



Pilbara Health Network
GP Super Clinic, Karratha
Transport Statement

230230-00

Final | 7 March 2014

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.








Job number 230230-00

Arup
Level 7 Wellington Central
836 Wellington Street
West Perth 6005
Australia
www.arup.com

ARUP

Document Verification

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Job title		GP Super Clinic, Karratha		Job number		230230-00	
Document title		Transport Statement		File reference			
Document ref		230230-00					
Revision	Date	Filename	0001Report_GP Super Clinic Karratha_Transport Assessment Report_DRAFT_240413.docx				
First draft	24/04/13	Description	First draft report				
			Prepared by	Checked by	Approved by		
		Name	Suan Guo	Ryan Falconer	Ryan Falconer		
		Signature					
Final report	25/10/13	Filename	0002Report_GP Super Clinic Karratha_Transport Assessment Report_FINAL_251013.docx				
		Description	Final report incorporating review comments from CODA and updated car parking layout analysis				
			Prepared by	Checked by	Approved by		
		Name	Suan Guo/ Ryan Falconer	Ryan Falconer	Darryl Patterson		
		Signature					
Draft	28/02/14	Filename	0003Report_GP Super Clinic Karratha (downscaled)_Transport Statement_DRAFT_280214.docx				
		Description	Revised report reflecting downscaled development proposal				
			Prepared by	Checked by	Approved by		
		Name	Suan Guo/ Ryan Falconer	Danya Mullins	Danya Mullins		
		Signature					
Final	07/03/14	Filename	0004Report_GP Super Clinic Karratha (downscaled)_Transport Statement_FINAL_070414.docx				
		Description	Final report				
			Prepared by	Checked by	Approved by		
		Name	Suan Guo/ Ryan Falconer	Danya Mullins	Danya Mullins		
		Signature					
Issue Document Verification with Document <input checked="" type="checkbox"/>							

Contents

	Page
Executive Summary	1
Overview 1	
Car parking	1
Site access and circulation	2
Traffic analysis	2
Non-car transport	4
1 Introduction	1
2 Development Proposal	2
3 Existing Context	5
3.1 Current land use and local transport	5
3.2 Town-site growth plan	7
3.3 Karratha City Centre planning	9
4 Parking Supply, Management and Access	10
4.1 On-site car parking provisions	10
4.2 Vehicle access and circulation	12
5 Traffic Generation, Distribution and Impacts	17
5.1 Overview of Karratha traffic modelling	17
5.2 Baseline traffic	18
5.3 Forecast traffic generation and impacts associated with the GP Super Clinic	18
5.4 Additional considerations	20
6 Walking and Cycling Environment	25
6.1 Overview	25
6.2 Surrounding network	25
6.3 Site access	27
6.4 End of trip facilities	27
7 Public Transport	29
8 Conclusions	30

Appendices

Appendix A

Swept Path – SRV (Ambulance and 10 Seater Bus) Access

Appendix B

Swept Path – SRV and B99 Access

Appendix C

Swept Path - B99 Access

Appendix D

SIDRA output for Basset Road/ Welcome Road/ Sharpe Avenue - Short Term
(from KCCIW Project)

Executive Summary

Overview

Pilbara Health Network engaged Arup to undertake a transport assessment of the proposed GP Super Clinic on Lot 7017 in the Karratha City Centre. The location of the site is shown in the following figure. The Super Clinic is proposed to be constructed and operational by 2015.



Transport analysis has been undertaken in accordance generally with the Western Australian Planning Commission's *Draft Transport Assessment Guidelines for Development, Volume 4 – Individual Developments*.

The Super Clinic is planned to incorporate 23 consulting rooms for use by a range of health service practitioners – General Practitioners (GPs), Allied Health, Indigenous Health and Mental Health. During peak periods of operation, up to 13 of these consulting rooms are anticipated to be in use.

In addition, a small number of rural health training staff (3) and students (5), and Visiting Medical Officers (VMOs) (2) will operate on the site. No pharmacy, café or other ancillary – independently traffic generating – activities are planned contrary to earlier development propositions.

Car parking

A total of 43 at-grade car parking bays are proposed as part of the development. DP18 (Karratha City Centre Interim Parking Policy) defines the actual requirements for on-site parking supply and circumstances under which the Shire of Roebourne will accept reductions (usually when an appropriate off-site reciprocal parking arrangement and/ or cash-in-lieu payment is agreed). According to DP18, the target (also maximum) rate of supply of on-site parking for the Super Clinic is 43 bays while the minimum is 23 (accounting for land uses that are likely to generate vehicle trips and therefore parking demand at the Super Clinic in their own right).

The policy generally permits supply of parking at or above the minimum but below the maximum in a range of circumstances where, for example, it can be demonstrated to the satisfaction of the Shire that:

- Empirical evidence shows that a particular type of development does not require the maximum
- Shared parking opportunities exist to permit a reduction in supply
- Some land uses proposed as part of a development will be ancillary to adjoining uses and either generate less or no independent traffic
- A cash-in-lieu payment for a shortfall is appropriate

In this instance, Arup considers that supply of parking as per the calculated maximum allowance for the Super Clinic is reasonable given proposed staffing levels, and the likely patient turnover and dwell time for each consulting room in peak hours of operation. It is also a number of bays that may be accommodated comfortably on site.

It is noted that there are no provisions for additional on-site parking supply; accordingly, should more consulting rooms become operational in peak hours, agreement would need to be reached with the Shire of Roebourne regarding how additional parking demand may be catered for. As part of this process, a review should be undertaken of actual on-site parking utilisation.

Site access and circulation

Access to the site will be facilitated via a common ingress/ egress from/ to Basset Road to the south. CODA discussed and agreed provision of an access in this location with LandCorp and the Shire of Roebourne. It is noted that a median island has been constructed adjacent to the cross-over location and this will need to be modified. Access from Sharpe Avenue is not feasible or desirable.

The car park will be available for use by general vehicles, motorcyclists, ambulances and a community shuttle bus. The proposed bin pad is located on the southern boundary and would be accessed directly from Basset Road. Medical waste is also proposed to be collected kerbside although this will require management by the Super Clinic (e.g. bins to be wheeled kerbside at scheduled collection times). Arup has been advised by CODA that this arrangement is acceptable to the Shire.

Swept path analysis and a design compliance check against AS2890.1 found that the off-street car-park is likely to accommodate vehicles that might be reasonably forecast. These vehicles include B99s, a community shuttle bus (Small Rigid Vehicle [SRV] tested as proxy) and ambulance (SRV tested as proxy).

Traffic analysis

Transport analysis has been undertaken in the context of broader traffic modelling and network design, which forms part of the Karratha City Centre Infrastructure Works (KCCIW) Project. The KCCIW Project represents the implementation of the Karratha City of the North (KCN) Plan by the Shire of Roebourne and LandCorp. The KCN Plan was endorsed by the State and published in 2011.

As part of the KCCIW Project, a series of traffic models was developed. Yield data for Lot 7017 is accounted for in these traffic models and the models were therefore used as the basis for the analysis discussed in the current report. The analysis represents a current snapshot of planning and analysis for the Karratha City Centre.

The KCCIW Project will involve the staged rollout of new transport infrastructure in the Karratha City Centre. These works include construction of new streets and some street realignments, various intersection upgrades, and creation of some new intersections. Evolution of the transport network is intended to occur independently of the development of the Super Clinic. The ultimate network proposed in Karratha City Centre is shown below.



Traffic likely to be generated by the Super Clinic in the PM peak hour was compared to traffic assumptions for Lot 7017 accounted for in the modelling. This analysis shows that *less* traffic is likely to eventuate as a consequence of development of the Super Clinic than is assumed for this Lot in the modelling (86 compared to 126 trips, a difference of about 30%).

On this basis, Arup considers that the traffic impacts of the Super Clinic are accounted for suitably in the broad assessment and network design undertaken as part of the KCCIW Project. We note that initial road works and intersection treatments including construction of Basset Road, creation of a four-way priority-controlled junction at Basset Road/ Sharpe Avenue/ Welcome Road, extension of Sharpe Avenue south to Dampier Road and signalisation of this three-way junction are already complete.

Additional traffic impact analysis may be warranted in future should additional consulting rooms within the Super Clinic development become operational during peak hours.

Non-car transport

Good provisions are being made for access to and from the Super Clinic by walking and cycling. These include clear pedestrian access to the site and good provision of end-of-trip facilities. It will be important that sufficient shading and plantings are incorporated into the detailed design both to add to amenity and assist with pedestrian comfort. DPI sets out specific requirements.

No specific public transport provisions are being made as part of the Super Clinic development. It is anticipated that at some time in the future, a transit service may operate along Karratha Terrace linking urban cells to the east of the Karratha City Centre via Wellard Way (e.g. Mulataga) with cells to the west via O'Keefe Road (e.g. Pegs Creek). While this service, if and when it becomes operational, may benefit some staff and patients, it is unlikely to have a significant impact on future mode shares.

1 Introduction

Pilbara Health Network (PHN) engaged Arup to undertake a transport assessment and prepare an associated report to support a Development Application (DA) for a GP Super Clinic site in the Karratha City Centre. A Transport Assessment (TA) Report was first prepared for a development proposal incorporating a larger range of facilities and greater land use yield overall. The current Transport Statement (TS) relates to a downscaled development proposal. The two yields are compared in **Section 2**.

The TS has been prepared in accordance with the *Draft Transport Assessment Guidelines for Development, Volume 4 – Individual Developments* (WAPC, August 2006). Given the scale of development proposed, with fewer than 100 vehicle trips forecast to be generated in the peak hour of operation, the less comprehensive requirements of a TS compared to TA Report are addressed in the current document.

The intent of the TS is to “*provide the approving authority with sufficient transport information to confirm that the proponent has adequately considered the transport aspects of the development and that it would not have an adverse transport impact on the surrounding area*”¹.

The transport analysis has been undertaken in the context of work associated with the Karratha City Centre Infrastructure Works (KCCIW) Project. Arup is also engaged to provide transport planning services in relation to the KCCIW Project, which represents the implementation of the Karratha City of the North (KCN) Plan by the Shire of Roebourne and LandCorp. The KCN Plan was endorsed by the State and published in 2011.

As part of the provision of transport consultancy services for the KCCIW Project, a series of traffic models have been developed. These include:

- The Karratha Spreadsheet Model (KSM), which applies to the Karratha town-site and surrounds
- A Paramics micro-simulation, which applies to the proposed Karratha City Centre
- SIDRA intersection models for select existing and new (proposed) intersections within and adjoining the proposed Karratha City Centre

Yield data for the Super Clinic site is accounted for in these traffic models. Traffic modelling, including traffic assignment, distribution and impacts are discussed in more detail in **Section 5** of this report.

