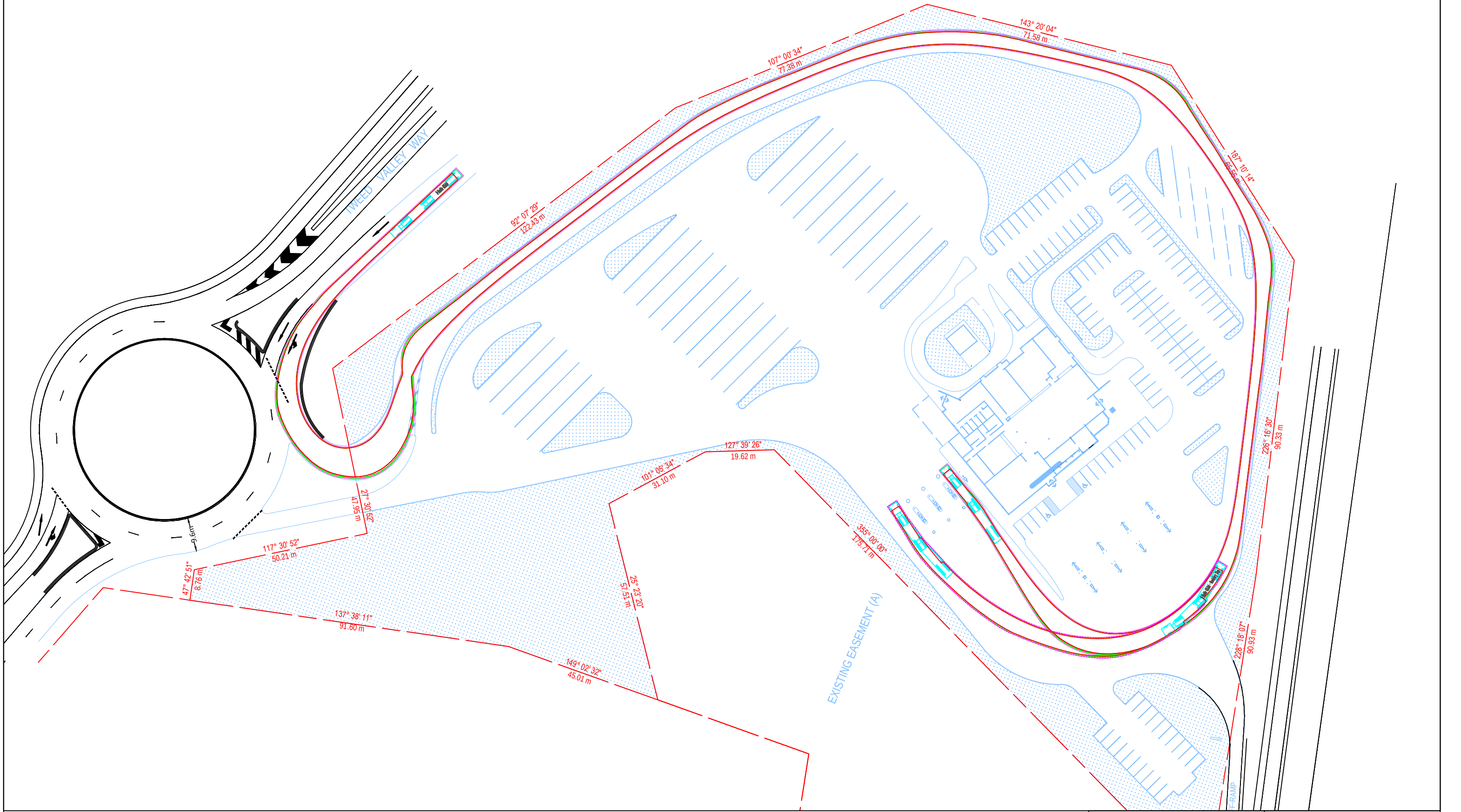
PROPOSED HIGHWAY SERVICE CENTRE CHINDERAH LOADING BAY ACCESS SWEPT PATH DIAGRAMS

Scale 0 5 10 1:500 @ A4

Drawing No : 706450

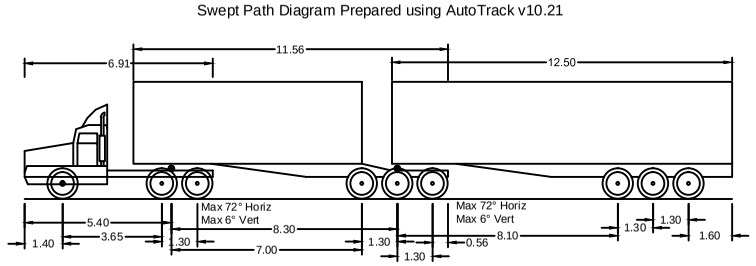
Sheet No : 4 Issue : A

APPENDIX I



Wheel path
Vehicle Overhang
Vehicle Overhang + 300mm Clearance

Swept Path Diagram Prepared using AutoTrack v10.21



B-Double (26.0m)

