

Traffic Impact Assessment

Cowra Hospital - Review of Environmental Factors

Prepared for Health Infrastructure / 20 December 2023

211721

Executive Summary

Taylor Thomson Whitting (TTW) has been engaged by Health Infrastructure NSW to provide traffic engineering consultancy services for the Cowra Hospital Redevelopment. This Traffic Impact Assessment assesses the traffic and transport impacts of the proposed development for the Cowra Hospital redevelopment. The project includes the development of a new hospital on the existing site and includes an increase in capacity from 30 beds to 34 beds, 3 additional treatment chairs and 4 additional dental chairs.

The overall transport strategy for the proposed hospital is as follows:

- **Pedestrians**
 - Provide pedestrian access points on Brisbane Street and Liverpool Street
 - Retain existing pedestrian infrastructure within the local network
- **Cyclists**
 - Provide 5 bicycle parking spaces
- **Public transport**
 - Existing bus infrastructure and services to be retained
- **Service and loading**
 - Provide a service and loading area with access from Brisbane Street
- **Ambulance**
 - Provide an ambulance bay with access from Brisbane Street
- **Patient transport parking**
 - Provide a parking space for a patient transport vehicle with access to the Emergency Department
- **Public drop off**
 - Provide 5 public drop off spaces with access from Liverpool Street
- **Car parking**
 - Provide a total of 41 car parking spaces including 3 accessible spaces and 2 electric vehicle charging spaces

The proposal contains two vehicle access points including one on Brisbane Street and Liverpool Street. The Brisbane Street access is used by ambulances, patient transport vehicles, service and loading vehicles and private vehicles, whereas the Liverpool Street access is used predominantly by private vehicles. A small car park with 10 parking spaces including 1 accessible space is accessed via Brisbane Street and a larger car park with 31 parking spaces including 2 accessible and 2 electric vehicle charging spaces is accessed via Liverpool Street. The design includes pedestrian access from Liverpool Street and Brisbane Street.

The proposed hospital is estimated to generate an increased parking demand of 15 spaces, from 130 to 145 spaces. The proposed design includes 14 additional formal on-site parking spaces, which accounts for the majority of the increase in parking demand. The remaining parking demand of 1 space would therefore overflow to the surrounding on-street parking but would result in an insignificant impact as there is widely available parking in the nearby streets (~ 170 vacant spaces). Therefore, minimal impact to on-street parking is expected as there will be negligible change to the existing usage of on-street parking.

A study undertaken by EMM in March 2022 indicated that on-street parking is widely available with 160 vacant spaces within 100 metres of the site (occupancy rate of approximately 37%). A further study of recent Nearmap images indicated a similar result with about 170 – 180 vacant spaces within 100 metres of the site (occupancy rate of approximately 30%). This availability is expected to be largely maintained into the future as the additional shortfall of 1 space would account for less than 1% of the current number of vacant spaces.

It is anticipated that the construction of the site will have minimal impact to surrounding properties and local roads. A detailed Construction Traffic Management Plan will be developed and submitted for approval prior to any works commencing on-site.

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Revision Register

Rev	Date	Prepared By	Reviewed By	Authorised By	Remarks
0.1	29/07/2022	EC	GC	PY	Draft for comment
0.2	28/11/2022	EC	GC	PY	Draft for comment
1.0	12/12/2022	EC	GC	PY	For issue
1.1	19/12/2022	EC	GC	PY	Updates for issue
1.2	20/12/2023	EC	GC	PY	Amended issue

1.0 Introduction

Taylor Thomson Whitting (TTW) has been engaged by Health Infrastructure NSW (HINSW) to provide traffic engineering consultancy services for the Cowra Hospital Redevelopment.

This report contains an overview of the existing conditions and assesses the proposed development in relation to traffic and parking. The intent of this report is to support a Review of Environmental Factors for the project.

1.1 Scope

Cowra Health Service (also known as Cowra Hospital) is a small hospital located in the Cowra local government area, in the central region of NSW. The hospital is within the Western NSW Local Health District (WNSWLHD) and provides several services including emergency, surgery, maternity, ambulatory care, renal dialysis and chemotherapy.

The project includes the development of a new hospital on the existing site and includes an increase in capacity from 30 beds to 34 beds, 3 treatment chairs and 4 additional dental chairs. Therefore, there will be a minor increase to staff, patient, and visitor numbers which will generate additional parking demand and vehicle trips to and from the site.

1.2 References and Guidelines

This report has been prepared in the context of and with knowledge of relevant documents as follows:

- Cowra Hospital Redevelopment Preliminary Parking and Traffic Assessment (EMM, March 2022)
- The Cowra Shire Council Development Control Plan 2021
- Cowra Local Environmental Plan 2012
- RMS Guide to Traffic Generating Developments 2002
- Building Code of Australia Volume One 2019
- Cowra Health Service Clinical Services Plan V1.5 2021
- Health Infrastructure NSW Hospital Car Park Design Guidelines V1.2 2019
- Health Infrastructure NSW Electrical Vehicle Charge Points in Hospital Carparks 2018

1.3 Authority Consultation

A meeting with Cowra Shire Council was held on the 13th of September, 2022. The key items raised were:

- Specific driveway crossover details related to the civil engineering design. This will be further developed in detailed design.
- Distance of the Liverpool Street driveway from the existing pedestrian refuge required to be 10m minimum. We confirm that the driveway is located more than 10m away from the existing pedestrian refuge.
- The requirement for trucks to move forward in/forward and turning path analysis to be provided. Turning paths confirming this forward in and forward out movement for vehicles on site are attached in Appendix A of this report.

2.0 Existing Conditions

2.1 The Site

The existing Cowra Hospital is located at 64 Liverpool Street, Cowra NSW. The site is situated within the local government area of Cowra Shire Council, in the central region of New South Wales.

The site is bounded by Liverpool Street to the south, Brisbane Street to the west and Ina Drive to the east. The hospital site is surrounded predominantly by general residential land use, as well as areas of public recreation to the north and the local town centre to the south. The site location and surrounding environs are shown in Figure 2.1.



Figure 2.1: Site Location within Local Context

2.2 Road Network

2.2.1 State and Regional Roads

The state and regional road network within the vicinity of the hospital site can be seen in Figure 2.2.

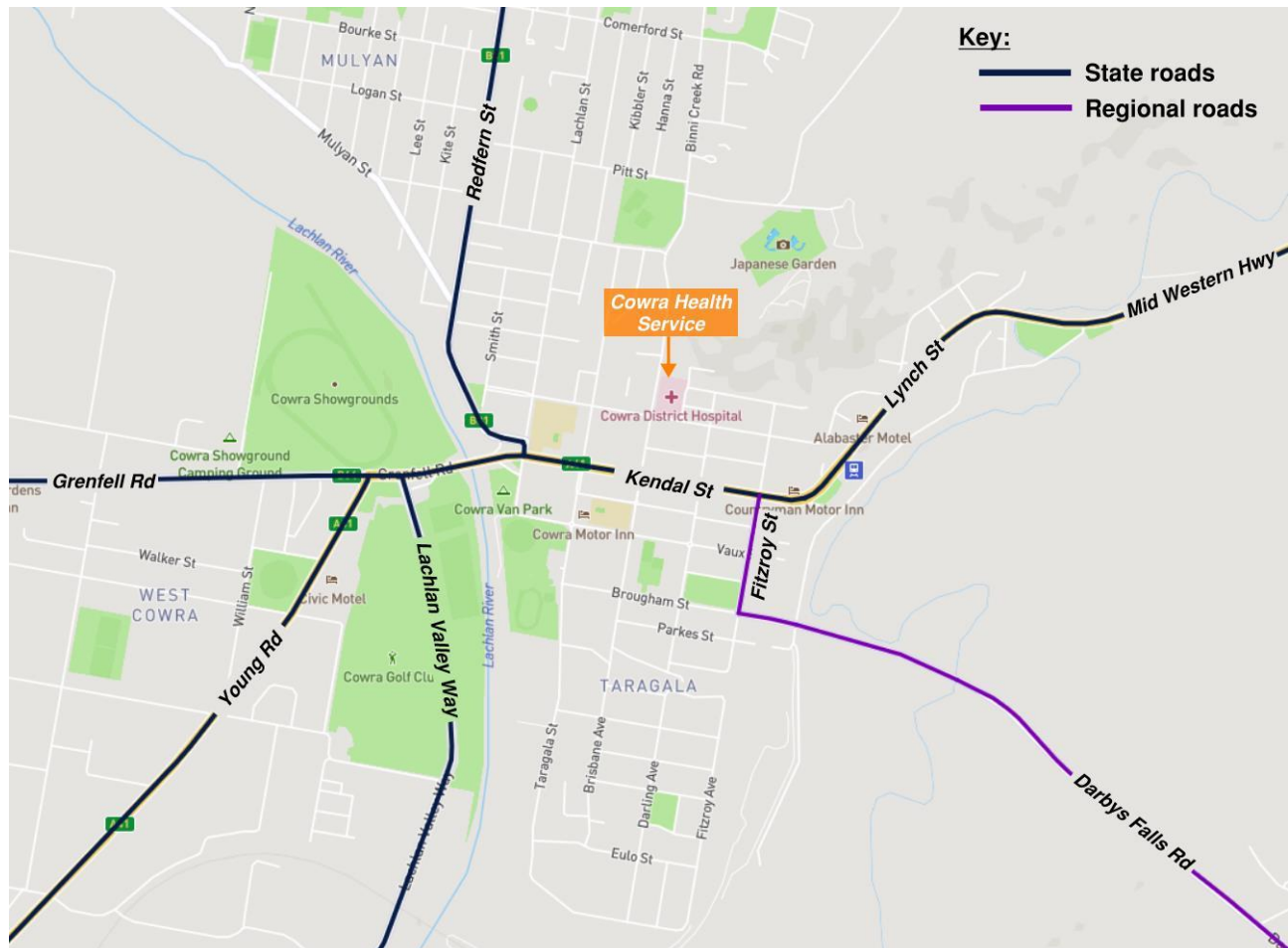


Figure 2.2: State and Regional Road Network

Source: NSW Road Network Classifications (TfNSW)

2.2.2 Local Roads

Liverpool Street

Cowra Hospital is bordered by Liverpool Street to the south. It is a two-way road with one lane in each direction and a 50 km/h speed limit. The road contains 45° angle on-street parking on either side of the road.

Brisbane Street

Brisbane Street runs along the western border of the site in the north-south direction. It contains two travel lanes, one in each direction. The road is signposted with a 50 km/h speed limit. A roundabout is located at the intersection between Brisbane Street and Liverpool Street at the southwest corner of the hospital site. To the south of the roundabout, 45° angle on-street parking is generally permitted along either side of the road. However, parallel on-street parking is generally permitted to the north of the roundabout and adjacent to the site. Brisbane Street connects the southern side of Cowra to the hospital, before changing to Binni Creek Road which extends 18 kilometres to the northeast.

Ina Drive

Ina Drive is a local road bordering the site to the east, running in the north-south direction. It is a two-way road with one travel lane in each direction, with no stopping permitted on either side of the road.

Carleton Street

Carleton Street is aligned perpendicularly with Ina Drive at the northeast corner of the site. The road has two travel lanes, one in each direction, with parallel on-street parking. The roadway is considerably wide, with about 18m between kerbs near the site.

2.3 Site Access

The hospital site has multiple access points from Brisbane Street, Liverpool Street and Ina Drive as shown in Figure 2.3. The site has an internal one-way road for drop off spanning the southern end of the site. Vehicles using the drop off enter from Liverpool Street and exit at the roundabout between Liverpool Street and Brisbane Street. Vehicle access to emergency, including ambulances, is from Ina Drive. Service and loading vehicles access the site from Brisbane Street. This access point is also used for some staff parking, as well as a second access on Brisbane Street for informal parking. Ina Drive also contains two access points for car parking, one for formal and one for informal parking.



Figure 2.3: Site Access Points

2.4 Car Parking

2.4.1 Off-Street Parking

The hospital contains several formal and informal car parks across the site. The informal parking spaces are made up of grass areas with no marked spaces and are used by staff. Figure 2.4 outlines the locations of all formal and informal car parks and Table 2.1 summarises the approximate capacity within each of these. There are about 20 informal spaces, 24 formal staff spaces, and three emergency spaces across the site.

Aside from these three emergency spaces, there is no dedicated parking for patients or visitors on the site. The existing site also does not contain any accessible parking spaces available for the public.



Figure 2.4: Locations of Off-Street Car Parking

Table 2.1: Off-Street Car Parking Allocation

Car Park	Type of Parking	Approximate Capacity
1	Informal	12
2		8
3	Staff	16
4		4
5		4
6	Emergency	3
Total		27*

*Note: informal car parking spaces have not been accounted for within the total parking.

2.4.2 On-Street Parking

On-street parking is widely available on Liverpool Street, with 45° angle parking available on both sides of the road for the majority of the road length. Outside the main hospital entry, there are four on-street parking spaces reserved for doctors, and five accessible parking spaces.

Brisbane Street has available parallel on-street parking along both sides of the road adjacent to the site, as well as 45° angle parking to the south of the site and towards the town centre. Carleton Street also has parallel on-street parking.

An assessment of the on-street parking availability is presented in the Preliminary Parking and Traffic Assessment undertaken by EMM in March 2022. This study was undertaken within a 200-metre radius of the hospital site at 1:30pm on a weekday which is a time of peak parking demand due to shift changeover. The results of this study are detailed in Table 2.2, with reference to Figure 2.5.



Figure 2.5: Extent of On-Street Parking Occupancy Study
Source: EMM (2022)

Table 2.2: Results of On-Street Parking Occupancy Study

Source: EMM (2022)

Zone	Area (from Figure 2.5)	Total Capacity	# of Occupied Spaces	# of Vacant Spaces
Blue (within 0 – 100m of site)	A	49	7	42
	B	60	17	43
	C	40	13	27
	D	80	41	39
	E	25	16	9
	Subtotal	254	94	160
Orange (within 101 – 200m of site)	F	25	0	25
	G	25	6	19
	H	37	0	37
	I	50	7	43
	J	52	14	38
	K	17	18	-1*
	L	49	8	41
	M	14	1	13
	Subtotal	269	54	215
Overall (within 0 – 200m of site)	Total	523	148	375

Note: a negative result indicates the occupancy is greater than the capacity of the area which may occur due to informal or illegal parking in non-designated parking spaces

The results of the on-street parking study indicate that there are 375 vacant spaces within a 200m radius of the hospital site, or an occupancy rate of 28%. Within a 100m radius of the site, the study indicates an occupancy rate of 37%.

Further to this, a review of more recent satellite imagery from Nearmap indicates similar results that align with the outcomes of the EMM study, and these are presented in Table 2.3. This study focuses on the 100m radius from the site and includes Nearmap images from November 2022 and September 2023 (Nearmap only provides imagery for these dates).