It is noted that additional key planning policies developed by the Shire apply to the proposed development. From a transport planning perspective, these include DP1 (Karratha City Centre Development Requirements) and DP18 (Karratha City Centre Parking Policy).

¹ Western Australian Planning Commission (2006) *Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments*, Perth: WAPC: p9.

2 Development Proposal

The Super Clinic site – Lot 7017 - is 4,182m² in area. This facility will enable GP, Allied Health, Indigenous Health, Mental Health and ancillary health clinicians to service the Karratha region. It will also provide non-residential educational programmes for rural health students. The site is bounded by Sharpe Avenue to the east, Basset Road to the south, Lot 7076 to the west and Lot 7016 to the north.

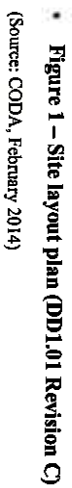
The development is subject to the requirements of DP1 and DP18. These policies that have been prepared by the Shire to guide built form outcomes in the City Centre and are intended to facilitate (among other outcomes):

- Rationalised parking supply, which is more in keeping with the shared parking opportunities within a city centre environment, opportunities for users to adopt alternative modes of transport, and management of vehicle traffic
- A greatly improved pedestrian realm, which incorporates weather protection, landscaping, general amenity and safer road crossing points. Collectively, these characteristics should facilitate increased walking trips, particularly between different land uses within Karratha City Centre

The proposed traffic-generating land use yields associated with the GP Super Clinic are shown in **Table 1**. These are compared to previous plans for the Super Clinic, which assumed a broader range and greater intensity of uses on the site. A revised site layout is shown in **Figure 1**. The location of Lot 7017 within the Karratha City Centre is shown in **Figure 2**.

■ **Table 1 – Proposed traffic-generating land use yields associated with the GP Super Clinic (original versus downscaled proposals)**

Land use	Yield (previous)	Yield (downscaled)
General practitioner and associated health services consulting rooms	14 rooms operating during peak periods	13 rooms operating during peak periods
Café	30m ² net leasable area (NLA)	N/ A
Single-bed short stay accommodation rooms	8 rooms	N/ A
Additional activities	5 staff and 3 students as part of rural health education programme	5 staff and 3 students as part of rural health education programme





■ **Figure 2 – Location of the GP Super Clinic within the existing Karratha City Centre**

3 Existing Context

3.1 Current land use and local transport

Until recently, the Karratha town centre is anchored by the Centro shopping centre, which was bounded by Sharpe Avenue, Barlow Place, Klenk Street and Welcome Road. Sharpe Avenue was the notional main street although it was hostile for pedestrians and had a very wide reserve (Figure 3).

In the last 12 months, the town centre has been transformed by the initial road-works agreed as part of the KCCIW Project. These include re-treatment of Sharpe Avenue and its extension to a signalised three-way intersection with Dampier Road (see Figure 4), construction of Basset Road west of Sharpe Avenue, and creation of a four-way priority controlled junction at Basset Road/ Sharpe Avenue/ Welcome Road (see Figure 5).

These road-works in associated with new land development at the northern end of the centre (including the multistorey Pelago development) have made a significant difference to built-form, vehicle access and pedestrian amenity.

The town centre, framed by but excluding Dampier Road, Balmoral Road and Searipple Road, is subject to a 40 kilometre per hour speed limit.

More broadly, Karratha exhibits a linear growth pattern (east-west), with residential cells adjacent to the town centre characterised by a Radburn design. This contributes to car dependency and excessive vehicle kilometres travelled, as there are few direct routes between adjacent urban cells (even by active modes).

Dampier Road, which frames the town centre to the south, is a dual carriageway, median-divided Primary Regional Road (as far east as Karratha Road), with a posted speed limit in the vicinity of 70 kilometres per hour. It has a high heavy vehicle mode share (about 15%) and is heavily trafficked in peak hours given tidal flow between Karratha and mine sites/ industry to the west. Traffic count data collected in 2011 (west of Millstream Road) showed an average weekday maximum count of 12,661 vehicles and 1,278 vehicles in the evening peak hour. This represents 20-25% growth in traffic compared to survey data from 2009.



▪ **Figure 3 – Sharpe Avenue, viewed from the north (pre initiation of Karratha City Centre Infrastructure Works)**



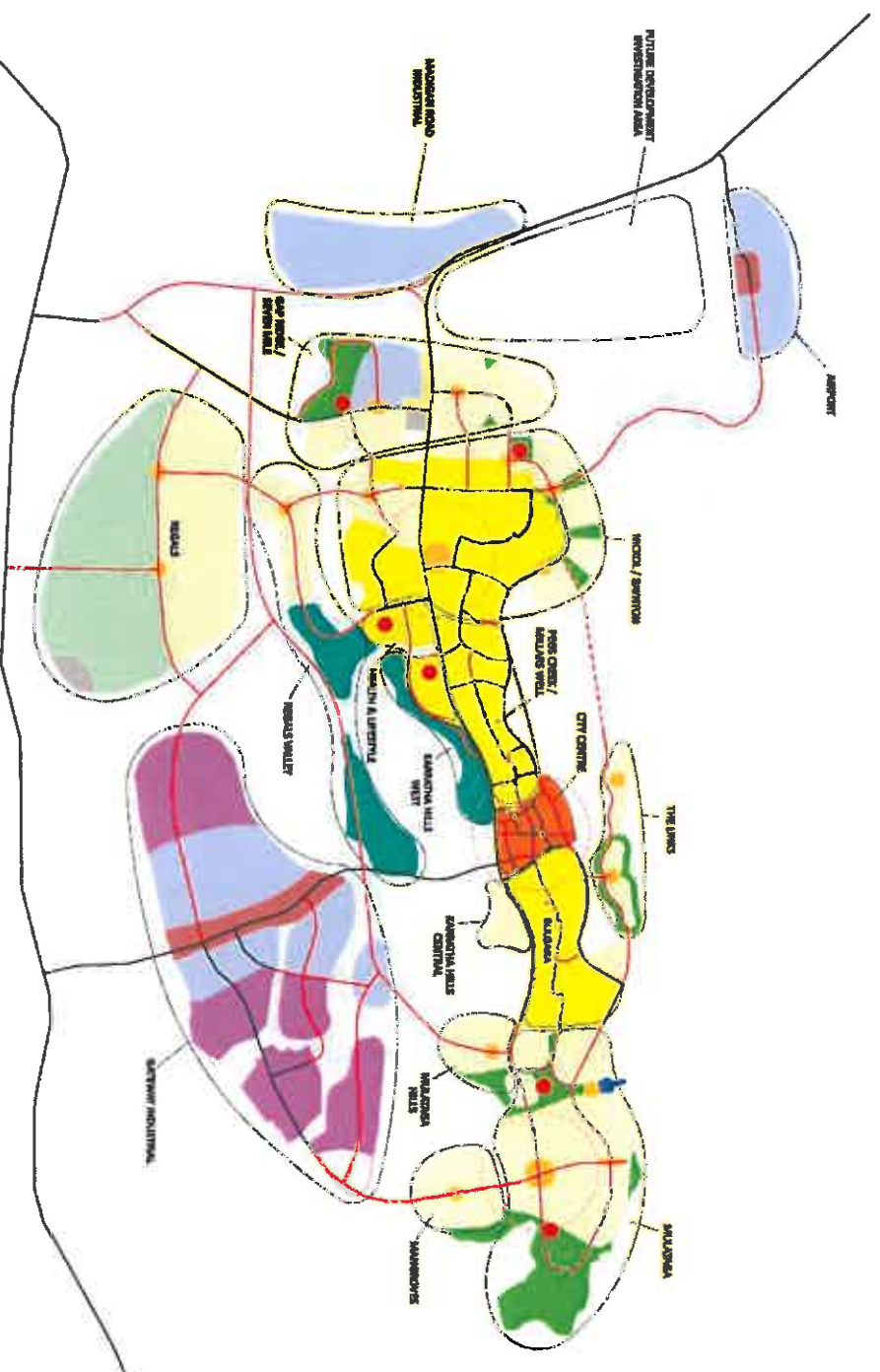
▪ **Figure 4 – Sharpe Avenue/ Dampier Road intersection, viewed from the north**



■ **Figure 5 – Basset Road western approach to Sharpe Avenue**

3.2 Town-site growth plan

The *Karratha City of the North Plan* articulates a vision for Karratha to be transformed from a town of around 15,000 people into a City of 50,000 people by 2031. The ambitious growth plan divides Karratha into precincts with new areas for growth identified (**Figure 6**). Given the linear form of the town, growth is likely to significantly increase east-west traffic flows: this has been verified by forecasts generated by the Karratha Spreadsheet Model (KSM).



- **Figure 6 – Town-site Growth Plan concept**
(Source: TPG, March 2010)

3.3 Karratha City Centre planning

The KCCIW Project represents the implementation of the Karratha City of the North Plan within the 'town centre' (future city centre) environment (see **Figure 7**). Since early 2011, a multi-disciplinary team of consultants, LandCorp and the Shire of Roebourne have been delivering the project. The work has included refinement of the proposed City Centre street network, detailing land use and transport planning, and traffic modelling. This work is discussed in more detail in **Section 5**.



■ **Figure 7 – Future City Centre Zone (marked 'Karratha')**

(Source: Whelans, November 2011)

4 Parking Supply, Management and Access

4.1 On-site car parking provisions

A total of 43 car parking bays plus one ambulance bay and a community bus bay are proposed to be provided on site, at-grade. Two of the bays will be of appropriate dimension for and marked as ACROD parking, which satisfies the requirements of the Building Code of Australia. Arup has been advised that sufficient tree planting will be incorporated adjacent to the at-grade parking to meet the requirements of DP1.

It is recommended that one of the standard car parking bays is marked and signed for use by motorcyclists. The bay should be of sufficient size to accommodate at least two motorcycles and is a reasonable provision in this location.

Arup has compared on-site provisions with requirements in accordance with DP18 (Karratha City Centre Interim Parking Policy). Based on the forecast yield, the target/ maximum on-site parking requirement is 43 bays. The minimum parking supply that would typically be permitted for a development of this scale and type of use would be 23 bays (see Table 2).

▪ **Table 2 – Target/ maximum and minimum parking requirements for the Super Clinic constituent land uses under DP18**

Variable	DP18 – Min Rate	DP18 – Min Parking	DP18 – Max Rate	DP18 – Max Parking
Staff parking per person (peak load)	0.45	11	0.9	22
Client parking per first two consulting rooms	1.8	9	3.6	18
Client parking per additional consulting rooms	0.45		0.9	
Rural health school student parking*	0.5/ student	2.5	0.5/student	2.5
Total		23		43

*Assumed rate: not articulated in DP18.

