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Our Reference: P3405.001L

Your Reference:

17 June 2019

TSA Management
Level 15, 207 Kent Street
Sydney NSW 2000

Attention: Justine Butler

Sent via email: jbutler@tsamanagement.com.au

Dear Justine,

RE: ALEX AVENUE PRIMARY SCHOOL, SCHOLFIELDS – TEMPORARY CAR PARKING DESIGN
COMPLIANCE ASSESSMENT

1.0 BACKGROUND

Bitzios Consulting was engaged by TSA Management to undertake a compliance assessment of the proposed temporary carpark design for the new Alex Avenue Public School, at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the site).

A carpark servicing the adjacent proposed council sports field was proposed to cater for both sports field and school parking under a Joint Use Agreement. However, it is further understood that the carpark may not be completed by the time the school commences operation. Additionally, the Pelican Avenue extension, which would have provided some on-street parking, will also not be completed by this time. As such, the only available parking spaces are on-street parking along Farmland Drive and adjacent local streets, which are both limited in numbers and not intended for school staff and visitor parking.

During the period after the commencement of school operations and before completion of the sports field carpark (the 'interim period'), the school is projected to service a total of 400 students and 35 staff members.

A temporary carpark is proposed within the boundary of the school site to provide parking to school visitors and staff. It consists of 32 parking spaces and 5 Drop-off and Pick-up spaces. The carpark also has a waste collection zone (bin enclosure) located on the south eastern corner of the carpark. A 12.5m Heavy Rigid Vehicle (HRV) was used as the design refuse collection vehicle for access, egress and manoeuvrability within the car park. The layout of the carpark is shown in Attachment A.

This letter is an addendum to Traffic Impact Assessment (TIA) report provided by Bitzios Consulting, and details the compliance assessment of the carpark layout and configuration against Australian Standard AS2890.1.

2.0 COMPLIANCE ASSESSMENT

2.1. Parking Provision Assessment

Parking Provision

An assessment of parking requirements, proposed provision and vehicular access to and within the proposed school was conducted against the relevant standards, guidelines and planning documents, including:

- Australian Standards;
 - Parking facilities Off-street car parking (AS2890.1);
 - Parking facilities Off-street car parking for people with disabilities (AS2890.6);
- Blacktown City Council Growth Centre Precincts Development Control Plan July 2018 (BCC Growth Centre Precincts DCP).

The NSW Department of Education is noted to adopt the principle that “A school is not obliged to provide parking on site to anyone at any time”. However, as the BCC Growth Centre Precincts DCP stipulates specific parking requirements for a primary school (outlined in Table 2.1 below), compliance was measured against these controls to ensure a minimal parking impact on the surrounding on-street car parking areas.

Table 2.1 Parking Requirements

Vehicle	Parking requirement rates	Required Spaces	Spaces provided
Car	1 space per staff member	35 spaces	32 spaces
	1 space per 100 students	4 spaces	

There is therefore observed a deficiency of seven (7) parking spaces per the parking requirements outlined in the BCC Growth Centre Precincts DCP. This is found to be a necessary outcome due to constraints of the available site and the intention of providing a more flexible and smoother drop-off area. It is further recognised that while the DCP allows each staff member their own space, the mode share of primary school staff in the Blacktown LGA is not comprised entirely of private vehicles, therefore some leeway in parking demand is possible.

Drop Off Capacity

A drop-off / pick-up area capable of accommodating at minimum five (5) vehicles is provided in the temporary carpark. This is deemed to be suitable for drop-off / pick-up operations for the projected 400 students during the interim period, following the same assumptions as outlined in Section 5.4 of the TIA report. The provided capacity is expected to allow for smooth operations given a turnover rate up to 2 minutes.

It is noted that under the analysis assumptions, during the PM peak period there will be a brief period immediately following release of school students at 3PM where the arrival rate will exceed the turnover rate (assuming that all parents/guardians are waiting for the full 2 minutes). Given that this period will be around 5 minutes, and that the drop off area is contained off-street with queueing capacity, this should not have any substantial effects on the traffic network.