Table 2.3: Results of Nearmap On-Street Parking Occupancy Study

Source: Nearmap

Zone	Area (from Figure 2.5)	Total Capacity	# of Occupied Spaces		# of Vacant Spaces	
			Nov-22	Sep-23	Nov-22	Sep-23
Blue (within 0 – 100m of site)	A	49	2	7	47	42
	B	60	13	16	47	44
	C	40	10	18	30	22
	D	80	46	41	34	39
	E	25	2	1	23	24
	Subtotal	254	73	83	181	171

The Nearmap imagery indicates an occupancy rate of about 29% and 33% for each of the surveyed dates within 100m radius of the site. This is consistent with the results of the study undertaken by EMM, which showed a similar occupancy rate of 37% within a 100m radius.

2.5 Emergency Drop Off

The emergency department is intended to be accessed from Ina Drive which is behind the main building frontage. However, wayfinding is confusing and there is a more formal drop off point outside the main entry on Liverpool Street.

There are three general parking spaces located within the emergency drop off driveway as well as ambulance parking as shown in Figure 2.6.



Figure 2.6: Emergency Drop Off

2.6 Public Transport

There are four public bus routes operating in Cowra as shown in the network map in Figure 2.7. These buses are operated by Cowra Bus Service. Each of the routes stop at the bus stop on Brisbane Street near Kendal Street which is about 250 metres (2-minute walk) from the main entry of the hospital. These routes typically operate three services per day. Services do not operate on the weekends or public holidays.

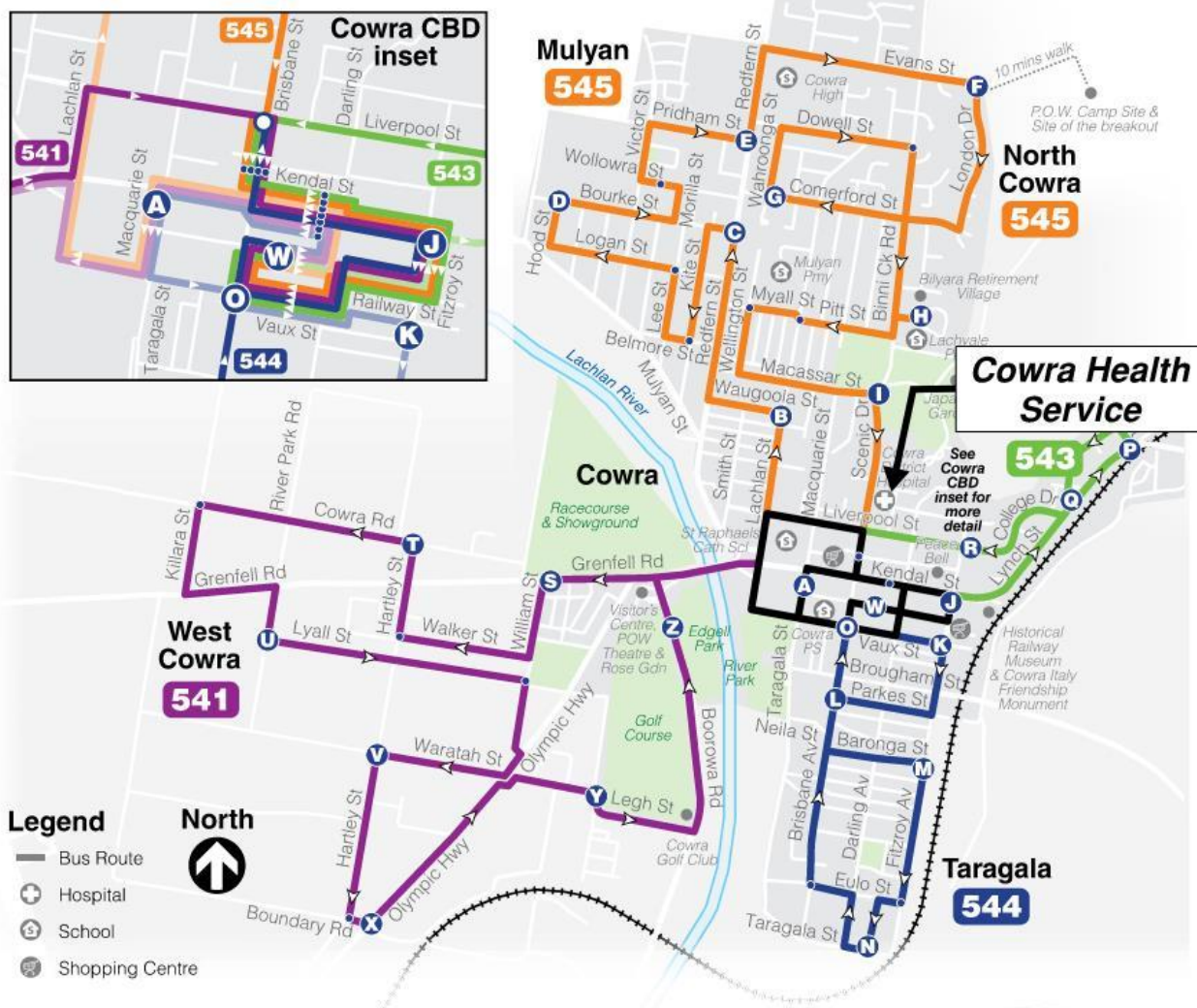


Figure 2.7: Cowra Bus Service Network Map

Source: Cowra Bus Service

2.7 Active Transport

2.7.1 Pedestrian Facilities

Figure 2.8 outlines the available pedestrian facilities within an approximate 200m radius of the site including footpaths and crossing points. Missing footpath links are noted adjacent to the site along Brisbane Street, Ina Drive and Carleton Street. Liverpool Street to the west of the site has a footpath on the southern side of the road only.

The site is well serviced by safe pedestrian crossing points, including a refuge median island on the northern and eastern leg of the roundabout to the southwest of the site, and on Liverpool Street near the main hospital entry.



Figure 2.8: Existing Pedestrian Infrastructure within Vicinity of the Site

2.7.2 Cyclist Facilities

Liverpool Street contains an on-road painted bicycle lane along both sides of the road. Brisbane Street to the south of the site contains an on-road bicycle route but without dedicated bicycle lanes.

2.8 Service and Loading

The existing service and loading area is accessible via Brisbane Street as detailed in Figure 2.9. Figure 2.10 shows the service and loading area in more detail. It is assumed that vehicles reverse into the service and loading area from the street. This occurrence was observed during a site visit.



Figure 2.9: Location of Existing Service and Loading Area



Figure 2.10: Existing Service and Loading Area

2.9 Travel Characteristics

Journey to Work (JTW) data supplied by the 2016 Australian Census approximates the current mode share split for those who work in Cowra, and can be used to represent the travel modes of the staff working at the hospital. The JTW data is defined by Statistical Area Level 2 zones, and the hospital is located within the Cowra region.

Table 2.4 demonstrates the breakdown of mode shares for each mode of travel. It is clear that private vehicle use is the favoured travel mode (as driver or passenger). Further to this, 5.6% walk to work and all other travel modes indicate low usage.

Method of Travel (MTW15P) categorisation of travel modes (as listed in the left column of Table 2.4) is used for a clearer and simpler assessment of key travel modes through the allocation of a primary mode when multiple modes have been used in one trip.

Table 2.4: Journey to Work Data for Cowra

Source: Australian Bureau of Statistics 2016 Census

Travel Mode	Mode Share (%)
Train	0.1%
Bus	0.2%
Taxi	0.2%
Car, as driver	84.0%
Car, as passenger	7.2%
Truck	1.5%
Motorbike/scooter	0.4%
Bicycle	0.3%
Walked only	5.6%
Other Mode	0.5%
Total	100.0%

Table 2.5 shows a summary of the above information into three main travel mode categories. Private vehicle usage is the most popular mode choice, with a 94% share, followed by active transport and lastly public transport.

Table 2.5: Summarised Journey to Work Data

Mode Summary	Mode Share (%)
Private vehicle (car, truck, taxi, motorbike)	93.8%
Public transport (train, bus)	0.3%
Active transport (walk, bicycle)	5.9%
Total	100.0%

3.0 Proposed Works

3.1 Development Summary

An overview of the proposed development is included in Figure 3.1. The emergency department is located on the first floor with ambulance access from Brisbane Street. A car park with 10 spaces (including one accessible space) is also accessed via Brisbane Street and is intended to provide after-hours or direct, urgent access for the public to the emergency department. This car park will also include a designated Patient Transport vehicle parking space providing access to the emergency department. Service and loading will occur at the northern end of the site, using the same driveway access from Brisbane Street.

The main car park is located to the southwest corner of the site, with access from Liverpool Street. This car park contains 31 car spaces including 2 accessible parking spaces and 2 electric vehicle charging spaces. The proposed plan includes pedestrian access from Liverpool Street and Brisbane Street. Daytime, non-urgent access to the emergency department by the general public is also available via the drop off zone within this car park, where five drop off spaces are provided.

The proposed development will allow for a total of 41 parking spaces available to the public, with 20 of these dedicated for fleet parking outside of hours. An Operational Management Plan for the car park will be developed by WNSWLHD prior to the commissioning of the hospital.

The proposed development will be constructed across the following stages:

- Stage 1: The new health care facility and northern car park with 10 parking spaces will be constructed, while the existing main hospital building will be retained and continue to operate.
- Stage 2: Following the construction of the new healthcare facility, the existing main hospital building will be demolished, and the southern car park with 31 spaces will be constructed.

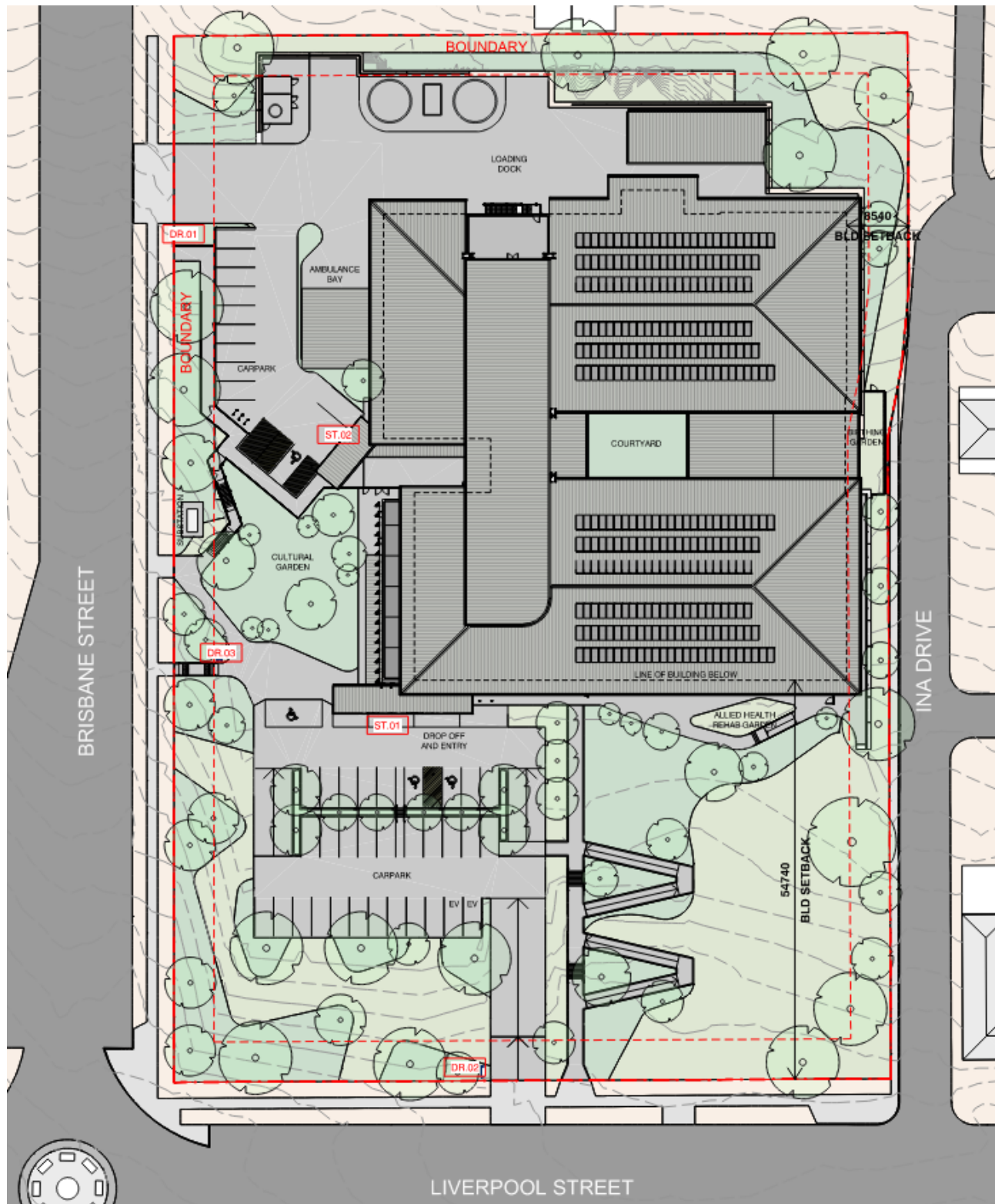


Figure 3.1: Site Plan

Source: DJRD Architects (130734-DJRD-AR-REF 01 [G] 18/12/22)

4.0 Parking

4.1 Parking Demand

Table 4.1 shows a summary of the private vehicle mode shares, occupancy rates and space turnover factors for a number of comparable hospitals as well as the JTW data for Cowra.

Table 4.1: Benchmarked Private Vehicle Mode Splits

Hospital User	Variable	JTW data	Shoalhaven Hospital	Wyong Hospital	Mudgee Hospital
Staff	Mode split	86.6%	97.0%	96.7%	91.0%
	Occupancy rate	-	1.04	1.12	1.06
Outpatients	Mode split	-	92.5%	87.0%	95.0%
	Occupancy rate	-	1.0	1.0	1.0
	Space turnover	-	2.74	-	2.41
Visitors	Mode split	-	98.6%	-	92.0%
	Occupancy rate	-	1.47	1.5	1.21
	Space turnover	-	2.74	-	2.41

Considering that the JTW data is not specific to hospital developments, the benchmarked hospitals provide a more accurate estimation of the mode share at Cowra Hospital. The Cowra Health Service Clinical Services Plan reports that approximately 80.4% of emergency presentations arrived by private vehicle. Considering this and the range of mode shares summarised in Table 4.1, the following private vehicle mode splits for Cowra Hospital have been adopted:

- Staff – 95%
- Outpatients – 92%
- Visitors – 95%
- Emergency presentations – 80.4%

The following occupancy rates have been adopted:

- Staff – 1.1 staff per vehicle
- Outpatients and emergency – 1.0 patients per vehicle
- Visitors – 1.4 visitors per vehicle

The following space turnover factors have been adopted:

- Outpatients and emergency – 2.6 times per day
- Visitors – 2.6 times per day

4.1.1 Parking Demand

Future hospital use has been estimated based on the increase in bed numbers. The hospital is increasing from 30 to 34 beds, or a 13.3% increase. The estimated parking demand resulting from the hospital is summarised in Table 4.2. The parking demand is estimated to increase by 15 parking spaces, from 130 to 145 spaces for the proposed hospital.