DP18 directs the proponent to demonstrate a case, where applicable:

- That some uses that form part of the development proposal are unlikely to generate traffic and parking demand in their own right (e.g. they are ancillary to other uses on site). In such instances, both the target and minimum parking requirements may be reduced
- For a reduction in supply below the target rate potentially as low as the specified minimum, where:
 - A reasonable ‘first principles’ calculation is shown to apply
 - A degree of internal trip capture is reasonable to be expected

- Evaluation of the daily demand profile of parking associated with each constituent land use identifies opportunities for shared parking on-site. Alternatively, parking supply efficiencies may be negotiated with off-site businesses within a short walking distance of the proponent's development
- Agreement is reached with the Shire to pay cash-in-lieu for a share of the parking requirement above the minimum threshold

Arup has undertaken an evaluation for the Super Clinic (see **Tables 3 and 4**). Based on a first principles approach, which controls for peak period staffing and patient turnover², total parking supply is recommended to be as per the target provisions: i.e. 43 bays. Staff shift changes will need to be managed within the context of on-site supply.

It is noted that there are around 20-25 nearby on-street short term bays suitable for use by some patients within 100 metres of the site. This parking will supplement on-site provisions.

It is noted that there are no provisions for additional on-site parking supply; accordingly, should more consulting rooms become operational in peak hours, agreement would need to be reached with the Shire of Roebourne regarding how additional parking demand may be catered for. As part of this process, a review should be undertaken of actual on-site parking utilisation.

▪ **Table 3 – Staff and student numbers (full-time equivalent and forecast to be on-site in peak hours)**

	No. of Staff (Full Time)	Peak Hour Factor (% of Full Time Staff)	No. of Staff (Peak Hour)
GPs	5	75%	4
Allied/ mental health (including Aboriginal Health Workers)	13	50%	7
Nursing/ support/ admin/ exec	14	75%	10
Rural clinic school staff and students	8	100%	8
Total			29

² Confirmed with Pilbara Health Network through consultation with CODA.

■ **Table 4 – Assessment of peak hour parking requirements per class of user**

Class of user	Parking requirement (bays)
4 GPs with 100% car mode share	4
6 allied health staff with 100% mode share	6
11 support/ administration/ executive staff with 15% allowance for drop off, car share and/ or other non-car driver modes	9
4 primary care clinic consulting rooms utilised in the peak, 4.1 patients per hour, 35% Indigenous* patients and 80% of non-Indigenous patients as car drivers	5**
9 Allied/ mental health care clinic consulting rooms utilised in the peak, 4.1 patients per hour, 35% Indigenous* patients and 80% of non-Indigenous patients as car drivers	12**
8 (rural clinic school – 3 staff and 5 students): allowance of one bay per staff and 0.5 bays per student	6
1 Aboriginal health workers with 100% car mode share	1
Total	43

*Arup was advised that 35% of clients are of Indigenous descent, 100% of these clients arrive by either kiss and ride or the PHN bus service

** Poisson distribution assumed to account for overlap of patient arrivals in peak (85th percentile). Average patient dwell time of 30 minutes assumed

4.2 Vehicle access and circulation

4.2.1 Overview

A compliance check against Australian Standard 2890.1 (off-street car parking) was conducted for both the external access and the internal design of the car park. Supplementary swept path analysis was undertaken in key locations to assess the suitability of the layout for access by relevant design vehicles. The key assumptions/ inputs applied include the following:

- Arup's compliance check and swept path analysis was originally conducted using base CAD plans issued by CODA on 5 February 2014:
 - A1.01_REV B [SITE PLAN]
- Following advice from Arup, revised base drawings were issued on 26 February 2014 by CODA (DD1.01 Site Plan_Rev C). Upon inspection, compliance issues previously identified have been resolved within the new site plan.
- Swept path analysis utilised the following design vehicles (consistent with requirements of AS2890.1)
 - B99: 5.2 metres x 1.94 metres – standard large car representing a 99th percentile vehicle (e.g. Toyota Landcruiser)
 - Small Rigid Vehicle (SRV): 6.4 metres x 2.33 metres – proxy for a small 10-seat bus and ambulance

- Design speed – 5 kilometres/ hour
- Body envelope – 300 millimetres

Vertical clearances and horizontal grading were not considered as part of this analysis.

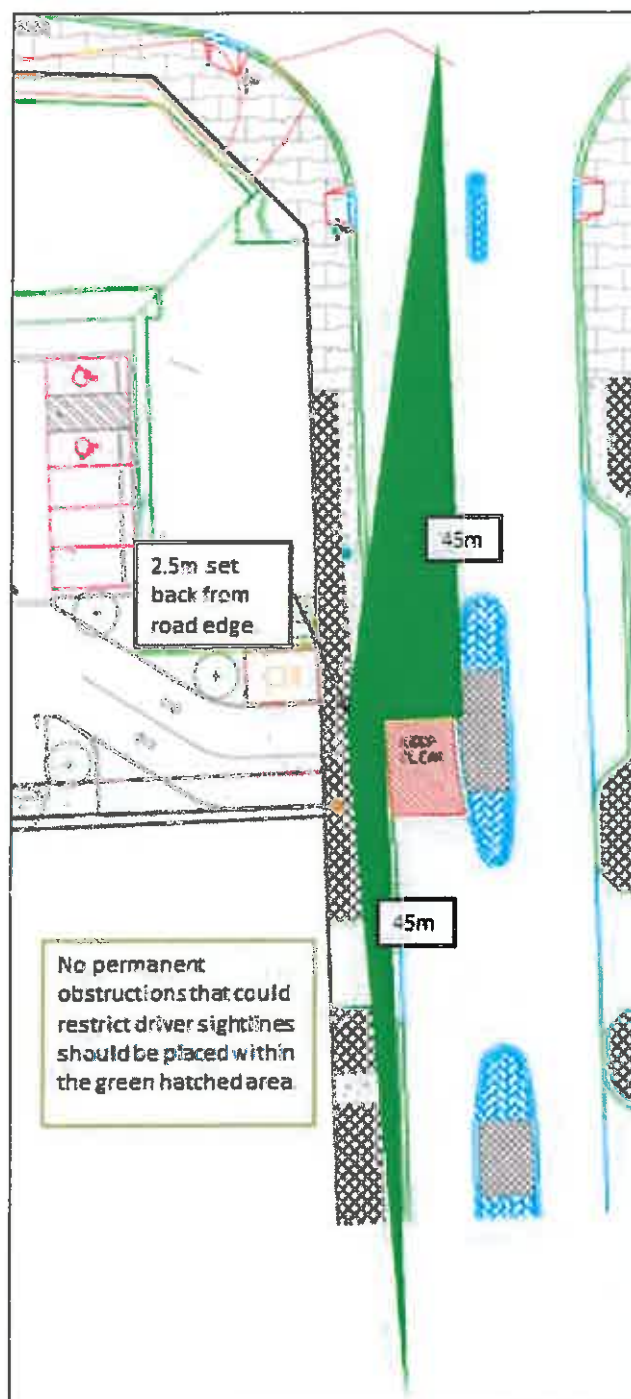
4.2.2 External access

Access to the site will be via a common ingress/ egress from/ to Basset Road to the south. Access from Sharpe Avenue to the east is not feasible or desirable because of its main street function within the Karratha City Centre and the intent for on-street parking to be maximised in this environment. Arup was advised that access from Basset Road is agreed with LandCorp and the Shire of Roebourne; however, a median island has been constructed on Basset Road and this will need to be modified to accommodate right turns into and from the site (see **Figure 8**).

The proposed width of the driveway is 6.7 metres. This tapers down to 6.0m once inside the parking compound. This satisfies AS2890.1 with regard for two-way operation. Sightlines for drivers exiting the car park should be maintained as per AS2890.1 and are shown in **Figure 9**. The defined area should be kept clear of permanent obstructions (including landscaping exceeding one metre).



- **Figure 8 – Median island on Basset Road requiring modification. The proposed cross-over for the Super Clinic will be located between the transformer and site boundary fence**



■ **Figure 9 – Sight line assessment at access driveway**

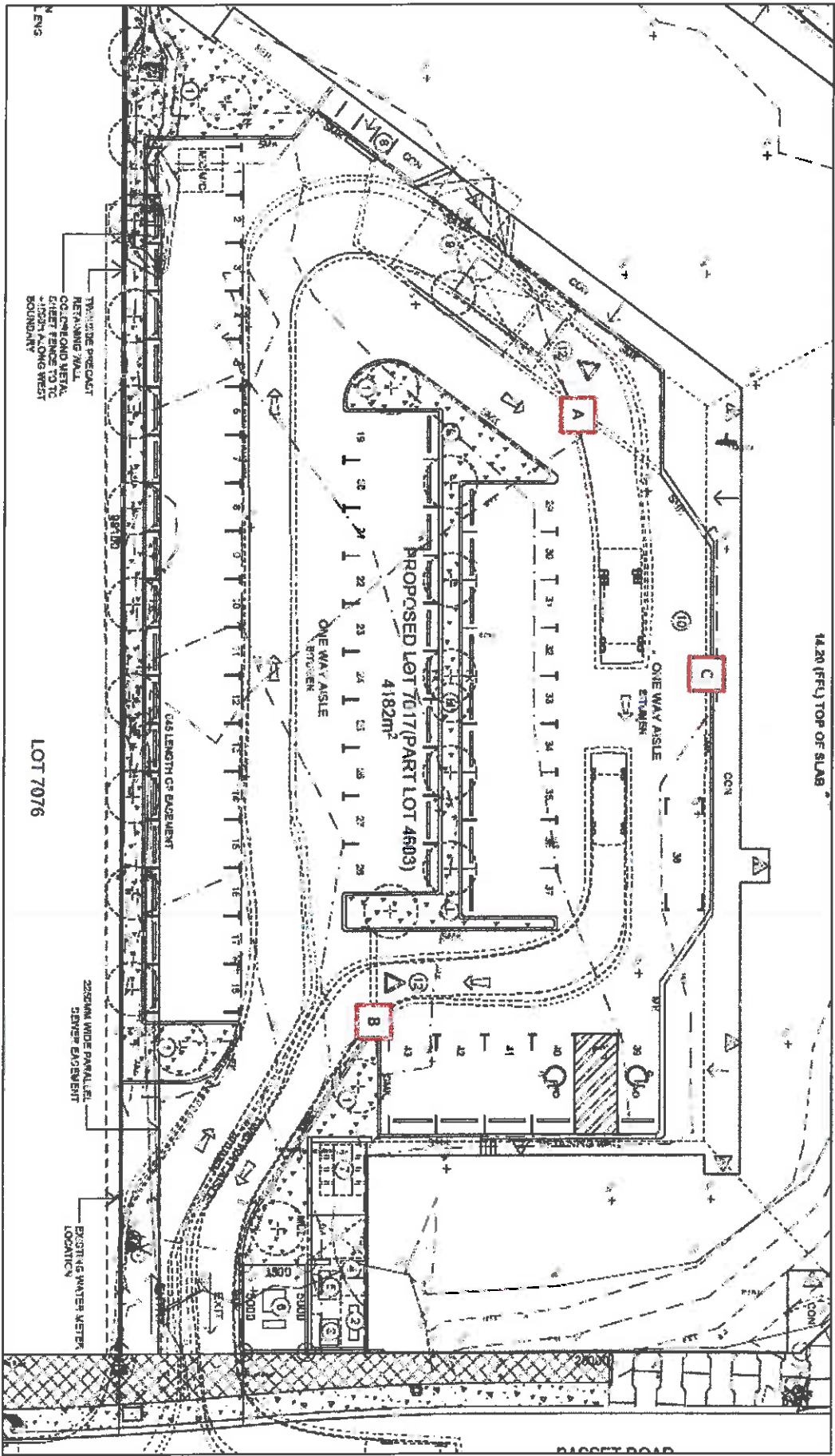
4.2.3 Internal design and circulation

The car park will be available for use by general vehicles, motorcyclists, ambulances and a community shuttle bus. Bin collection is proposed to occur kerbside (acceptable to the Shire according to correspondence received from their Technical Services Department). Accordingly, garbage trucks will not be required to access the site.