PWD & Bicycle Parking

PWD parking spaces are not required in the temporary carpark, as one PWD space will already be provided at the special needs drop off along Farmland Drive and has been checked for compliance in the Traffic Impact Assessment Report prepared by Bitzios Consulting. Bicycle parking spaces are also not required in the temporary carpark as they will have been provided near the main entrance of the school.

2.2. Design Assessment against Australian Standards Series 2890

The arrangement and layout of the proposed temporary car park was assessed against Australian Standard AS2890.1-2004 (Off-Street Car Parking) . The assessment includes:

- Parking Space Dimensions;
- Aisle Width;
- Clearances; and
- Barriers, including wheel stops.

User Classes

The proposed temporary facilities are expected to have different parking behaviour in terms of vehicle turnover; therefore, the parking spaces allocated to each facility have a specific User Class defined by AS2890.1, summarised in Table 2.2, and dictates the minimum requirements for each parking space type.

Table 2.2 User Classes

Space Type	Turnover	User Class
Drop off & Pick Up	High	User Class 3
Parking	Low	User Class 1A

Parking spaces are assessed against requirements for User Class 1A, while the Drop off & Pick Up spaces are assessed against requirements for User Class 3.

Design Compliance Assessment

Table 2.3 summarises the compliance assessment for the proposed temporary carpark arrangement. All dimensions are in millimetres.

Table 2.3 Compliance Assessment Summary

Item	Space Type/Number	Minimum Requirement (AS2890)	Provision	Compliance
Space Dimensions				
Space Dimensions	Perpendicular Parking All Spaces 1-32	2400 x 5400	2400 x 5400 (min)	Compliant
	Parallel Drop off & Pick Up End Spaces D1, D3-D5	2100 x 6200	3000 x 10800 (min)	Compliant See Note 1
	Parallel Drop off & Pick Up Spaces D4	2100 x 5900	3000 x 12350	Compliant See Note 1
	PWD & Shared Space	N/A, Provided at Special Needs Drop-off		See TIA Report
Aisle Width				
Parking Aisle	Northern & Southern Parking Aisles (Perpendicular to User Class 1A spaces)	5800	5800 (min)	Compliant

Item	Space Type/Number	Minimum Requirement (AS2890)	Provision	Compliance
	Western Parking Aisle (One-way, adjacent to parallel spaces only)	3000-3600	5800	Compliant See Note 1
Access Driveway	Category 1 Access Facility (Combined Exit/Entry)	5500	5800	Compliant See Note 2
Circulating Roadway	Eastern Side of Carpark (Circulating Roadway with no parking)	3000 (One-way) 5500 (Two-way)	5800	Compliant
Clearances				
Horizontal clearance to walls or columns	All Spaces Spaces 1-32	N/A		
Vertical Clearance	All Spaces Spaces 1-32	N/A		
Barriers, including bollards and wheel stops				
Wheel Stops	Perpendicular Parking Spaces 1-32	900 from end of space	900 from end of space	Compliant See Note 3
	Parallel Drop off & Pick Up Spaces D1-D5	N/A (Parallel Spaces)		

Compliance Assessment Notes

Based on the above assessment, a number of key items were identified and are detailed below:

- Note 1: Parallel parking requirements are set out in AS 2890.1 Clause 2.4.4(a). The one-way aisle width is 5800 mm. For this width, the minimum space length is 5900 mm, and the minimum space length for obstructed end spaces is 6200 mm. However, as these spaces being used for Drop off & Pick Up where reverse parking is not desirable, swept path analysis have been undertaken to determine whether space lengths are suitable for single forward manoeuvre entry and exit.
- Note 2: The requirements for access driveway widths are set out in section 3.2.1 of AS 2890.1. The carpark has 32 User Class 1A spaces and 5 User Class 3 spaces, corresponding to a Category 1 access facility. The minimum combined entry/exit driveway width required is between 3000 and 5500 mm, dependent on a case-by-case basis. Since the width of the driveway in the layout is 5800mm, it is deemed compliant for any case. Swept path analysis have been undertaken to show that a B85 and a B99 are able to pass each other.
- Note 3: Wheel stops are to be provided for parking spaces to prevent a vehicle from encroaching into an adjacent space or walls during entry. They are to be 90-100 mm in height and 1650 (±50) mm in width. For a B85 vehicle, and assuming a wheel stop height of 100 mm, the minimum wheel stop distance required is 900 mm from the end of the space. As this car park is temporary, wheel stops can be made from rubber instead of concrete for easier removal after the interim period.