Table 4.2: Estimated Parking Demand for Hospital Users

Parking demand	Staff		Emergency		Outpatients		Visitors		Fleet		Total	
	Now	Future	Now	Future	Now	Future	Now	Future	Now	Future	Now	Future
# of users during weekday day shift	74	84	14	16	88	99	30	34	20 cars	20 cars	225	253
Private vehicle mode share (%)	95%	95%	80.4%	80.4%	92%	92%	95%	95%	-	-	-	-
Users per vehicle	1.1	1.1	1.0	1.0	1.0	1.0	1.4	1.4	-	-	-	-
Parking demand	64	73	6	7	32	36	8	9	20	20	130	<u>145</u>

The existing hospital has 75 full-time equivalent clinical staff and 36 administration staff. It is assumed that 50% of clinical staff (38 clinical staff) attend the day shift, resulting in 74 staff per weekday day shift¹. In accordance with the increase in bed numbers, a 13.3% increase in staff would result in approximately 84 future staff per weekday shift. A 95% private vehicle mode share and an estimate of 1.1 staff members per vehicle results in a parking demand of 73 spaces for the proposed hospital during the day shift.

Cowra Health Service Clinical Services Plan reports that in 2018/19, there were a total of 7,488 presentations to the emergency department. Forecast emergency presentations can be estimated with a 13.3% increase to 8,486 presentations per annum. The Plan also reports that 80.4% of emergency presentations arrived via private vehicle and 17.9% via ambulance. Those arriving via ambulance are expected to be followed by a related party that drives a private vehicle (assume 95% mode share for the related party as for visitors). The Plan records that 65% of emergency presentations occur during 8am and 5pm. A space turnover of 2.6 times per day has been applied, as per the outpatient space turnover factor. Therefore, the number of emergency presentations occurring during day shift will increase from approximately 6 to 7.

Mudgee Hospital is a comparable hospital development with 100 full-time equivalent staff and 31 beds. In 2016/17, Mudgee Hospital recorded 21,991 occasions of service for outpatients, which has been used to provide an estimate of the outpatient occasions of service for the existing Cowra Hospital. Forecast occasions of service for outpatients can be estimated with a 13.3% increase to 24,923 presentations per annum. A 92% private vehicle mode share, vehicle occupancy rate of 1 patient per vehicle, and a parking space turnover factor of 2.6 results in an overall increase in parking demand from 32 to 36 spaces for the proposed hospital.

Approximately 2 visitors per bed are expected each day, with about 50% of these visiting during the day shift. A 95% private vehicle mode share, vehicle occupancy rate of 1.4 visitors per vehicle, and a parking space turnover factor of 2.6 results in an overall increase in parking demand from 8 to 9 spaces for the proposed hospital.

Parking for fleet vehicles is generally a set value equal to the total number of fleet vehicles owned by the hospital. No increase to the number of fleet vehicle has been advised, so it is assumed the proposed hospital will continue to own a total of 20 fleet vehicles.

¹ EMM Preliminary Parking and Traffic Assessment (March 2022)

4.1.2 Parking Impacts

As described in Section 4.1.1, the proposed development is estimated to generate a demand for an additional 15 parking spaces, or an increase in demand of 130 to 145 parking spaces. As shown in Table 4.3, the existing scenario results in an on-site parking shortfall of approximately 103 vehicles which are currently accommodated for within the surrounding on-street parking. For an increase in parking demand of 15 spaces in the proposed scenario, the on-site provision will be 14 spaces. The majority of increased parking demand will be accommodated within the site, resulting in additional shortfall of only 1 space.

Table 4.3: Estimated Parking Demand Shortfall

Parking Impacts	Demand	On-Site Provision	On-Site Shortfall
Existing	130	27	103
Proposed	145	41	104
Difference	+15	+14	+1

As detailed in Section 2.4.2, the existing traffic condition contains widely available on-street parking as follows:

- Study undertaken by EMM (March 2022):
 - 160 vacant spaces within a 100m radius of the hospital
 - Occupancy rate of 37%
- Nearmap imagery study (November 2022 & September 2023):
 - ~ 170 – 180 vacant spaces within a 100m radius of the hospital
 - Occupancy rate of about 30%

An additional shortfall of 1 space will have negligible impact to on-street parking availability, as this would account for less than 1% of the current number of vacant spaces. Therefore, it is anticipated that there will be insignificant impact to on-street parking due to the redevelopment.

4.1.3 Benchmarking

The following comparable hospitals can be used as a benchmark for the parking demand generated by the development:

- Mudgee Hospital has 100 existing staff and 31 beds. The development did not include any increase to staffing or bed numbers and was estimated to generate a parking demand of approximately 120 spaces².
- The Lismore Base Hospital Stage 3C redevelopment involved an increase of 8 staff and 4 visitors but no increase to outpatient numbers. This resulted in an increase in parking demand of approximately 11 spaces³.
- The redevelopment of Bowral & District Hospital included no increase to staff and an increase of 6 beds. This generated a parking demand of approximately 14 additional spaces⁴.

The existing Cowra Hospital has similar staffing and bed numbers to Mudgee Hospital before its redevelopment. The parking demand at Cowra Hospital is estimated to be 128 spaces, which is close to the recorded parking demand for Mudgee Hospital.

² Parking and Traffic Assessment for Mudgee Hospital (PTC, 2018)

³ Transport and Accessibility Impact Assessment Lismore Base Hospital Stage 3C (TTW, 2018)

⁴ Bowral and District Hospital Redevelopment Transport Impact Assessment (GTA, 2018)

The proposed Cowra Hospital involves a similar increase to patient and visitor numbers as the Lismore Base Hospital Stage 3C redevelopment and produces a similar parking demand (discrepancy is due to the increase in outpatient numbers which does not occur at Lismore).

Therefore, the calculated parking demand in Section 4.1.1 is shown to be benchmarked against other similar hospital sites.

4.2 Parking Provision

4.2.1 Off-Street Parking

The Cowra Shire Council Development Control Plan (DCP) provides a car parking rate including:

- 1 space per 10 beds (visitors)
- 1 space per resident or staff doctor
- 1 space per staff member on duty at any one time
- Ambulance parking

The car parking rate according to the DCP can be developed based on the estimated staff numbers calculated in Section 4.1.1 above. According to the DCP, the existing hospital requires 77 parking spaces, and the proposed hospital requires 88 parking spaces (in addition to ambulance parking). This results in an 11 space increase as shown in Table 4.4.

Table 4.4: DCP Parking Rate Requirements

DCP Requirements	Beds	Staff per weekday day	Parking Rate
Existing	30	74	77
Proposed	34	84	88
Difference	+4	+10	+11

According to the DCP, the proposed hospital requires an increase of 11 parking spaces due to the additional staff and bed numbers. Although the proposed design does not meet the DCP requirements, it does provide parking spaces beyond the required 11 space increase by including an additional 14 spaces.

4.2.2 On-Street Parking

An assessment of the on-street parking availability is presented in the Preliminary Parking and Traffic Assessment undertaken by EMM in March 2022. This study was undertaken within a 200-metre radius of the hospital site at 1:30pm on a weekday which is a time of peak parking demand due to shift changeover. The assessment outlines an on-street parking occupancy rate of approximately 37% within 100 metres of the hospital, and 20% between 100 and 200 metres of the site.

As detailed in Section 2.4.2, a further study of recent Nearmap images has been conducted using imagery from November 2022 and September 2023 (Nearmap only provides imagery for these dates). The results indicate an on-street parking occupancy rate of about 30% within 100 metres of the hospital.

Both studies indicate that on-street parking is widely available within the streets immediately surrounding the hospital and that the existing usage of on-street parking is low compared to the availability.

4.2.3 Provision During Construction

The project is proposed to be constructed in two stages to allow for continual operation of the Hospital. Following Stage 1, the northern carpark of 10 spaces will be constructed and the future loading dock will be constructed. While this will temporarily result in a reduced parking provision on site from the current situation,

as discussed in Section 2.4.2 there are some 375 available on street parking spaces near to the hospital that are expected to account for the shortfall in parking during the construction period.

4.2.4 Accessible Parking

Currently, five accessible parking spaces are available on Liverpool Street near the main entry to the hospital. Two of these spaces are located on the opposite side of the road to the hospital, requiring users to cross Liverpool Street.

The Building Code of Australia (BCA) requires a rate of 1 accessible space per 50 car parking spaces or part thereof for the outpatient area of a hospital for up to 1000 car parking spaces. Therefore, one accessible space is required to meet this rate. However, the Cowra Council DCP specifies a rate of 1 accessible parking space for parking areas comprising up to 20 spaces and thereafter at a rate of 2% of designated spaces. Therefore, the hospital would require two accessible spaces to satisfy the DCP requirement, which is provided in the proposed development (one in the first floor carpark and two in the ground floor car park).

4.2.5 Electric Vehicle Parking

The HINSW Electric Vehicle Charge Points in Hospital Carparks contains the following requirements in relation to electric vehicle parking:

- Include provisions for 2% of the total number of car spaces
- For at-grade car parks, allow for power and communication conduits to be installed in an appropriate nestled area

The proposed design includes 2 electric vehicle charging spaces which is about 5% of the total number of car spaces and meets the requirements outlined above.

4.2.6 Motorcycle Parking

There are no requirements for motorcycle parking specified in the Cowra Council DCP. There are no motorcycle parking spaces provided.

4.2.7 Bicycle Parking

The Cowra Council DCP specifies a bicycle parking rate of 1 bicycle parking bay per 10 car parking spaces for developments generating more than 20 car parking spaces. Therefore, the hospital requires five bicycle parking spaces in accordance with the DCP.

The DCP also states that cyclists should be able to secure the frame and two wheels of a bicycle to a fixed, secure stand.

The HINSW Hospital Car Park Design Guidelines contains the following requirements in relation to bicycle parking facilities:

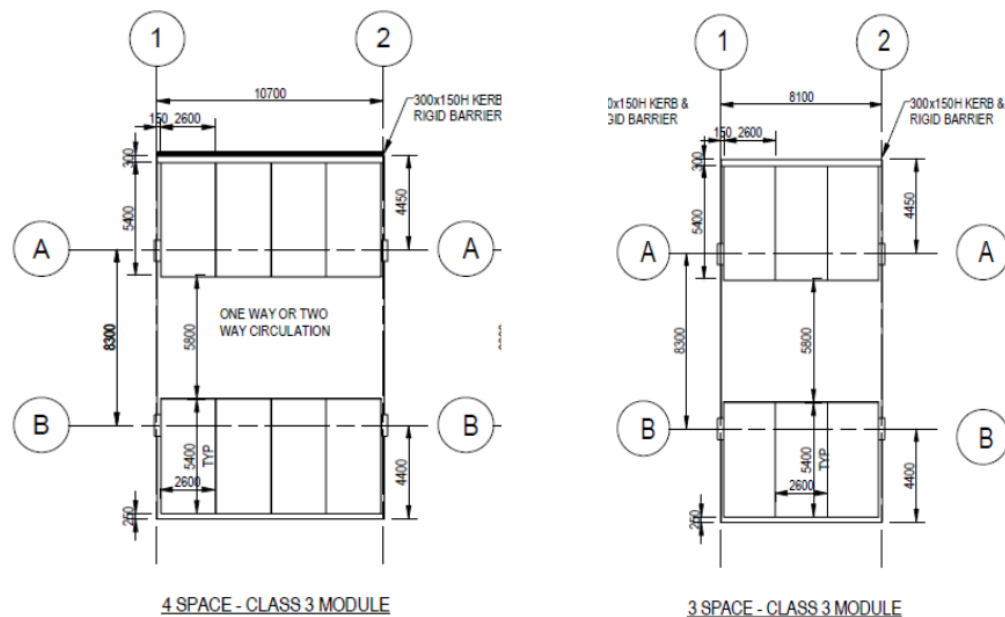
- The bicycle facility should be located as close as possible to the entry/exit. Where possible, it should be visible from the entry/exit and should be located along the most frequented access path to the hospital
- The design of the bicycle parking facilities should comply with AS 2890.3 – 1993
- The bicycle facility should be connected to the existing footpath or accessible path, with an appropriate setback from the general path of travel so that bicycles when parked, do not encroach on the general path of travel as per AS 1428.2 – 1992
- The bicycle parking area/ concrete slab installed at each location will have a yellow border painted on the ground slab around its perimeter (50mm wide line, in bright yellow line marking paint) to delineate the bicycle parking area
- Requirements for CCTV coverage to the bicycle facility will be based on a security risk assessment

Bicycle racks suitable for the storage of five bicycle parking spaces will be included within the proposed development.

4.3 Layout and Design

The HINSW Hospital Car Park Design Guidelines contains recommendations for the design of hospital car park facilities and includes the following relevant guidelines:

- The car park access should be located to maximise the distance from adjacent intersections in order to provide on road queueing and to separate conflicting turning movements.
- Car parks up to 600 cars need 2 lanes inbound and 2 to 3 lanes outbound.
- Pedestrian and vehicular movements should be separated (except for within parking aisles).
- Limit surface gradients with asphalt to 1:33 (3%) cross fall and 1.133 (0.75%) longitudinal fall excluding accessible space gradients.
- The preferred grid dimensions for patient and visitor hospital car parks (user class 3 as per AS2890.1) are shown in Figure 4.1 and are as follows:
 - 10.7m x 8.3m (4 spaces per grid at 2.6m width); or
 - 8.1m x 8.3m (3 spaces per grid at 2.6m width)
- The preferred grid dimensions for staff only hospital car parks (user class 1 as per AS2890.1) are shown in Figure 4.2 and are as follows:
 - 9.9m x 8.7m (4 spaces per grid at 2.4m width); or
 - 7.5m x 8.7m (3 spaces per grid at 2.4m width)



User Class 3 - 4 CAR SPACES

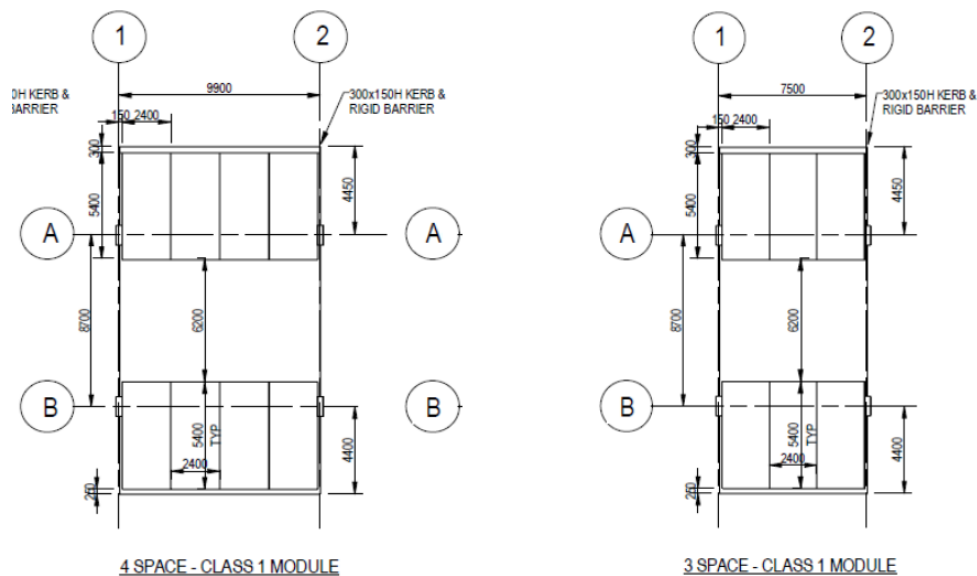
- Typical grid module 10.7m x 8.3m
- Provides 4 car spaces between columns

User Class 3 - 3 CAR SPACES

- Typical grid module 8.1m x 8.3m
- Provides 3 car spaces between columns.