General comments in relation to design compliance with AS2890.1 include:

- General parking bay sizes are 5.4 metres x 2.7 metres, with five parking bays along the southern edge of the parking lot measuring 5.6 metres x 2.7 metres in size. These bay sizes are compliant with AS2890.1 for parking user class 3 (short term town centre parking). CODA has indicated that these sizes are acceptable to the Shire of Roebourne
- Aisle widths (5.8 metres) comply with AS2890.1. The Shire of Roebourne advised previously that their preferred aisle width in off-street car parks is 6.0 metres; however, 5.8 metres has been accepted elsewhere
- The parking lot consists of a clockwise one circulation configuration. A minimum circulation aisle width of 3.5 metres is observed along the northern side of the parking lot. This is compliant with AS2890.1 minimum requirements for one way roadways of 3.3m (3.0m minimum with a 300mm clearance to the wall adjacent to the ambulance set down area)
- Swept path analysis indicates that both an ambulance and small bus (6.4 metre long SRV tested) is able to access and manoeuvre around the site as per the set down areas indicated on the site plan (drawing number DD1.02, revision C). Given the proposed geometry no other vehicles will be able to dwell in the embayment areas when the shuttle bus or ambulance requires access to the facility. Vehicle swept paths are shown in **Appendix A**
- This report has given high level advice in relation to the following points,:
 - Advice has been given in relation to line-marking and signage for the exit from the ambulance set down area (point A, **Figure 10**) and the area indicated by point B in **Figure 10**. It is still recommended that signs and line-marking drawings/ advice be sought from the project civil engineer
 - Advice has been given in relation to a set down ramp for the bus drop off area. This is to allow access for people with disabilities (wheel chair access) onto the raised kerb. This should be in compliance with AS 1428.1. Furthermore kerb treatment along the bus drop off area is recommended to be in the form of a barrier kerb if bollard protection is not afforded in order to protect waiting pedestrians from a vehicle potentially mounting the kerb (Point C, **Figure 10**). It is recommended to seek the advice of the project civil engineer to clarify these requirements

Within the scope of our transport planning activities, we have identified safety in design issues and potential hazards whenever reasonably practicable within our field of expertise. Due to our limited and upfront role on this project, it is not considered reasonably practicable to identify all potential hazards that may occur throughout the life of a project, including during construction activities. For any ensuing design stages, it is strongly recommended our advice regarding safety in design be reviewed and revised as required, to reflect any changes to the current design.



■ Figure 10 – Location of general safety issues

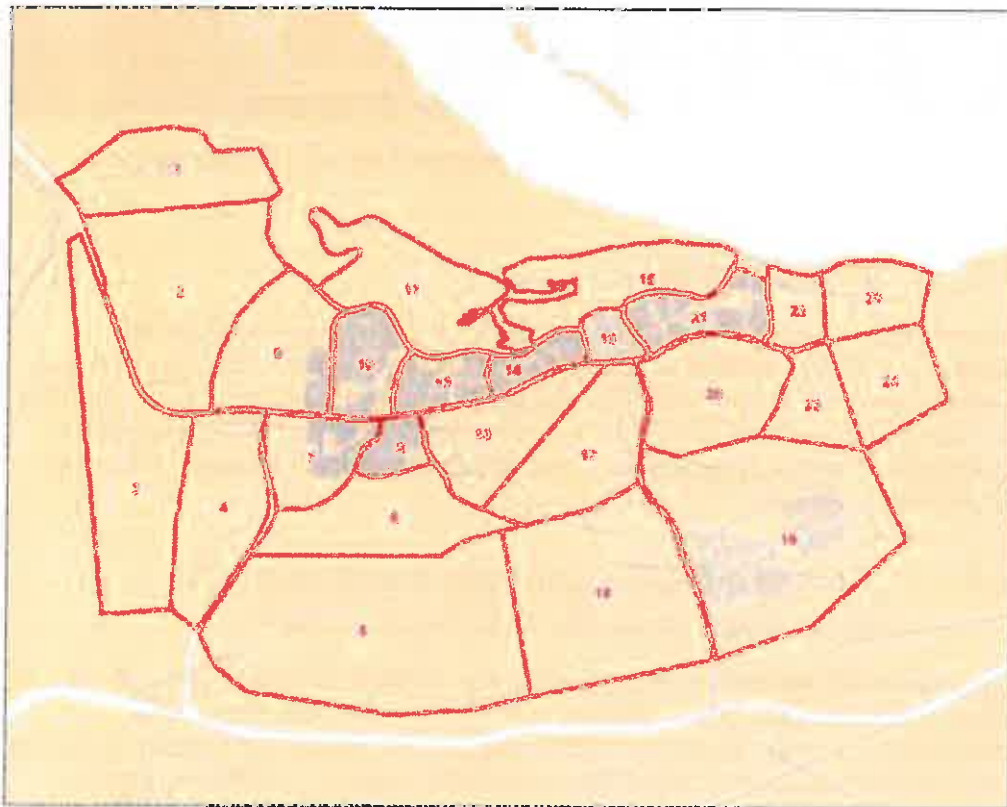
5 Traffic Generation, Distribution and Impacts

5.1 Overview of Karratha traffic modelling

A series of traffic models have been developed as part of the provision of transport consultancy services for the KCCIW Project. These include:

- The Karratha Spreadsheet Model (KSM), which applies to the Karratha town-site and surrounds
- A Paramics micro-simulation, which applies to the proposed Karratha City Centre
- SIDRA intersection models for select existing and new (proposed) intersections within and adjoining the Karratha City Centre

The land use zones adopted in the KSM are shown in **Figure 11**. The Super Clinic forms part of zone 16 in this model. The City Centre zones adopted in the micro-simulation are shown in **Figure 12**. The Super Clinic forms part of zone 010 in this model.



■ **Figure 11 – KSM model zones**



■ **Figure 12 – Paramics model zones (long term street network and zone connectors shown)**

5.2 Baseline traffic

Recent changes to traffic conditions on the local network are likely given completion of new development (e.g. Pelago) and city centre road infrastructure works. Thus, rather than referring back to historic traffic counts, it is more useful to consider forecast traffic conditions according to the KCCIW models and the contribution that traffic generated by the Super Clinic site may make to demand flows on the network.

5.3 Forecast traffic generation and impacts associated with the GP Super Clinic

The vehicle trip generation statistics shown in **Table 5** were derived for the Super Clinic using first principles. This is considered to be a more reasonable calculation in this instance than multiplying generic vehicle trip generation factors and floor areas because detailed data is available regarding staffing and patient turnover (therefore actual trip demands) and vehicle trip generation will have a clear relationship to parking supply.

Relatively conservative car driver mode shares have been assumed: some staff are likely to car pool, be dropped-off or use active modes to get to the Super Clinic and some patients to visit the Super Clinic as part of a trip chain. There may be

some additional pick-up and set-down trips not captured in Table 5 but these are forecast to be relatively few (less than 10 in the peak).

These statistics represent the current proposed yield scenario and supersede the statistics originally incorporated into the KSM (Table 6). Lot 7017 is incorporated into a broader land use zone, which also includes Lots 7076 (DP61045) and 7016 (drainage reserve). Land use forecasts, provided to Arup by TPG as part of the KCCIW Project, are not broken down on a lot-by-lot basis. Thus, the statistics reported in Table 6 represent a *pro rata* calculation of trip generation based on size of Lot 7017 relative to the size of the entire zone (approximately 23% of the developable area).

- Table 5 – Trip generation statistics derived for the Super Clinic (PM peak hour) using forecast yield/ operations data

User Class/Type	No.	Car Driver Mode Share	One-way Peak Trips
Tertiary consultation facilities (rural health school)			
Staff	3	100%	3
Students	5	50%	3
General practitioner and associated health services consulting rooms			
GP	4	100%	4
Allied/Mental Health	6	100%	6
Support/ Nurses/Admin/Executive	11	85%	9
Non-Indigenous Patients – primary consulting (assume in/ out in the peak, 65% of all patients, 4.1 patients per hour per operating consulting room)	11	80%	17
Non-Indigenous Patients - Allied Health (assume in/ out in the peak, 65% of all patients, 4.1 patients per hour per operating consulting room)	24	80%	38
Visiting Medical Officers (assumed one dropped off / picked up from Airport during peak)			2
Community bus (assume in/ out in peak, transport for Indigenous patients)			2
Ambulance (assume in/ out in peak)			2
Total trips			86

- **Table 6 – Trip generation statistics derived for the Super Clinic site (PM peak hour) using superseded forecast yield data**

Land use type	Equivalent Model yield input	Trip rate	PM peak hour trips (vph)
City centre accommodation	20 units	0.44 per unit	9
Retail (e.g. café)	115m ² NLA	5 per 100sqm	6
Office	780m ² NLA	1.5 per 100sqm	12
Medical	1,658m ² NLA	6 per 100sqm	99
Total			126

The revised peak hour estimate represents approximately 70% of the KSM forecast. In practice, the impacts of the Super Clinic are accounted for in the longer term planning for the Karratha City Centre and no further impact analysis is warranted aside from consideration of site ingress and egress from Basset Road (see Section 4). In particular, reduced activity intensity on this site is not of a scale that would impact on external infrastructure works: the intersection of Basset Road/ Welcome Road/ Sharpe Avenue is already built.