3.0 SWEPT PATH ANALYSIS

Swept path analysis was undertaken to determine the suitability of vehicle manoeuvres into and out of certain parking spaces within the new proposed temporary carpark. The plans can be found in Attachment B.

Swept path analysis was conducted using a B85 design vehicle for all parking and Drop off & Pick Up spaces in the temporary carpark.

The findings of the swept path and manoeuvre analysis are as follows:

- Space 1-18: can be accessed by reversing into space, performing a standard reversing manoeuvre.
- Space 19-21: can be accessed using a forward-entry movement. Reverse exit can be achieved performing a standard reversing manoeuvre. Space 21 can also be accessed using a reverse-entry movement.
- Space 22-29: can be accessed by reversing into space, performing a standard reversing manoeuvre. Standard forward exit can be achieved.
- Space 30-32: can be accessed by reversing into space, performing a standard reversing manoeuvre. However, due to the limited turn radius between the space and the access driveway, forward exit can only be achieved by driving onto the circulation roadway, drive one round around the carpark, before turning into the access driveway.
- Spaces D1-D5: can be accessed by forward-entry in a single manoeuvre. Forward exit can also be performed in a single manoeuvre.
- Circulating Roadway: The circulating roadway is able to accommodate a B85 turning left from the northern roadway into the access driveway, and a B99 travelling south on the access driveway, passing one another and maintaining sufficient clearance (300mm) to the adjacent parking spaces. However, this can only be done by driving slightly onto painted chevron "No Parking" area. The same situation happens when the left-turning vehicle is a B99 and the southbound vehicle is a B85.
- Bin Enclosure: A HRV refuse truck is only able to access and exit the bin enclosure by opposing the intended direction of carpark traffic and utilising the chevron "No Parking" area. The truck will also be blocking any traffic when parked stationary at the bin enclosure. It is recommended that the any refuse collection be done outside school hours.

4.0 OTHER COMMENTS

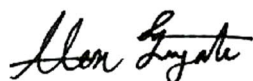
Upon review of the provided plans, a further traffic and parking related item was been identified and is detailed below. It should be noted it is not a part of the compliance assessment and is a comment only.

- Pedestrian Walkways: Pedestrian walkways have not been included in the temporary carpark design. Ideally, pedestrians should be guided away from the access driveway.

5.0 CONCLUSION

The assessment of the proposed temporary parking layout is found to meet the requirements of Australian Standard Series AS2890.