Figure 4.1: Preferred Grid Spacing for Patient and Visitor Car Parks

Source: Hospital Car Park Design Guidelines V1.2 (HINSW, 2019)



User Class 1 - 4 CAR SPACES

- Typical grid module 9.9m x 8.7m.
- Provides 4 car spaces between columns.

User Class 1- 3 CAR SPACES

- Typical grid module 7.5 x 8.7m
- Provides 3 car spaces between columns.

Figure 4.2: Preferred Grid Spacing for Staff Only Car Parks

Source: Hospital Car Park Design Guidelines V1.2 (HINSW, 2019)

5.0 Access and Circulation

The proposed development includes two vehicle access points, one to the northwest corner of the site on Brisbane Street, and one to the southern end of the site on Liverpool Street. The Brisbane Street access is used by ambulances, patient transport vehicles, service and loading, and private vehicles. The Liverpool Street access is used by private vehicles only.

5.1 Ambulance

Ambulance access is proposed from Brisbane Street at the northwest corner of the hospital site. Ambulances will be able to circulate within the site and drop off patients outside the emergency department.

Swept path analysis for bariatric ambulance vehicles has been assessed for the site and is attached in Appendix A.

5.2 Patient Transport

Provision for patient transport vehicle operations is proposed within the Brisbane Street car park, accessible via a two-way driveway on Brisbane Street to the northwest of the site. Vehicles turn right upon entry to the site to access the car park and a turning bay is provided at the end of the parking aisle for vehicles to safely turn around and reverse into a designated parking space for patient transport vehicles. This designated parking space provides direct access to the emergency department, with a 3m loading area at the rear of the vehicle to assist with the movement of patients to and from the vehicle. Vehicles can then exit in a forward direction.

Swept path analysis for patient transport vehicles has been assessed for the site and is attached in Appendix A.

5.3 Fire Appliance

Fire appliance access is proposed from Brisbane Street. We have been advised that the largest vehicle required would be the General Fire Appliance vehicle and that an aerial appliance would not be required.

A swept path analysis has been conducted of this vehicle and is attached in Appendix A.

5.4 Service and Loading

Service and delivery vehicles are proposed to access the site from the same access on Brisbane Street at the northwest corner of the site. Many of the services requiring vehicle access such as the oxygen tank will be located along the northern site boundary, so service and delivery vehicles require access to this area.

A turning bay is proposed to allow heavy vehicles to safely manoeuvre within the site and exit in a forward direction, as well as provide access to the oxygen supply.

We have been advised that oxygen tank access would be required for a smaller 13m long 19,000L Oxygen Tanker in lieu of a 19m semi-trailer.

Swept path analysis has been conducted for the site's anticipated service vehicles and is attached in Appendix A.

5.5 Emergency Drop Off

Access to the emergency drop off point for the general public is proposed within the ground floor level car park, accessible from a two-way driveway on Liverpool Street at the southern end of the site. Private vehicles enter the car park and circulate in a clockwise direction to reach the undercover drop off zone. Upon departure, vehicles continue back towards Liverpool Street and use the same driveway to exit.

5.6 Parking

There are two proposed locations for car parking on the site, one is accessible via Liverpool Street and the other via Brisbane Street. Access to the Liverpool Street car park is via a two-way entry and exit driveway. The car park is proposed to be one-way, with vehicles circulating in a clockwise direction.

The proposed Brisbane Street car park is accessed via the two-way driveway to the northwest of the site. Vehicles turn right upon entry to the site to access the car park and a turning bay is provided at the end of the parking aisle for vehicles to safely manoeuvre and exit in a forward direction.

Swept path analysis of standard passenger vehicles through these carparks to confirm compliance with AS2890.1 has been conducted and is attached in Appendix A.

6.0 Traffic Impacts

6.1 Trip Generation

A draft version⁵ of the RMS Guide to Traffic Generating Developments provides a trip generation rate specifically for hospitals based on collected survey data throughout urban and regional NSW. For hospitals with lower accessibility, trip generation rates are presented as follows:

- AM Peak = 0.41 (S) + 0.62 (B)
- PM Peak = 0.59 (S) + 0.05 (B)

where S is the number of staff during the main day shift and B is the number of beds at the hospital.

Applying the above formulas results in the trip generation as shown in Table 6.1, with an increase of 7 trips in the morning and 6 trips in the afternoon peak as a result of the redevelopment. Minimal impact to the road network is expected as these additional volumes are negligible.

Table 6.1: Trip Generation

Trip Generation	Existing	Proposed	Increase
AM peak trips	49	56	+7
PM peak trips	46	52	+6

⁵ As provided directly to TTW from RMS in August 2018

7.0 Construction Traffic Management

7.1 Management of Construction Vehicles

7.1.1 Construction Vehicle Routes to and from Site

Access to the worksite for construction and delivery vehicles is anticipated to be via Brisbane Street and Ina Drive.

The recommended access route is described below and aims to avoid local access roads where possible:

- Approach via Kendal Street.
- Left/Right turn onto Brisbane Street.
- Enter the site via left/right turn from Brisbane Street.
- Exit site in a forward direction onto Brisbane Street.
- Left/Right turn onto Kendal Street.

7.1.2 Hospital Operation

Emergency vehicle access is anticipated to be modified per stage of construction. It is anticipated that a temporary adjustment to the ambulance access to the site will be incorporated during the staged development. This is to be further developed with the future Contractor.

Priority will be given to Hospital vehicles at all times.

7.1.3 Traffic Control

A Traffic Guidance Scheme will be prepared for the site showing traffic control measures that will be implemented to maintain safety within the existing road network. This will include traffic marshals, signage, manoeuvring areas, and any other relevant traffic management strategies to be in place during construction.

7.2 Impact of the Project

7.2.1 Traffic Flow

Construction of the proposed works is anticipated to result in minor impacts to traffic flows. It is not anticipated that any road closures will be required to facilitate construction of the site, however this will be reviewed once a Contractor is engaged.

Ambulance vehicles will continue to have priority at all times and construction vehicles will be required to yield to these emergency vehicles.

Traffic impacts from the construction works are expected to be limited to the truck routes detailed in this report. These routes are likely to experience only minor impacts due to the presence of additional vehicle movements. These additional vehicles are not expected to cause delays on local roads or create subsequent impacts to other roads.

There will be no changes to public transport routes and services as a result of the construction.

7.2.2 Parking Impacts

It is anticipated that no on-site parking will be provided for contractors associated with the works, as the Hospital will remain in operation during construction. Workers will not be permitted to park on site or within the Hospital, therefore on street parking is expected to experience additional demand. It is recommended that workers are advised not to park within on street spaces within one block of the Hospital to allow for convenient parking for Hospital users. As part of the tender for the works, a car parking strategy that retains existing off site parking for the public will be sought from Contractors.

WNSWLHD is currently leasing a carpark close to the hospital to accommodate fleet vehicles from commencement of the Early Works until completion of the project, which will ensure off site parking in closest proximity to the Hospital remains available to patients, staff and visitors.

During the site induction, employees will be advised of the parking restrictions and other transport modes discussed within this report. They will be encouraged to make use of public transport, active transport or carpooling options to assist in minimising the impact to local residents and Hospital users.

7.2.3 Emergency Access

Emergency access to the Hospital and all local properties will be maintained during the works. Construction vehicles will not be permitted to block access to the emergency vehicle access driveway.

7.2.4 Cumulative Local Impacts

According to NSW Major Projects, there are no State Significant Developments that would impact the construction of the site.

During the preparation of the Construction Traffic Management Plan, review of any development applications near to the site should be constructed to determine if any other local developments may have an impact.

7.3 Summary

A detailed Construction Traffic Management Plan will be developed and submitted to the approval authorities prior to any works commencing on-site. A final CTMP requires detailed information regarding construction methodologies, works phasing, proposed access arrangements, signage, timing, and other works details which cannot be provided at this stage.

At this stage, the construction traffic impacts and requirements of the redevelopment are anticipated to be management within the site and within the local road network.

8.0 Conclusion

8.1 Summary

The proposed design contains two vehicle access points including one on Brisbane Street and Liverpool Street. The Brisbane Street access is used by ambulances, patient transport vehicles, service and loading vehicles and private vehicles, whereas the Liverpool Street access is used predominantly by private vehicles. A small car park with 10 parking spaces including 1 accessible space is accessed via Brisbane Street and a larger car park with 31 parking spaces including 2 accessible and 2 electric vehicle charging spaces is accessed via Liverpool Street. The proposed development includes pedestrian access from Liverpool Street and Brisbane Street.

The proposed development will result in an increase in staff, patients and visitors due to the minor expansion in services from 30 to 34 beds. It is estimated that an increase of this size could result in an increased parking demand of 15 spaces. The proposed redevelopment includes 14 additional formal on-site parking spaces, which accounts for the majority of the increase in parking demand. The remaining parking demand of 1 space would therefore overflow to the surrounding on-street parking but would result in an insignificant impact as there is widely available parking in the nearby streets (~ 170 vacant spaces). Therefore, minimal impact to on-street parking is expected as there will be negligible change to the existing usage of on-street parking.

A study undertaken by EMM in March 2022 indicates that on-street parking is widely available with 160 vacant spaces within 100 metres of the site. A study of recent Nearmap images indicates ~ 170 – 180 vacant spaces within 100 metres of the site. This availability is expected to be largely maintained into the future as the additional shortfall of 1 space would account for less than 1% of the current number of vacant spaces.

The proposed redevelopment is expected to increase peak hour trip generation by an additional 7 trips in the morning and 6 trips in the afternoon peak hour. Minimal impact to the road network is expected as these additional volumes are negligible.

It is anticipated that the construction of the site will have minimal impact to surrounding properties and local roads. A detailed Construction Traffic Management Plan will be developed and submitted for approval prior to any works commencing on-site.

Prepared by
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(NSW) PTY LTD

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TAYLOR THOMSON
WHITTING (NSW) PTY LTD