5.4 Additional considerations

The KCCIW Project incorporates staged network upgrades to facilitate the growth of the City Centre. Specific upgrades are being bundled together as works packages, which will be rolled out as funding becomes available. The various stages of work, which will incorporate bundles of works packages, are:

- Short term - 2016
- Medium term - 2021
- Long term - 2031

Arup has been advised that the Super Clinic will be constructed and operational by 2015, soon before the short term time horizon anticipated in the KCCIW Project. The anticipated short term street network is shown in **Figure 13**. **Figures 14** and **15** show the medium and long term networks, respectively. The network surrounding the Super Clinic is therefore proposed to be completed by 2016 with Sharpe Avenue (south), Basset Road (east) and Welcome Road (west) the most likely routes for traffic to assign to, to access/ depart from the City Centre.

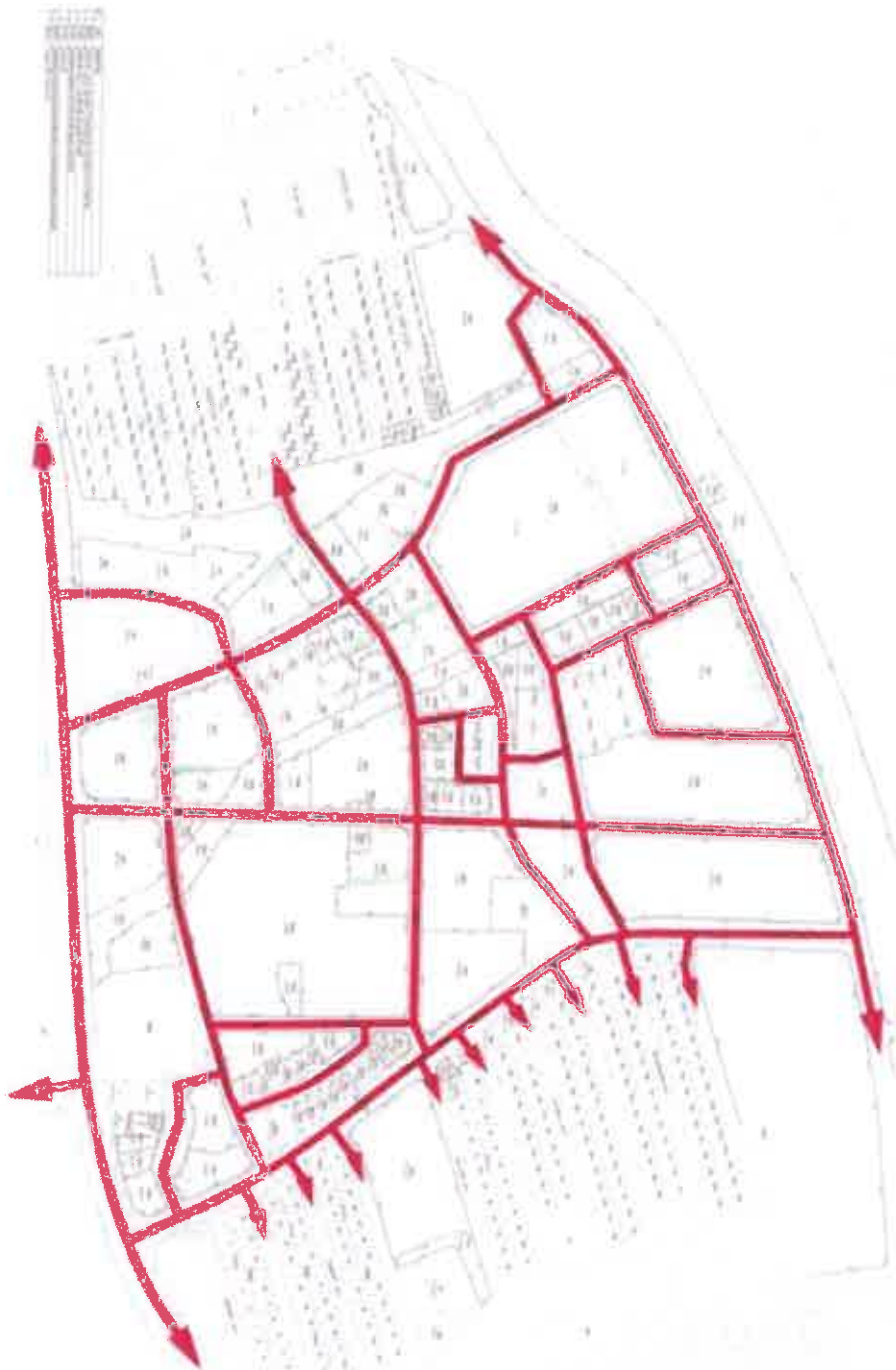
SIDRA intersection analysis completed as part of the KCCIW project shows that peak hour queues on Basset Road (eastbound) are forecast to extend regularly back past the Super Clinic access, particularly prior to road network upgrades signposted to occur by the medium term (see **Appendix D**). This could lead to significant operational issues if the Super Clinic access is blocked given vehicles waiting to turn right on to the site would impede traffic travelling east-to-west on Basset Road. Accordingly, Arup recommends that 'keep clear' marking is installed on Basset Road outside the Super Clinic to help to address this issue (see **Figure 16**).



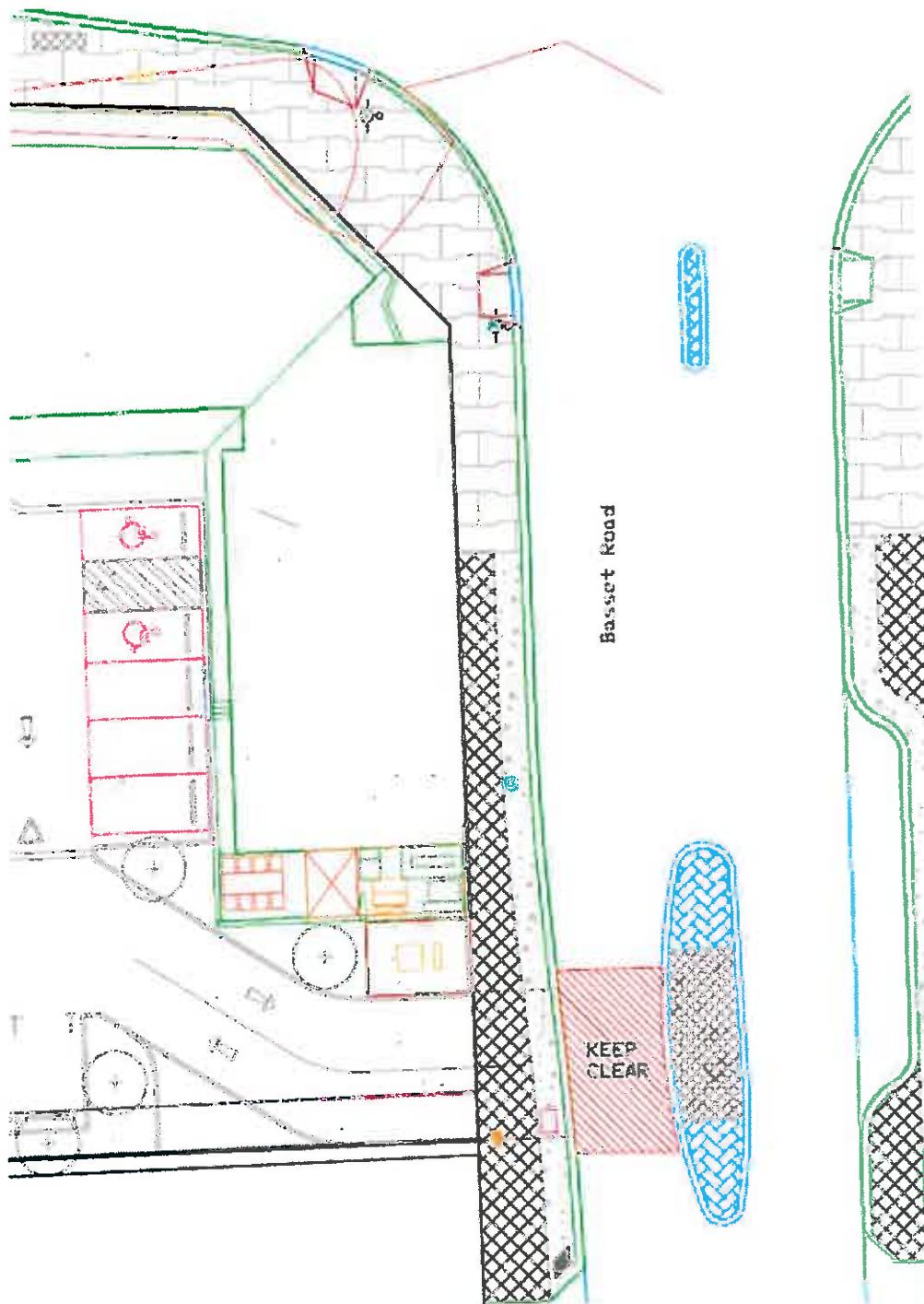
■ **Figure 13 – Proposed short term (year 2016) City Centre street network**



■ **Figure 14 – Proposed medium term (year 2021) City Centre street network**



■ **Figure 15 – Proposed long term (year 2031) City Centre street network**



- **Figure 16 – Proposed ‘keep clear’ marking on Basset Road to obviate risk of access being blocked during peak hours**

6 Walking and Cycling Environment

6.1 Overview

The location of the Super Clinic within the Karratha City Centre will provide good opportunities for alternative mode use; however, these opportunities need to be considered within the context of the:

- Immaturity of the public transport network (discussed in the following section)
- Particular needs of staff and patients (medical conditions can make patients less mobile and therefore less able to utilise non-car modes of transport and tolerate more than short walking distances to and from off-site parking)
- Climate in Karratha, which can dissuade trips by active modes

Nevertheless, a strong case remains for DDA-compliant pedestrian access to the Super Clinic (that incorporates good shade provisions) and supply of bicycle parking and end-of-trip facilities as per the stipulations of DP18.

6.2 Surrounding network

All external streets should be constructed with footpaths on both sides, providing good access to the Super Clinic. The intersection of Basset Road/ Welcome Road/ Sharpe Avenue is not proposed to be signalised in the short-medium term, which means that the nearest controlled crossing points of Sharpe Avenue will be at Dampier Road (to the south) and Karratha Terrace (to the north). Even so, the single carriageway, tight design of Sharpe Avenue, intermittent median islands and 40 kph speed limit should help to facilitate midblock pedestrian crossing movements, which are acceptable within a highly urbanised environment.

It is likely that some patients will occasionally park their vehicles off-site and therefore require safe and direct pedestrian access. Furthermore, staff are likely to undertake walking trips during breaks and at the end of shifts to other destinations within the City Centre.