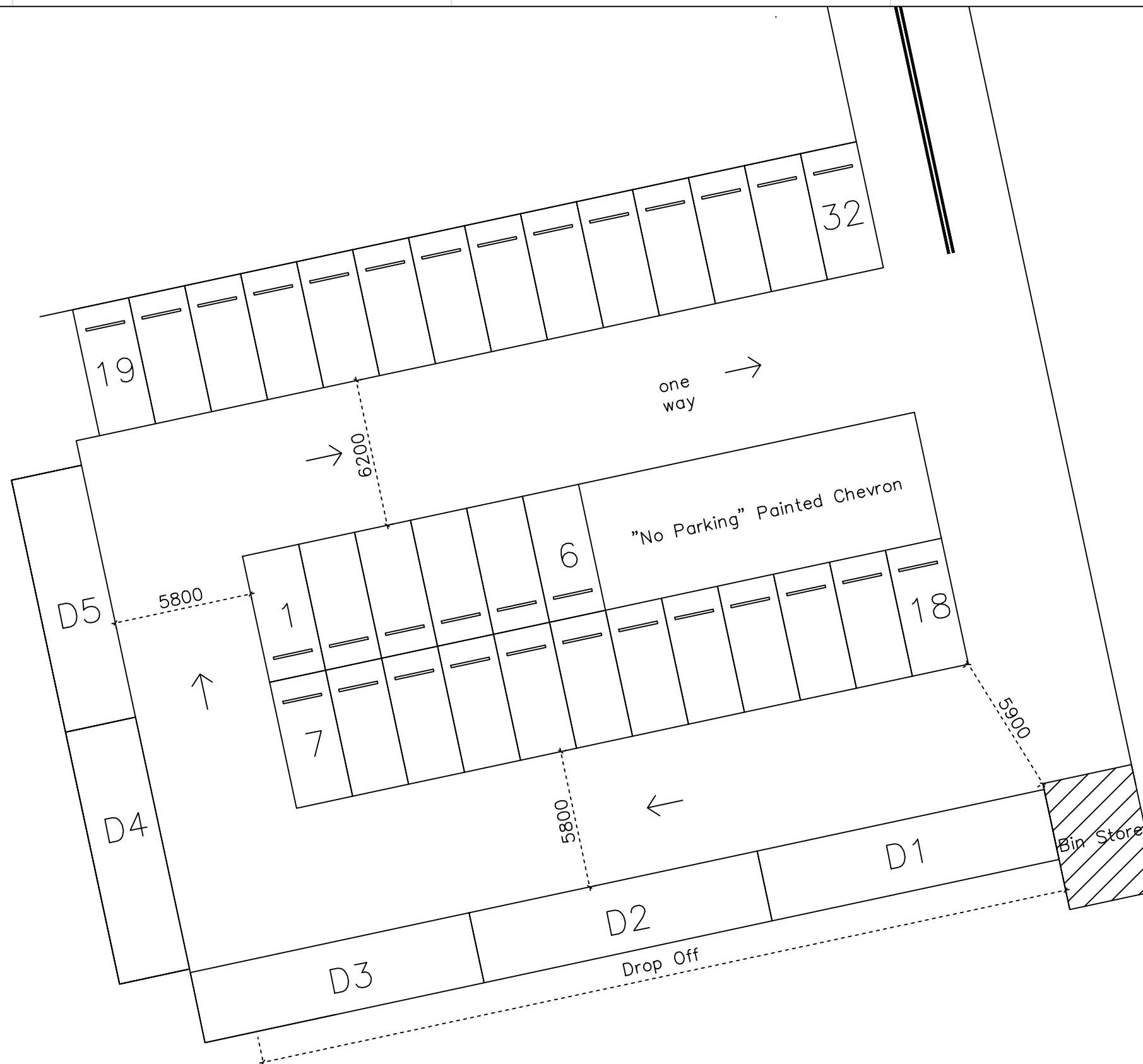
Yours faithfully,



Alex Giyahi
Principal Traffic Engineer
BITZIOS CONSULTING

ATTACHMENT A

PROPOSED TEMPORARY CARPARK PLAN



REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Temporary Carpark Markup	C.M	13.06.2019
002	Temporary Carpark Markup	C.M	14.06.2019
003	Temporary Carpark Layout	C.M	17.06.2019

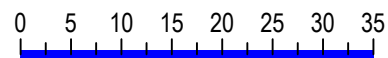
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Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
Title Temporary Carpark Layout	Project Number P3405	Sheet Number 101	Date 17.06.2019
			Issue 003