Authorised By
TAYLOR THOMSON
WHITTING (NSW) PTY LTD



EMMA COWDERY
Traffic Engineer



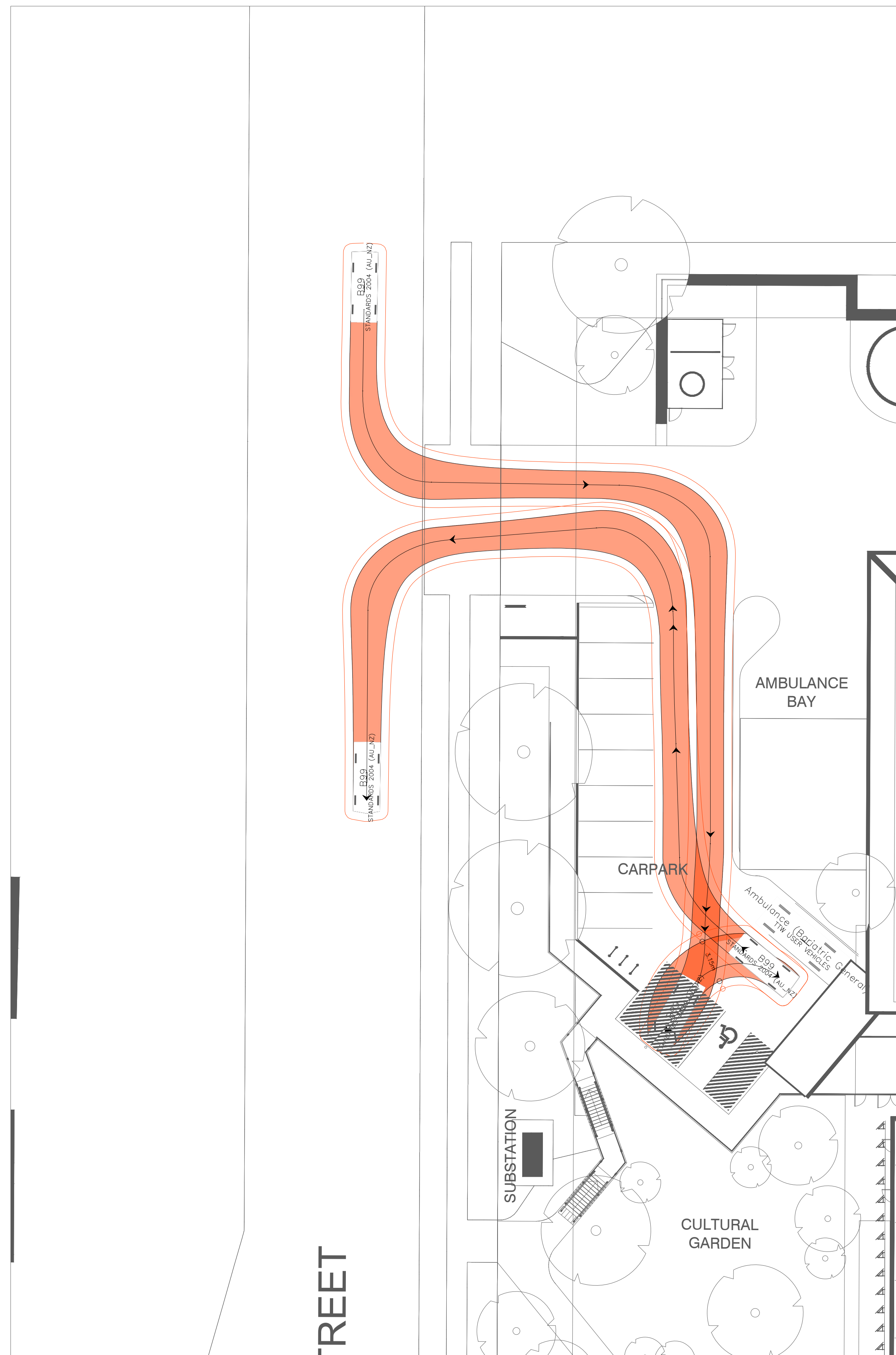
GRACE CARPP
Associate



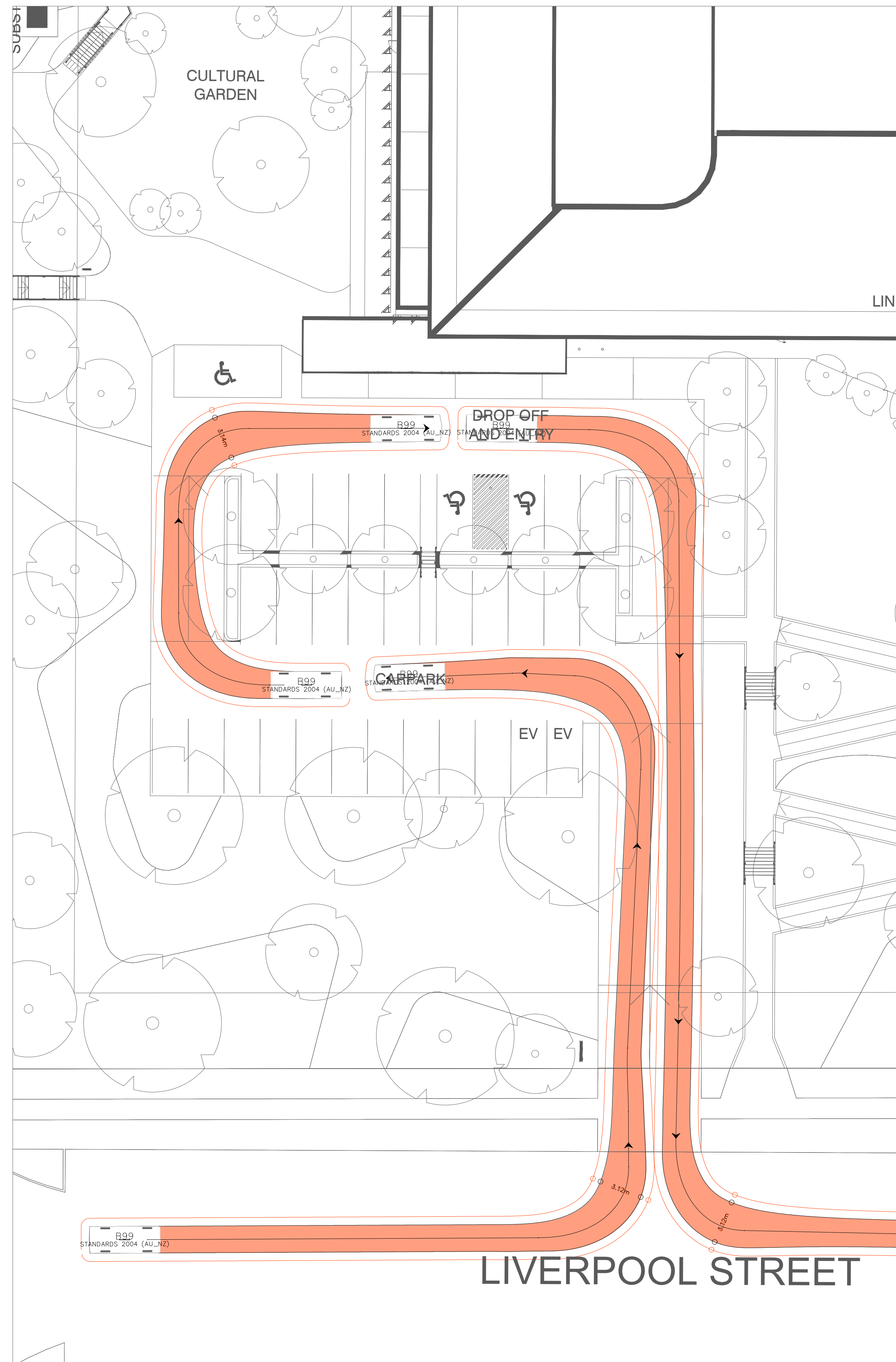
PAUL YANNOULATOS
Technical Director

Appendix A

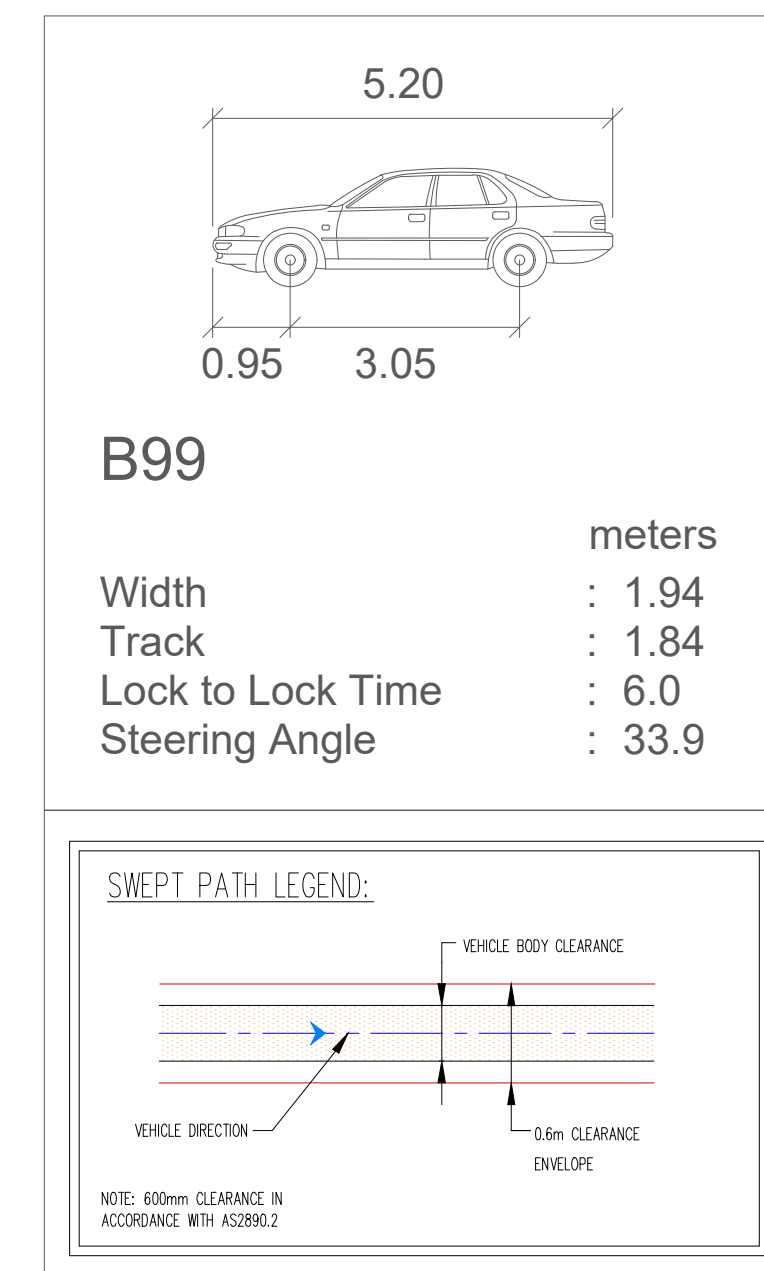
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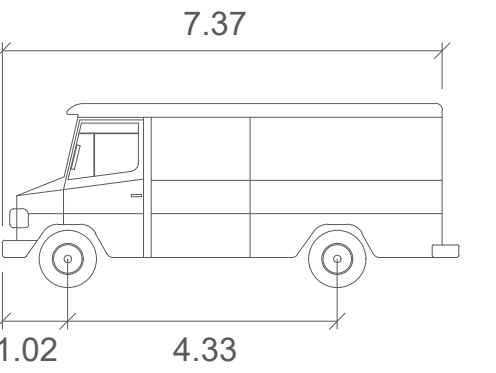


BRISBANE STREET CAR PARK



LIVERPOOL STREET CAR PARK

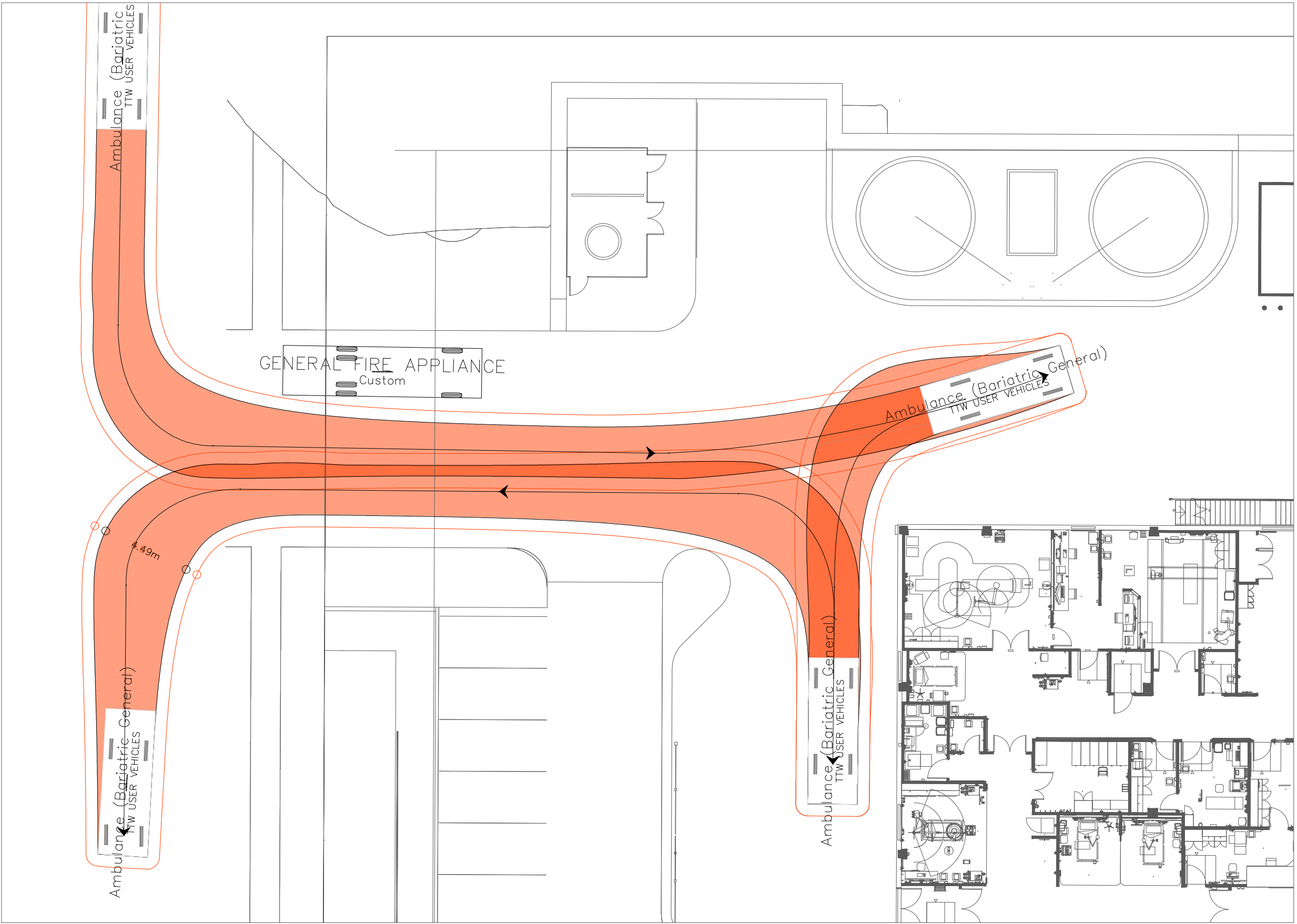
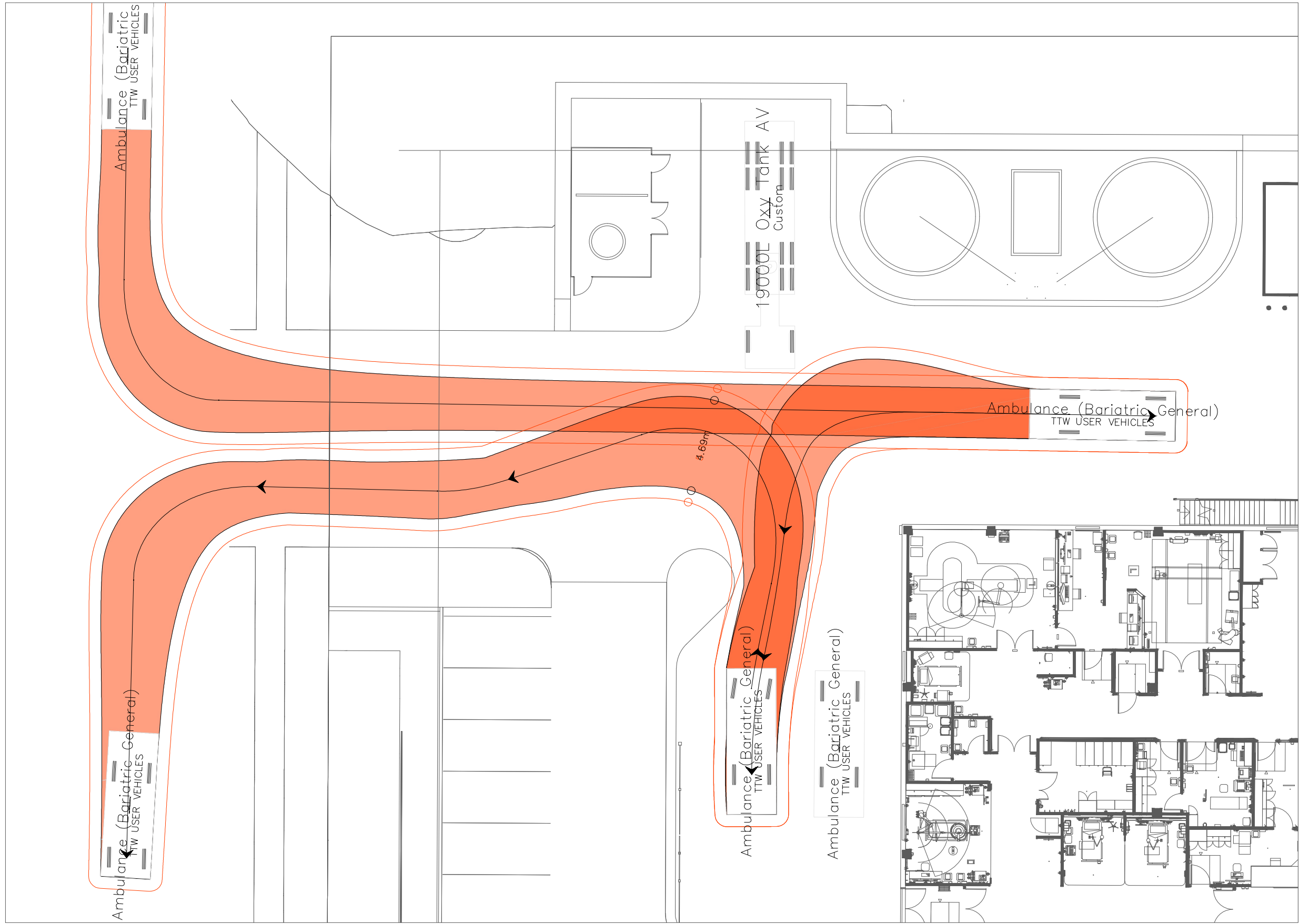
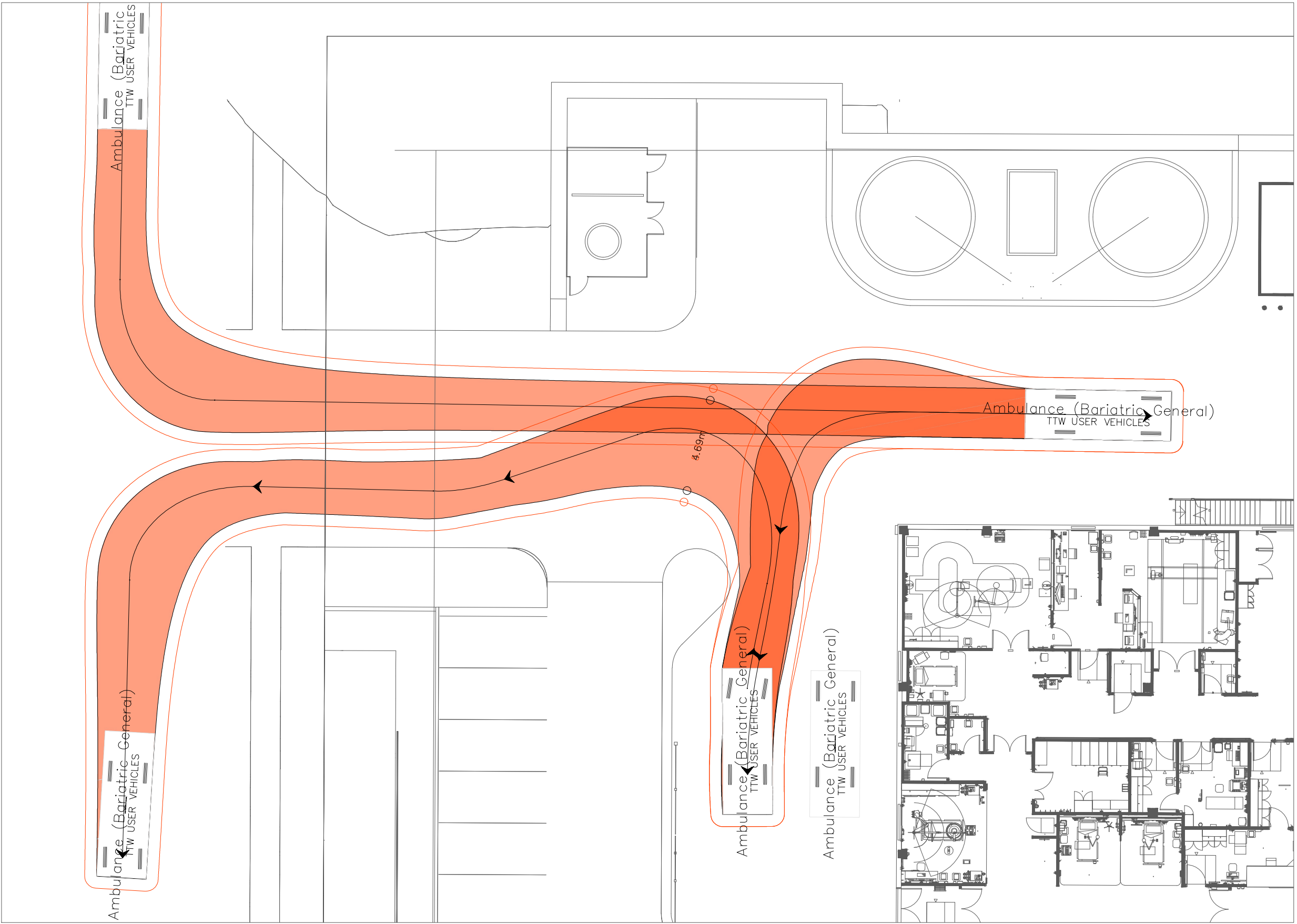
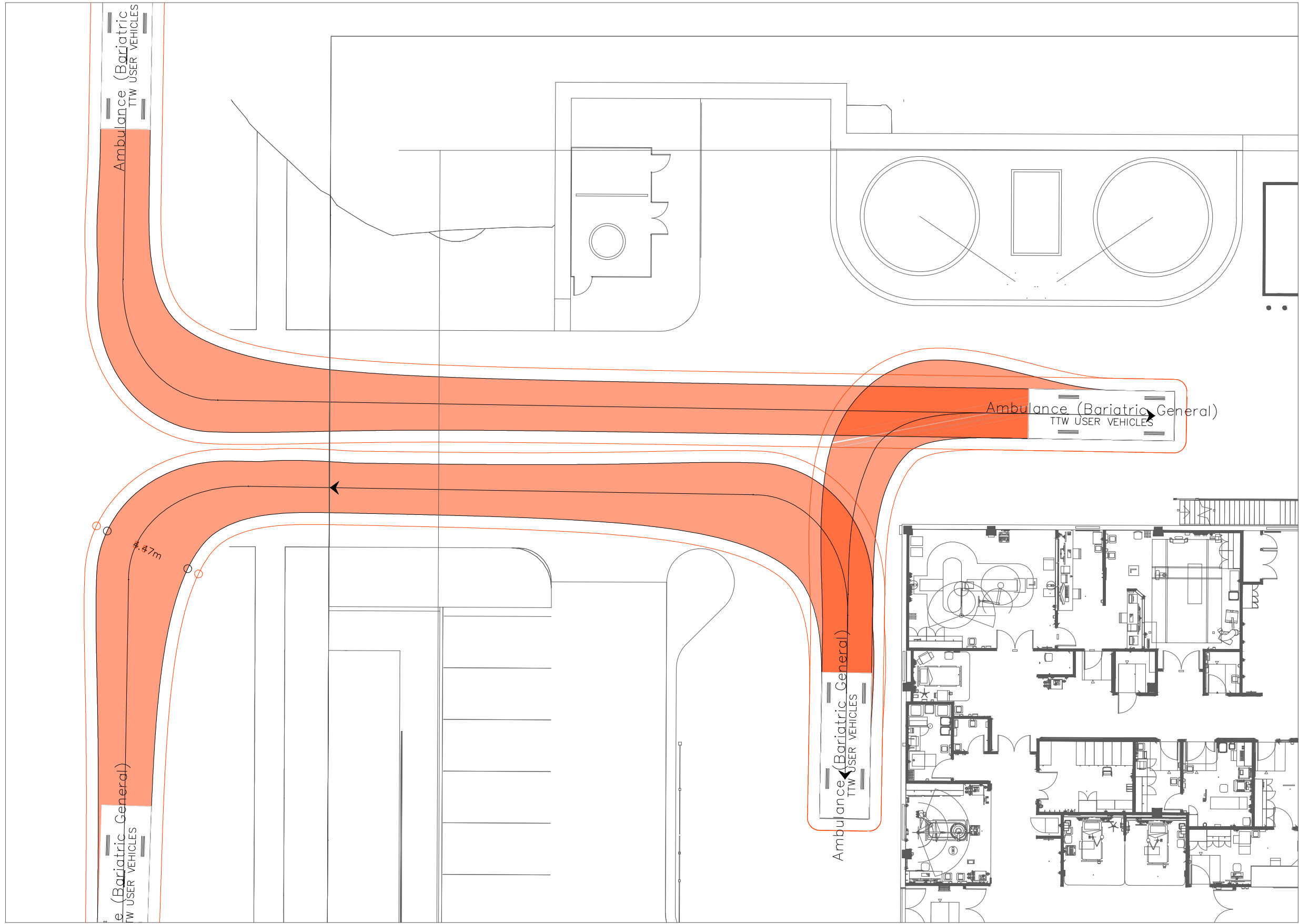
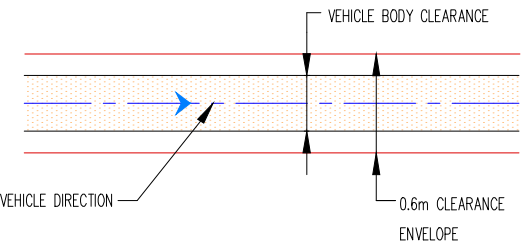
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Ambulance (Bariatric General)