Shade coverage will be an important consideration in view of the climate in Karratha. DP1 sets out shading requirements and Arup supports their application to the Super Clinic site. Significant shade structures are generally anticipated along Sharpe Avenue, consistent with the Karratha City of the North Plan, Karratha Vernacular Report (Hassell, April 2011) and DP1.

The slow speed nature of most streets within the City Centre will be suitable for on-street bicycling. Specific on-street provisions will be considered along Balmoral Road (in the medium term). Other provisions within the City Centre include on-street bicycle lanes on Warambie Road and Karratha Terrace (the future transit link) to help establish a strong east-west connection as per the Shire Bike Plan.

On-street lanes may also be considered along Searipple Road (medium term) and City North Boulevard (long term). Separate bicycling facilities are also recommended along Dampier Road, but these would need to be planned and funded by Main Roads WA (see **Figure 17**).

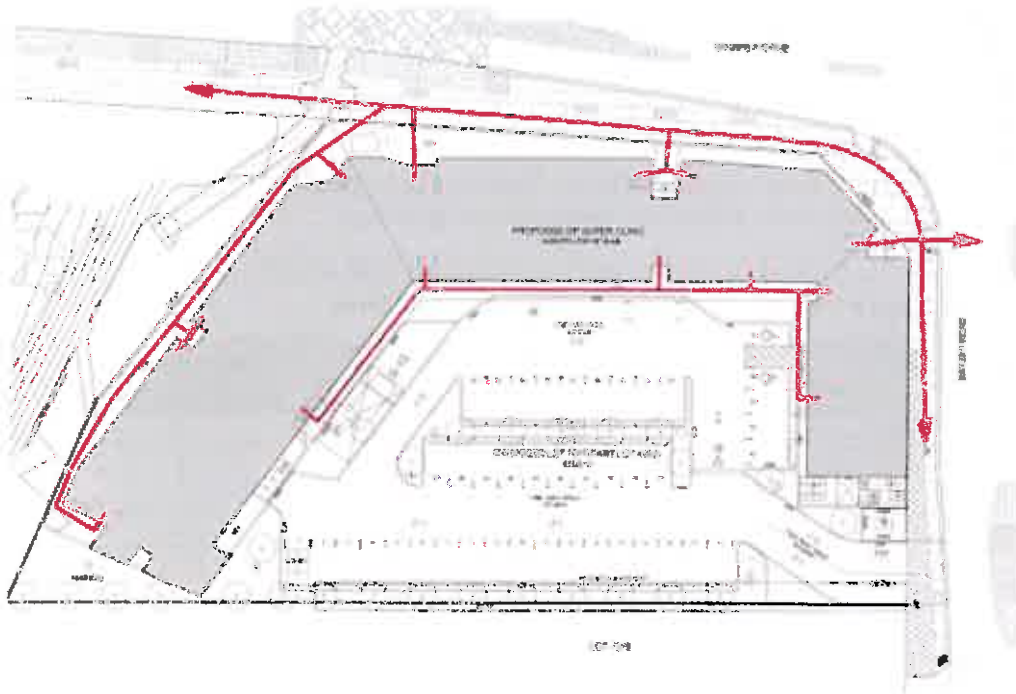


■ **Figure 17 – Future strategic bicycling network through the City Centre**

6.3 Site access

The primary pedestrian access to the Super Clinic will be from Sharpe Avenue. Secondary access (primary access to the mental health facility) will be from the rear, via the car parking area. Pedestrian accesses should be covered in accordance with DP1.

Key pedestrian desire lines are shown on **Figure 18**.



■ **Figure 18 – Key pedestrian desire lines to, from and around the Super Clinic**

6.4 End of trip facilities

End-of-trip facilities – bicycle parking spaces, showers and lockers – are generally provided as part of new developments to help facilitate active transport trips. Bicycle parking can abet commuter and visitor trips while showers and lockers are usually specifically targeted towards commuters. In the case of a teaching Super Clinic, patients are unlikely to use bicycle facilities while some staff may. In comparison, bicycle facilities may be important for rural health school students.

Based on the plans and yield schedule supplied to Arup, the proposed supply of end-of-trip facilities is:

- Four U-rails located at the northwest end of the car parking area (sufficient to allow eight bicycles to be secured)
- Two showers (one male and one female). Lockers will be provided in the staff room (south wing)

The Shire Bike Plan does not stipulate specific end-of-trip requirements for Super Clinics. There is also no specific Western Australian guidance regarding such

facilities. Accordingly, Arup considers reference to *Victoria Planning Provisions* (Particular Provisions Clause 52.34, 2006) to be reasonable to establish a supply benchmark. The Victorian recommendations are:

- One staff bicycle parking space per eight practitioners and one visitor space per four practitioners
- One space per 20 students

Table 7 compares actual proposed supply with Victorian recommendations. Recommended supply was calculated based on 14 medical practitioners being on site during peak periods. In practice, the supply of end-of-trip facilities is more than sufficient. I

The lack of secure on-site bicycle parking may lead to some staff and students wishing to store their bicycle indoors. This should be handled by Pilbara Health Network as part of their facilities management practices.

▪ **Table 7 – Comparison of actual proposed supply of end-of-trip facilities in the Super Clinic with Victorian recommendations**

Facility	Actual proposed supply (bays)	Victorian statutory standards (bays)
Public bicycle parking spaces	8	4
Tenant/ private bicycle parking spaces	0	3
Showers	2	0

7 Public Transport

There are no existing public transport services in Karratha at this time, excepting school services and a community bus that operates between Karratha and other nearby towns (e.g. Wickham) twice daily on Tuesdays and Thursdays, and weekends. The service stops on Welcome Road a relatively short walk from the proposed Super Clinic.

Given these operating characteristics, the service is not a viable transport alternative for staff employed at the Super Clinic. Furthermore, the service is unlikely to appeal to more than a small number of patients and then only on days of operation, given the:

- 1) Nature of many medical conditions means most clients will seek direct access to the Super Clinic (e.g. will have a low tolerance for walking to the Super Clinic from an offsite set-down or parking area)
- 2) Community bus service operated by Pilbara Health Network, which can utilise a set-down/ pick-up bay outside the entrance to the Super Clinic, will be significantly more attractive than the alternative transit service

As part of the KCCIW Project, Karratha Terrace is being designed with sufficient lane widths to accommodate future bus services. This upgrade forms part of the initial works packages (currently in detailed design and construction).

Additionally, it is proposed that O'Keefe Road, west of Karratha Terrace will connect through to Balmoral Road in the short term to permit a future service to link with residential cells to the west. Similarly, it is proposed that Wellard Way could eventually connect through to Viveash Way, permitting access to residential cells to the east.

Future bus services utilising these links would operate at increased frequencies than the existing community bus (potentially up to hourly during weekdays) and provide better connectivity between the City Centre and residential precincts to the east and west. It is expected that such a service would have a relatively small impact on mode choice for trips associated with the Super Clinic because of the convenience issues already noted.

8 Conclusions

Arup has prepared this TS to address the transport network impacts associated with the planned development of a Super Clinic on Lot 7017 in the Karratha City Centre. The Super Clinic is proposed to be constructed and operational by 2015.

Transport analysis has been undertaken in accordance generally with the Western Australian Planning Commission's *Draft Transport Assessment Guidelines for Development, Volume 4 – Individual Developments*.

The Super Clinic is planned to incorporate 23 consulting rooms for use by a range of health service practitioners – General Practitioners (GPs), Allied Health, Indigenous Health and Mental Health. During peak periods of operation, up to 13 of these consulting rooms are anticipated to be in use.

In addition, a small number of rural health training staff (3) and students (5), and Visiting Medical Officers (VMOs) (2) will operate on the site. No pharmacy, café or other ancillary – independently traffic generating – activities are planned contrary to earlier development propositions.

A total of 43 at-grade car parking bays are proposed as part of the development. DP18 (Karratha City Centre Interim Parking Policy) defines the actual requirements for on-site parking supply and circumstances under which the Shire of Roebourne will accept reductions (usually when an appropriate off-site reciprocal parking arrangement and/ or cash-in-lieu payment is agreed). According to DP18, the target (also maximum) rate of supply of on-site parking for the Super Clinic is 43 bays while the minimum is 23 (accounting for land uses that are likely to generate vehicle trips and therefore parking demand at the Super Clinic in their own right).

In this instance, Arup considers that supply of parking as per the calculated maximum allowance for the Super Clinic is reasonable given proposed staffing levels, and the likely patient turnover and dwell time for each consulting room in peak hours of operation. It is also a number of bays that may be accommodated comfortably on site.

It is noted that there are no provisions for additional on-site parking supply; accordingly, should more consulting rooms become operational in peak hours, agreement would need to be reached with the Shire of Roebourne regarding how additional parking demand may be catered for. As part of this process, a review should be undertaken of actual on-site parking utilisation.

Access to the site will be facilitated via a common ingress/ egress from/ to Basset Road to the south. CODA discussed and agreed provision of an access in this location with LandCorp and the Shire of Roebourne. It is noted that a median island has been constructed adjacent to the cross-over location and this will need to be modified. Access from Sharpe Avenue is not feasible or desirable.

The car park will be available for use by general vehicles, motorcyclists, ambulances and a community shuttle bus. The proposed bin pad is located on the southern boundary and would be accessed directly from Basset Road. Medical waste is also proposed to be collected kerbside although this will require management by the Super Clinic (e.g. bins to be wheeled kerbside at scheduled collection times). Arup has been advised by CODA that this arrangement is acceptable to the Shire.

Swept path analysis and a design compliance check against AS2890.1 found that the off-street car-park is likely to accommodate vehicles that might be reasonably forecast. These vehicles include a 99th percentile car, community shuttle bus (Small Rigid Vehicle [SRV] tested as proxy) and ambulance (SRV tested as proxy).

Transport analysis was undertaken in the context of broader traffic modelling and network design, which forms part of the Karratha City Centre Infrastructure Works (KCCIW) Project. The KCCIW Project represents the implementation of the Karratha City of the North (KCN) Plan by the Shire of Roebourne and LandCorp. The KCN Plan was endorsed by the State and published in 2011.

As part of the KCCIW Project, a series of traffic models was developed. Yield data for Lot 7017 is accounted for in these traffic models and the models were therefore used as the basis for the analysis discussed in the current report. The analysis represents a current snapshot of planning and analysis for the Karratha City Centre.

The KCCIW Project will involve the staged rollout of new transport infrastructure in the Karratha City Centre. These works include construction of new streets and some street realignments, various intersection upgrades, and creation of some new intersections. Evolution of the transport network is intended to occur independently of the development of the Super Clinic.