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	15.000m

N

A	MD	10/7/13	Original Issue
Issue	Appd	Date	Comments

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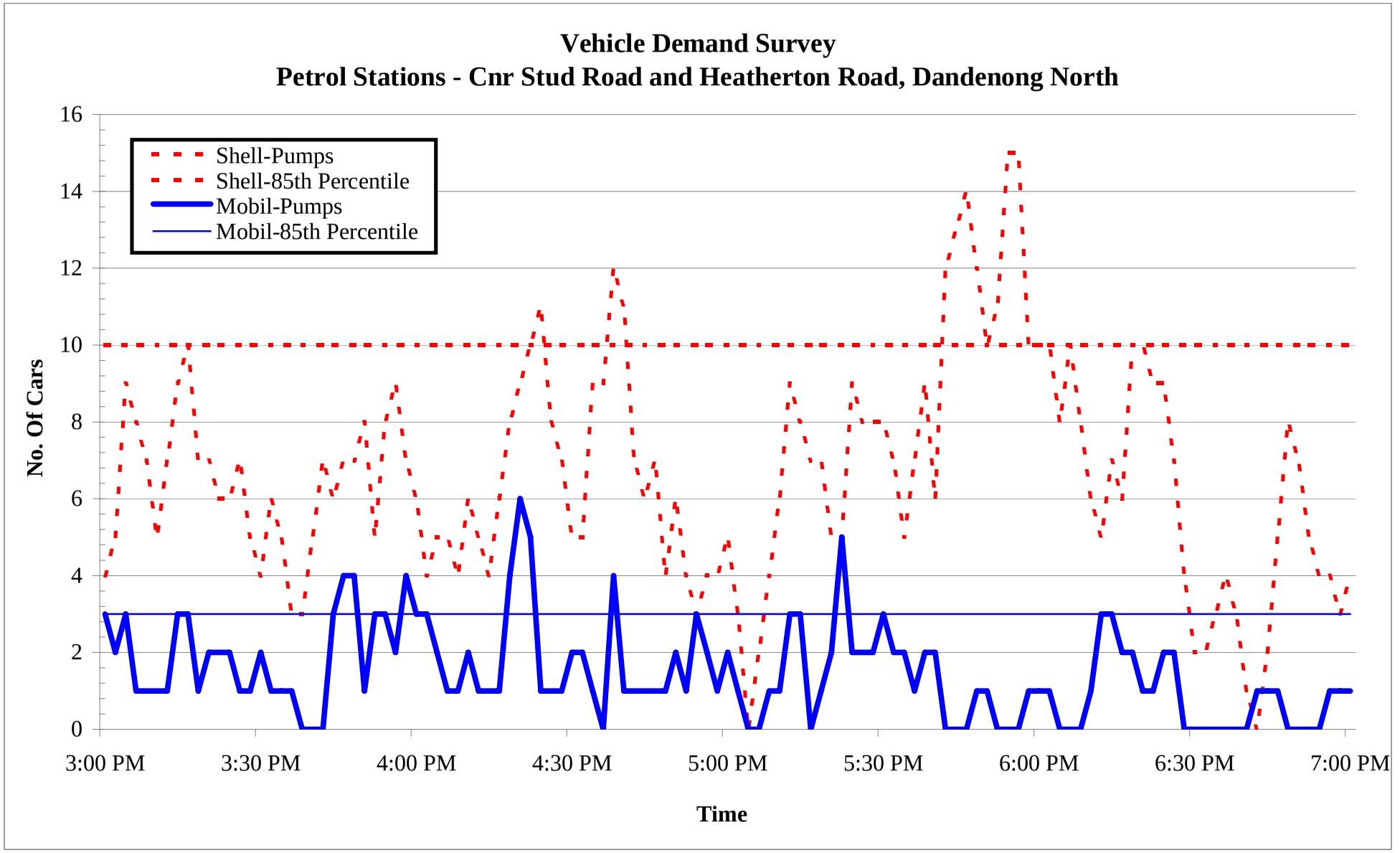
PROPOSED HIGHWAY SERVICE CENTRE, CHINDERAH VEHICULAR CIRCULATION FROM TWEED VALLEY WAY TO FUEL PUMPS

Scale 0 5 10 15 20 25
1:1,000 @ A3

Drawing No : 706450

Sheet No : 5 Issue : A

APPENDIX J


Vehicle Demand Survey
Petrol Stations - Cnr Stud Road and Heatherton Road, Dandenong North
Shell-Pumps
Shell-85th Percentile
Mobil-Pumps
Mobil-85th Percentile
No. Of Cars
16
14
12
10
8
6
4
2
0
3:00 PM
3:30 PM
4:00 PM
4:30 PM
5:00 PM
5:30 PM
6:00 PM
6:30 PM
7:00 PM
Time