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Steering Angle	: 45.7

SWEPT PATH LEGEND:



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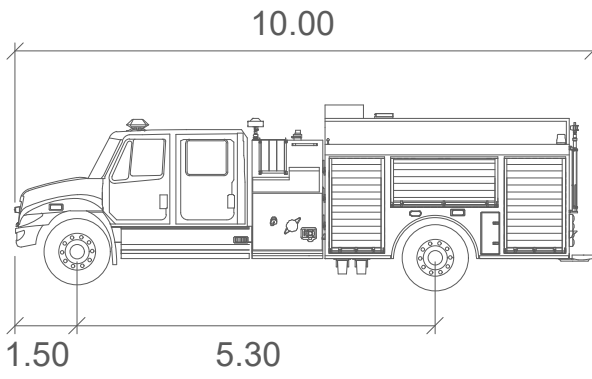
Architect
DJRD Architects
63 Myrtle Street
Chippendale
NSW 2008

Engineer
TTW Structural
Civil
Traffic
Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
COWRA HOSPITAL

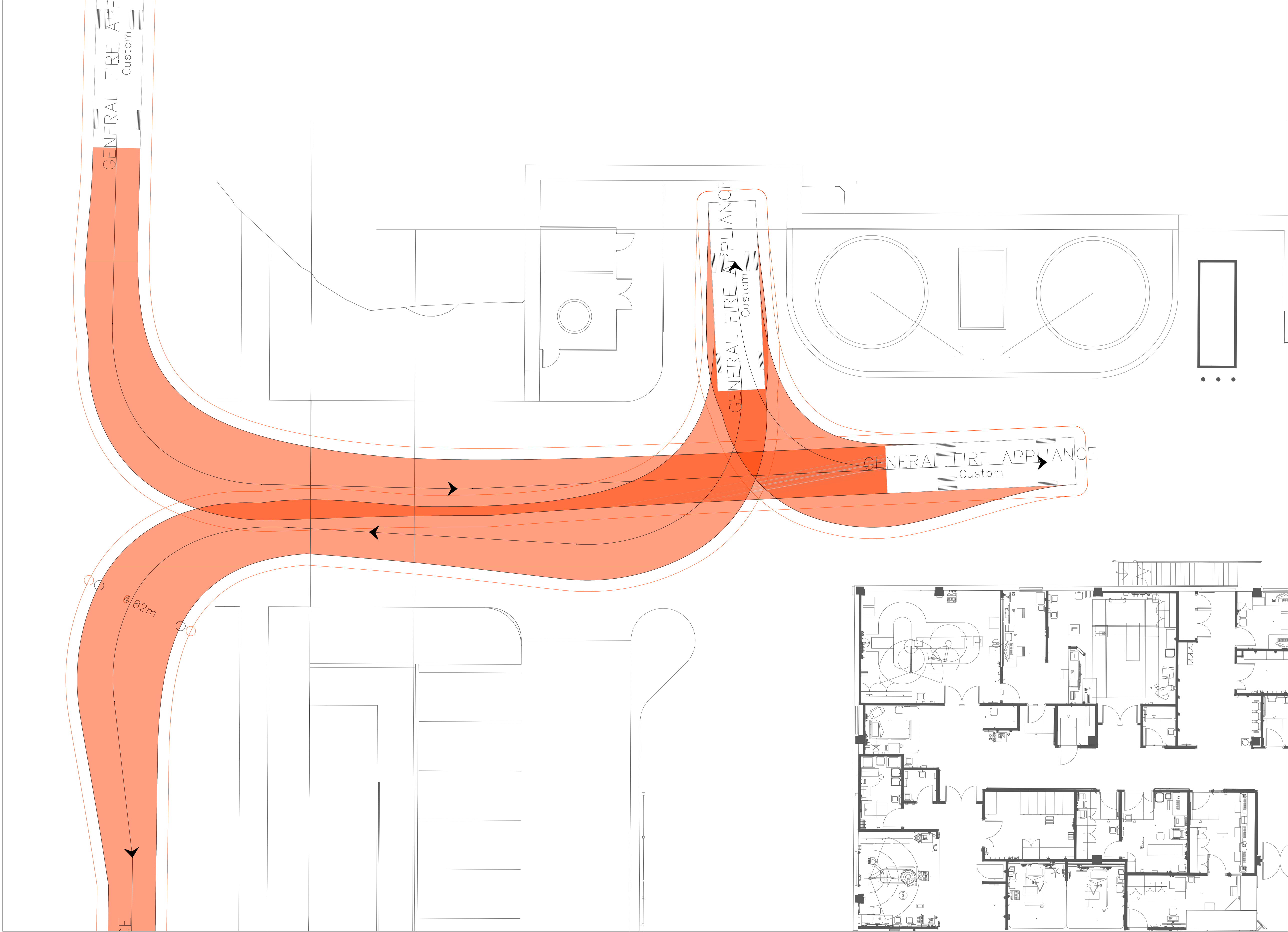
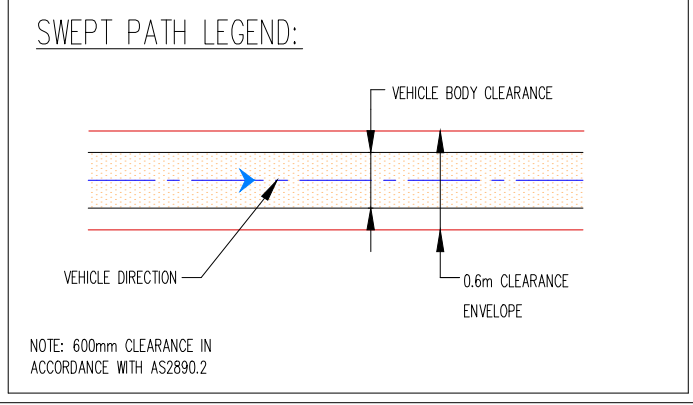
Sheet Subject
TURNING PATH ANALYSIS
BARIATRIC AMBULANCE

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Job No 211721	Drawing No SKT38	Revision P1
Plot File Created: Dec 19, 2023 - 11:44am		



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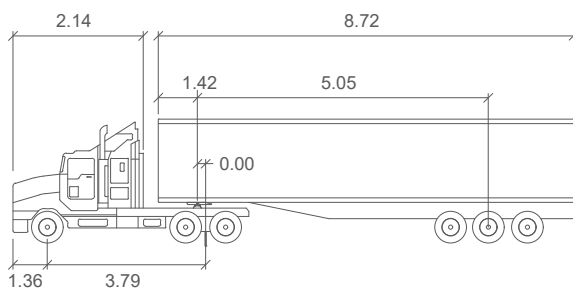


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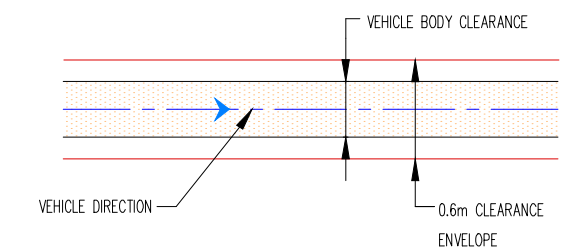