Traffic likely to be generated by the Super Clinic in the PM peak hour was compared to traffic assumptions for Lot 7017 accounted for in the modelling. This analysis shows that *less* traffic is likely to eventuate as a consequence of development of the Super Clinic than is assumed for this Lot in the modelling (86 compared to 126 trips, a difference of about 30%).

On this basis, Arup considers that the traffic impacts of the Super Clinic are accounted for suitably in the broad assessment and network design undertaken as part of the KCCIW Project. We note that initial road works and intersection treatments including construction of Basset Road, creation of a four-way priority-controlled junction at Basset Road/ Sharpe Avenue/ Welcome Road, extension of Sharpe Avenue south to Dampier Road and signalisation of this three-way junction are already complete.

Additional traffic impact analysis may be warranted should additional consulting rooms within the Super Clinic development become operational during peak hours.

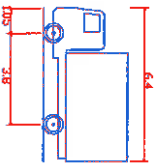
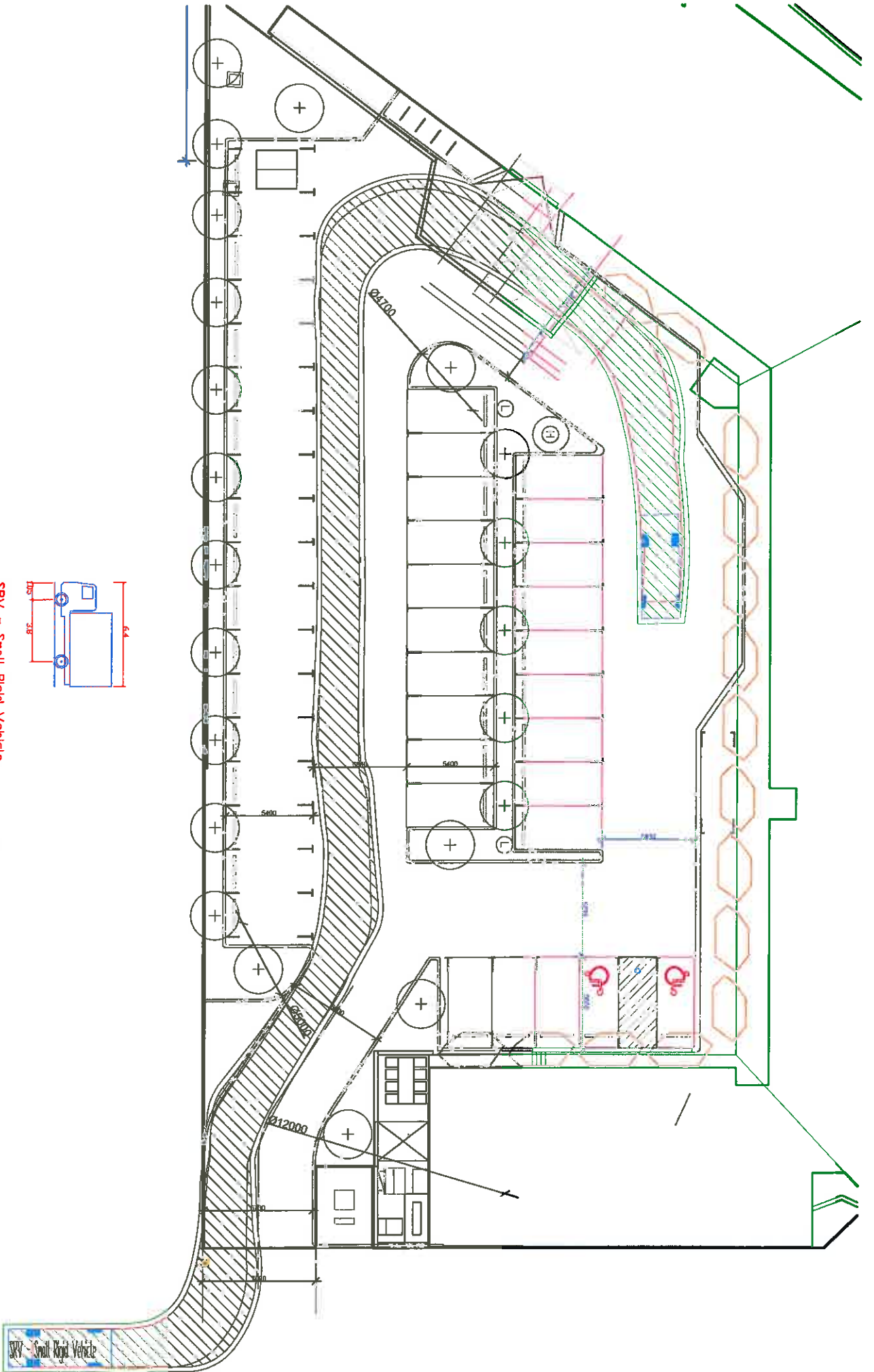
Good provisions are being made for access to and from the Super Clinic by walking and cycling. These include clear pedestrian access to the site and good provision of end-of-trip facilities. It will be important that sufficient shading and plantings are incorporated into the detailed design both to add to amenity and assist with pedestrian comfort. DPI sets out specific requirements.

No specific public transport provisions are being made as part of the Super Clinic development. It is anticipated that at some time in the future, a transit service may operate along Karratha Terrace linking urban cells to the east of the Karratha City Centre via Wellard Way (e.g. Mulataga) with cells to the west via O'Keefe Road (e.g. Pegs Creek). While this service, if and when it becomes operational, may benefit some staff and patients, it is unlikely to have a significant impact on future mode shares.

Appendix A

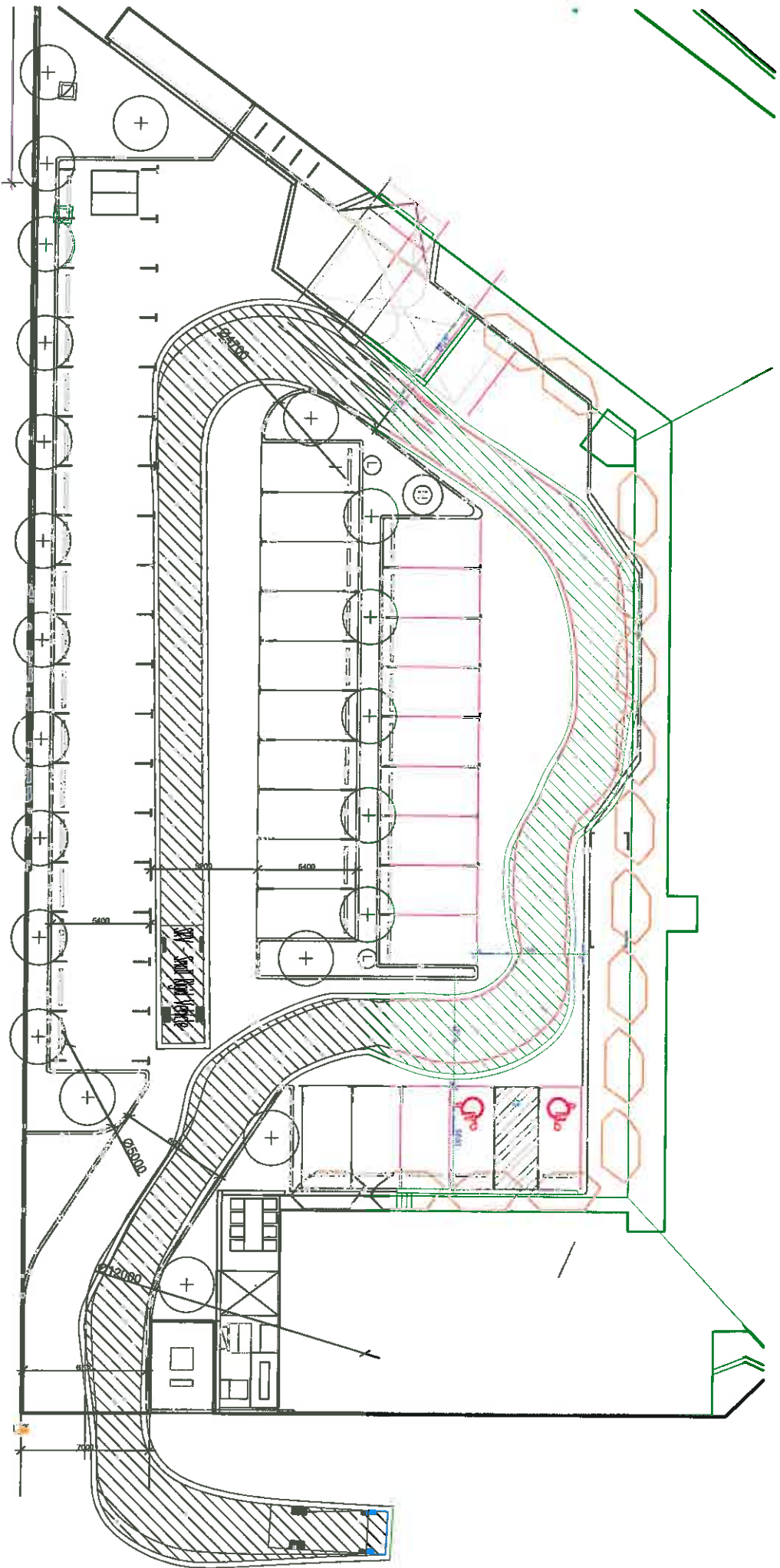
**Swept Path – SRV (Ambulance
and 10 Seater Bus) Access**

A1



SRV - Small Rigid Vehicle
 Overall Length 6.400m
 Overall Width 2.800m
 Overall Height 1.050m
 Min Body Ground Clearance 0.398m
 Track Width 2.330m
 Lock to Lock Time 4.005
 Curb to Curb Turning Radius 7.100m