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										63 Myrtle Street Chippendale NSW 2008			612 9439 7288 Level 6, 73 Miller Street, North Sydney, NSW 2060									Job No		Drawing No		Revision	
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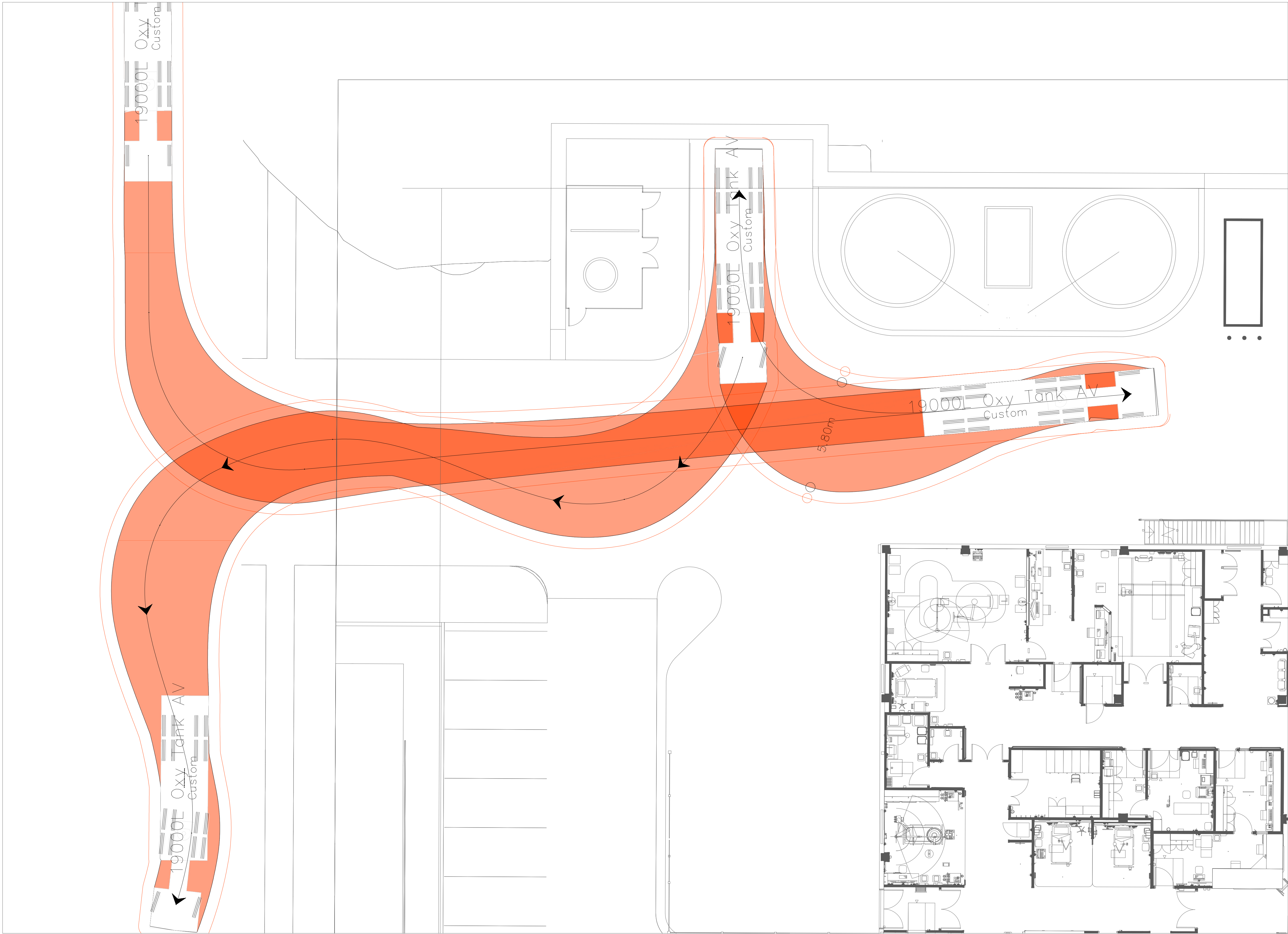


19000L Oxy Tank AV			
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Tractor Track	: 2.50	Steering Angle	: 28.3
Tractor Wheelbase	: 2.50	Articulating Angle	: 70.0

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2885.2



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Rev	Description	Eng	Draft	Date	Rev Description Eng Draft Date Rev Description Eng Draft Date

Architect
DJRD Architects
63 Myrtle Street
Chippendale
NSW 2008

Engineer

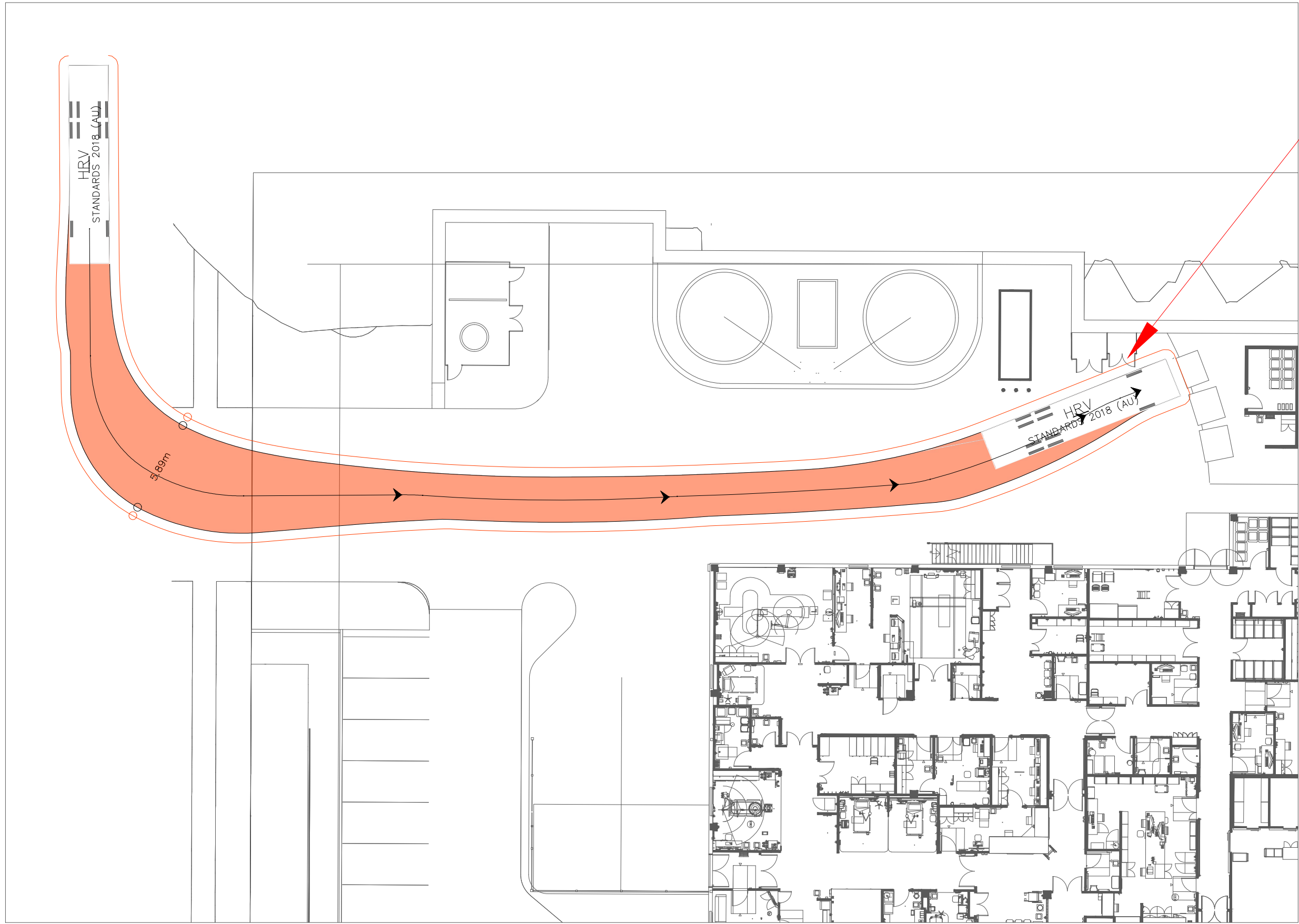
TTW **Structural Civil Traffic Façade**

612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

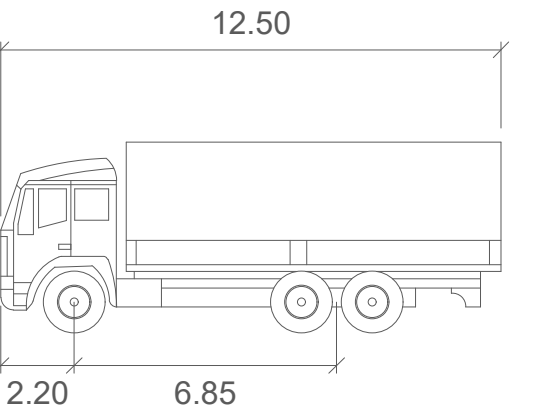
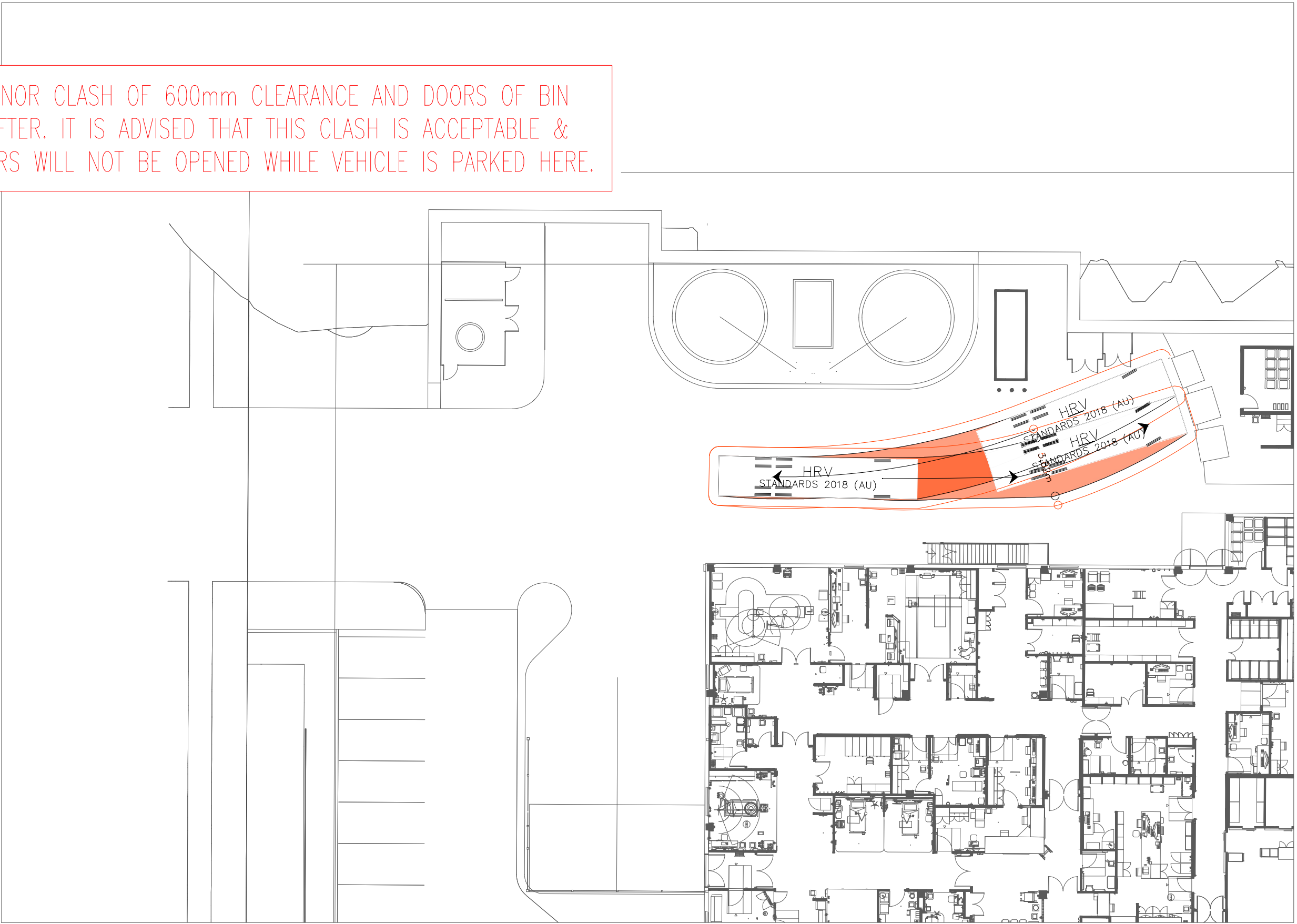
Project
COWRA HOSPITAL

Sheet Subject
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OXYGEN TANK

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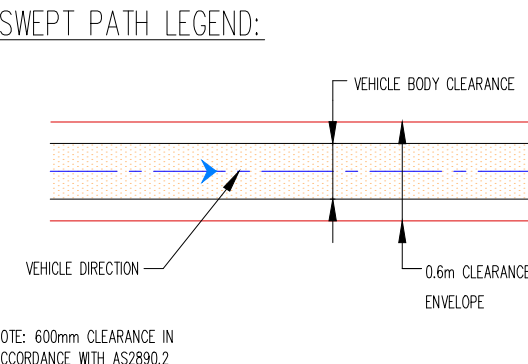


MINOR CLASH OF 600mm CLEARANCE AND DOORS OF BIN LIFTER. IT IS ADVISED THAT THIS CLASH IS ACCEPTABLE & DOORS WILL NOT BE OPENED WHILE VEHICLE IS PARKED HERE.



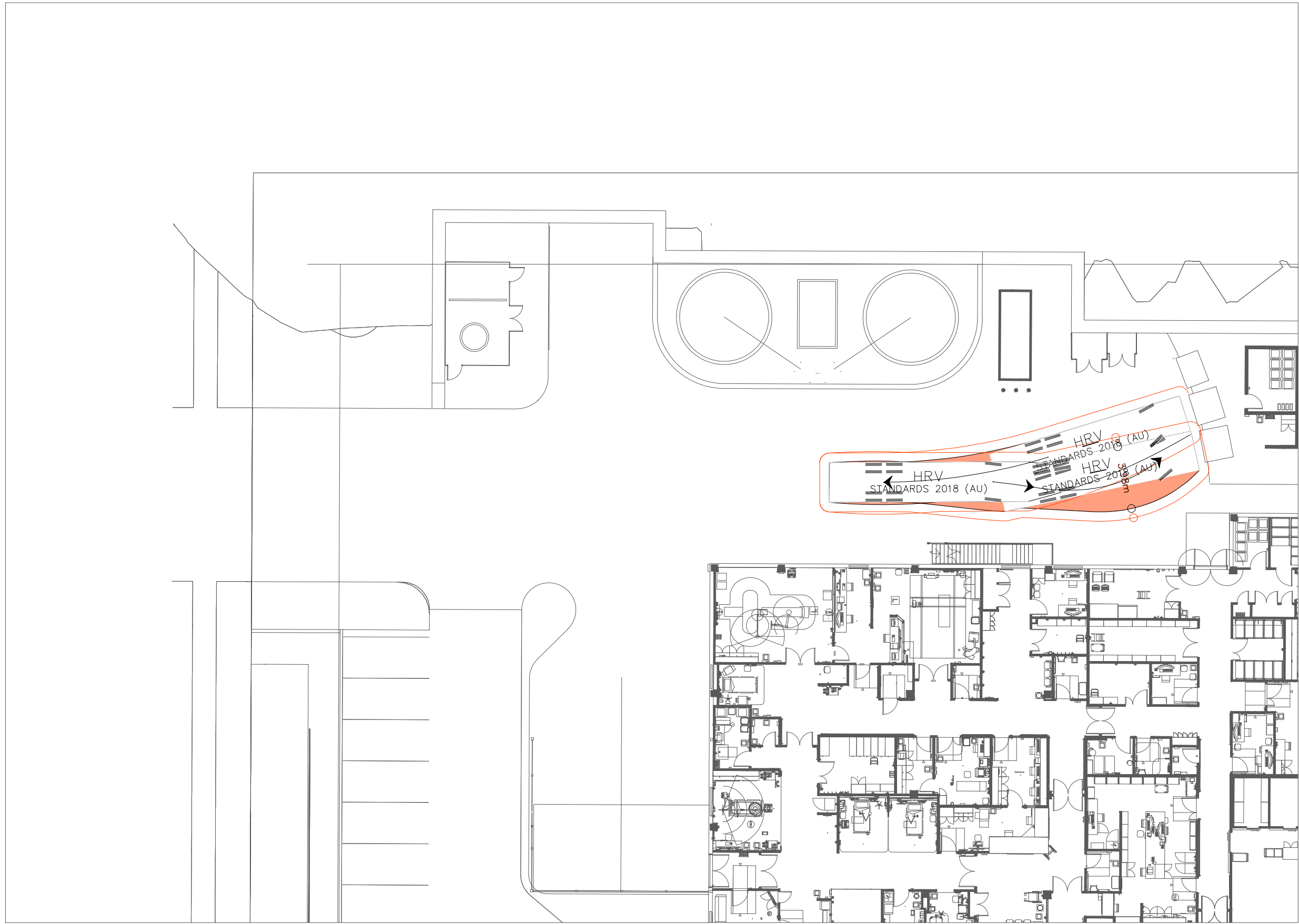
HRV

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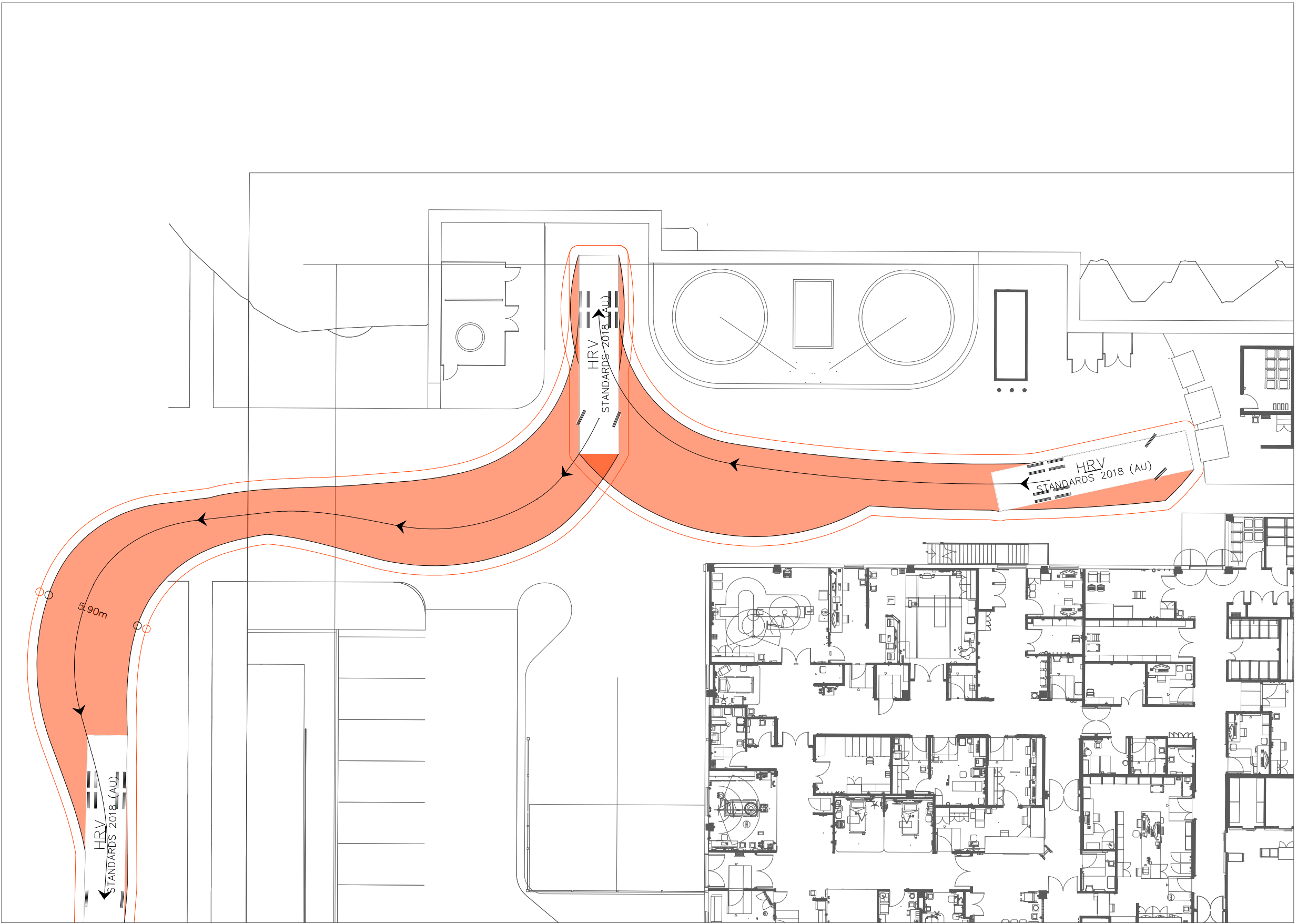


ENTRY MOVEMENT TO BIN C

MOVEMENT FROM BIN C TO BIN A



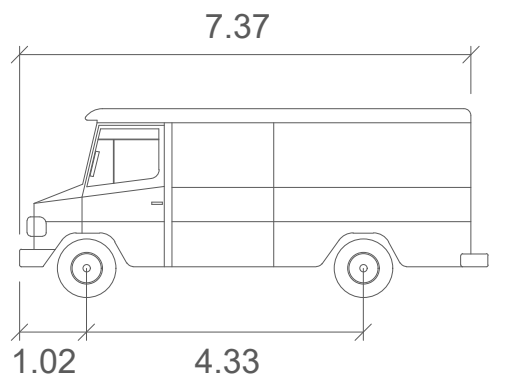
MOVEMENT FROM BIN A TO BIN B



EXIT MOVEMENT FROM BIN B

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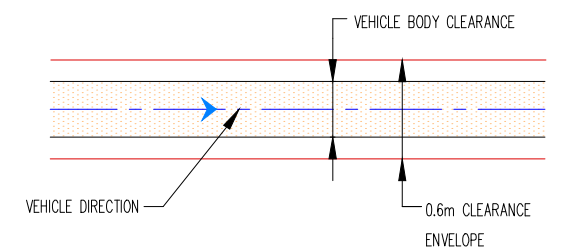
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			Chippendale			612 9439 7288 Level 6, 73 Miller Street, North Sydney, NSW 2060						HEAVY RIGID VEHICLE											
			NSW 2008																				
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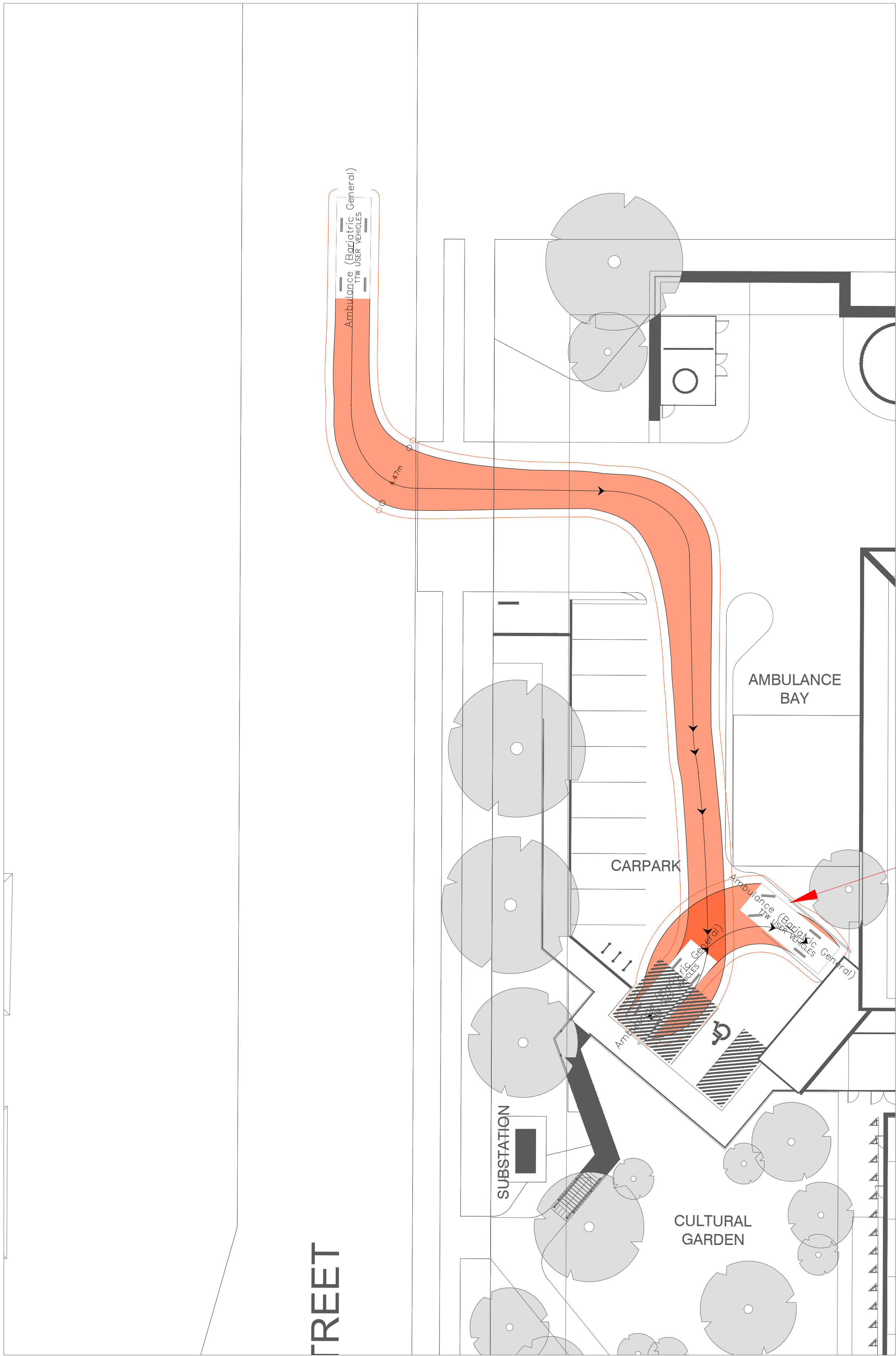
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Track	: 2.02
Lock to Lock Time	: 6.0
Steering Angle	: 45.7

SWEPT PATH LEGEND:

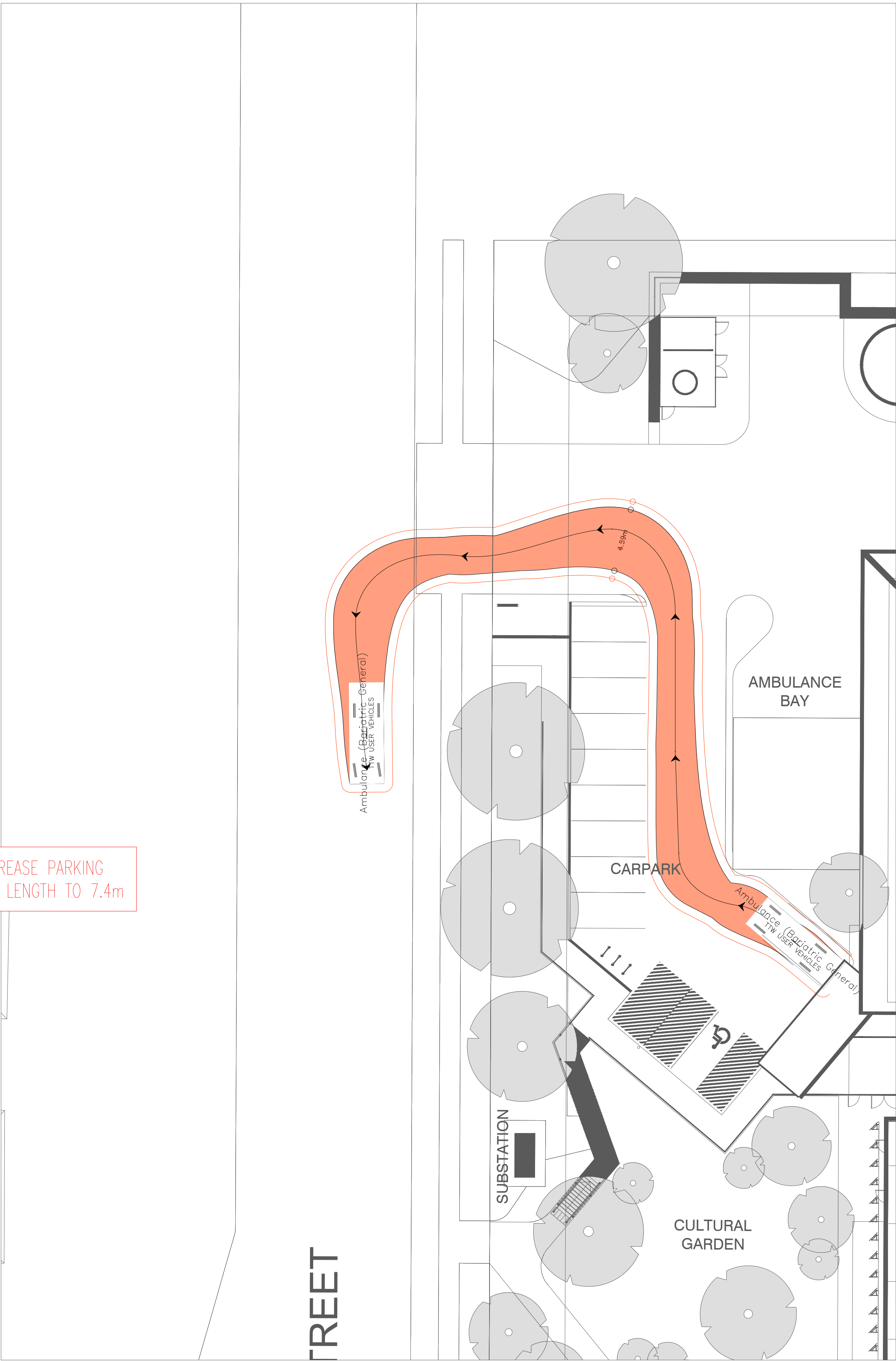


NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890.2



ENTRY MOVEMENT

INCREASE PARKING
SPACE LENGTH TO 7.4m



EXIT MOVEMENT

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Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description

Architect
DJRD Architects
63 Myrtle Street
Chippendale
NSW 2008

Engineer

TTW **Structural Civil Traffic Façade**

612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
COWRA HOSPITAL

Sheet Subject
TURNING PATH ANALYSIS
ED CAR PARK
PATIENT TRANSFER VEHICLE

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