SRV - Small Rigid Vehicle



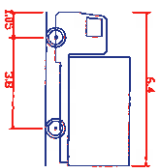
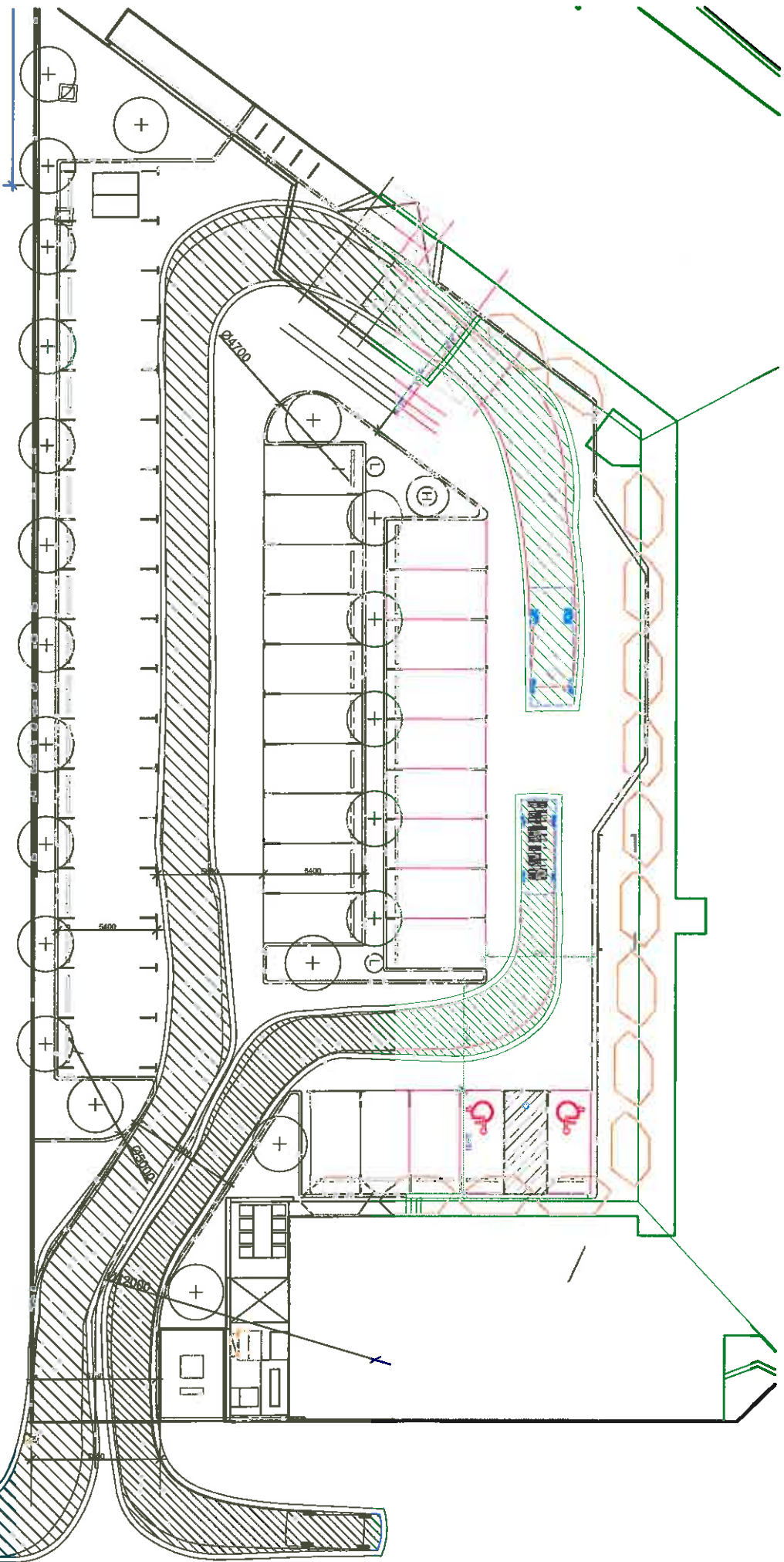
SPV - Small Rigid Vehicle
 Overall Length 6.4m
 Overall Width 2.05m
 Overall Body Height 2.38m
 Min. Body Ground Clearance 4.005m
 Lock to Lock Time

6.400m
 2.050m
 2.380m
 4.005m

Appendix B

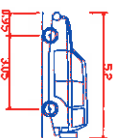
Swept Path – SRV and B99 Access

B1



SRV - Small Rigid Vehicle

- Overall Length: 6.400m
- Overall Width: 2.330m
- Overall Body Height: 2.330m
- Min Body Ground Clearance: 0.398m
- Track Width: 1.840m
- Lock to Lock Time: 4.00s
- Curb to Curb Turning Radius: 7.100m



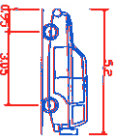
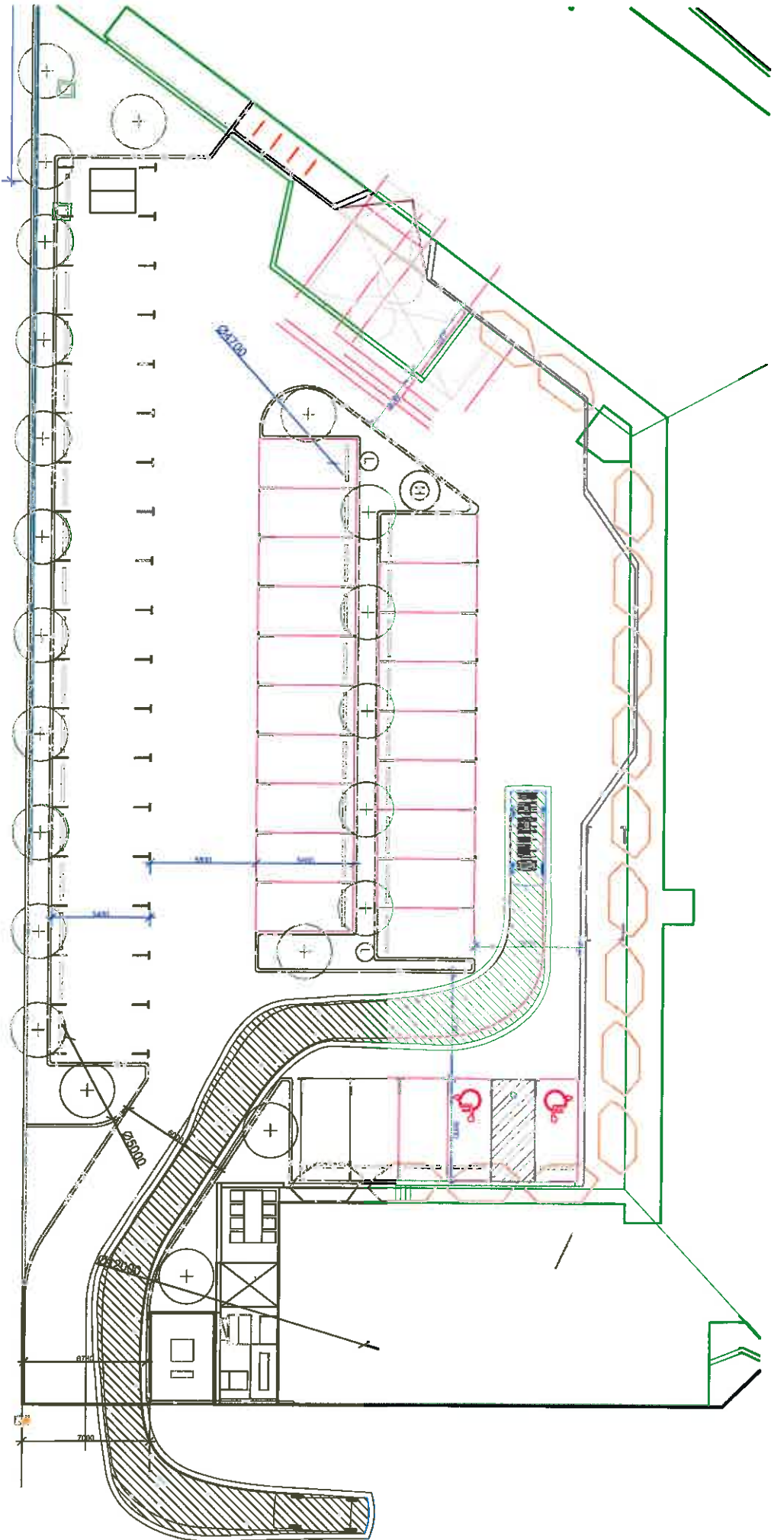
B99 Vehicle (Realistic min radius)

- Overall Length: 5.200m
- Overall Width: 2.000m
- Overall Body Height: 1.878m
- Min Body Ground Clearance: 0.398m
- Track Width: 1.640m
- Lock to Lock Time: 4.00s
- Curb to Curb Turning Radius: 6.250m

Appendix C

Swept Path - B99 Access

C1



B99 Vehicle (Realistic min radius) (2004)
 Overall Length 5.200m
 Overall Width 1.940m
 Overall Body Height 1.878m
 Min Body Ground Clearance 0.278m
 Track Width 1.846m
 Lock to Lock Time 4.80s
 Curb to Curb Turning Radius 6.250m

Appendix D

**SIDRA output for Basset Road/
Welcome Road/ Sharpe Avenue
- Short Term (from KCCIW
Project)**

D1 Movement Summary

MOVEMENT SUMMARY

Site: 6. Welcome_Sharp (4 to 5pm)

New Site
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Dep. Satn s/h	Average Delay sec	Level of Service	60% Rank of Queue Vehicles veh	60% Rank of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South Sharpe Road											
1	L	49	0.0	0.155	4.5	LOS A	0.0	0.0	0.00	0.00	36.7
2	T	251	0.0	0.155	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
3	R	65	0.0	0.164	13.2	LOS B	0.0	3.4	0.76	0.00	31.6
Approach		365	0.0	0.164	3.0	NA	0.0	3.4	0.14	0.00	37.7
East Welcome Road											
4	L	73	0.0	0.721	42.0	LOS E	3.0	28.3	0.94	1.01	21.8
5	T	68	0.1	0.721	41.4	LOS E	3.0	26.3	0.94	1.28	21.7
6	R	34	0.0	0.440	68.4	LOS F	1.5	10.4	0.95	1.01	18.8
Approach		175	0.2	0.721	47.1	LOS E	3.0	26.3	0.94	1.28	20.5
North Sharpe Road											
7	L	57	0.0	0.492	4.5	LOS A	0.0	0.0	0.00	0.00	36.7
8	T	992	0.0	0.492	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
9	R	1	0.0	0.001	5.8	LOS A	0.0	0.0	0.33	0.00	55.7
Approach		957	0.0	0.492	0.3	NA	0.0	0.0	0.00	0.04	36.6
West Welcome Road											
10	L	48	0.0	1.680	665.5	LOS F	80.2	567.1	1.00	8.95	2.8
11	T	222	0.1	1.680	665.3	LOS F	80.2	567.1	1.00	5.50	2.9
12	R	96	0.0	1.000	422.1	LOS F	7.1	49.7	1.00	1.60	10.9
Approach		376	0.0	1.680	526.8	LOS F	80.2	567.1	1.00	4.66	3.4
All Vehicles		1475	1.1	1.680	171.0	NA	80.2	567.1	0.32	1.18	12.2

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDPA Standard Delay Model used.

Q = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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 SIDRA INTERSECTION 5.1.12.2285
 Project: Regional and Urban Infrastructure PER Projects 221000: 221566-02 Karratha City Centre Infrastructure Works
 Project: Technical Modeling Information Arup modeling: SIDRA: Layout: Spot Term: Karratha City Centre ST -
 Revised: 16/1/2012 RP
 8000547, ARUP PTY LTD, FLOATING

SIDRA
INTERSECTION