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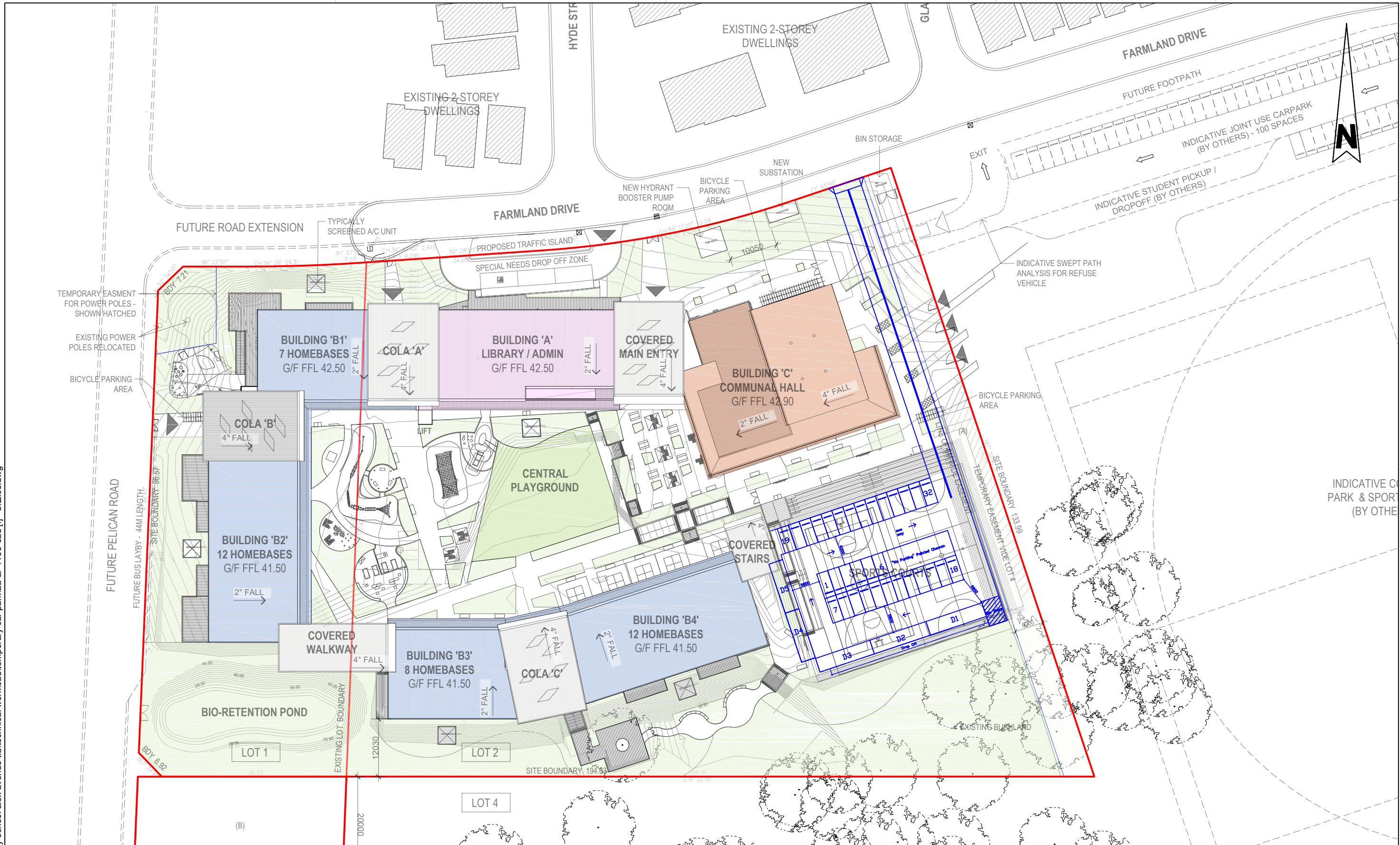
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003	Site Layout Temporary Car Park	C.M	17.06.2019

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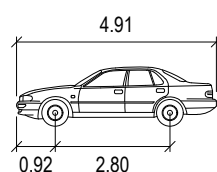
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	Date 17.06.2019		
Title Proposed Stage 1 Car Park Temporary Site Layout	Project Number P3405	Sheet Number 102	Issue 003



ATTACHMENT B

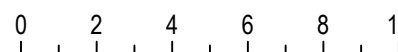
SWEPT PATH ANALYSIS



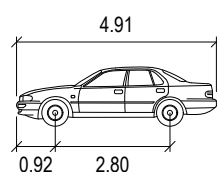
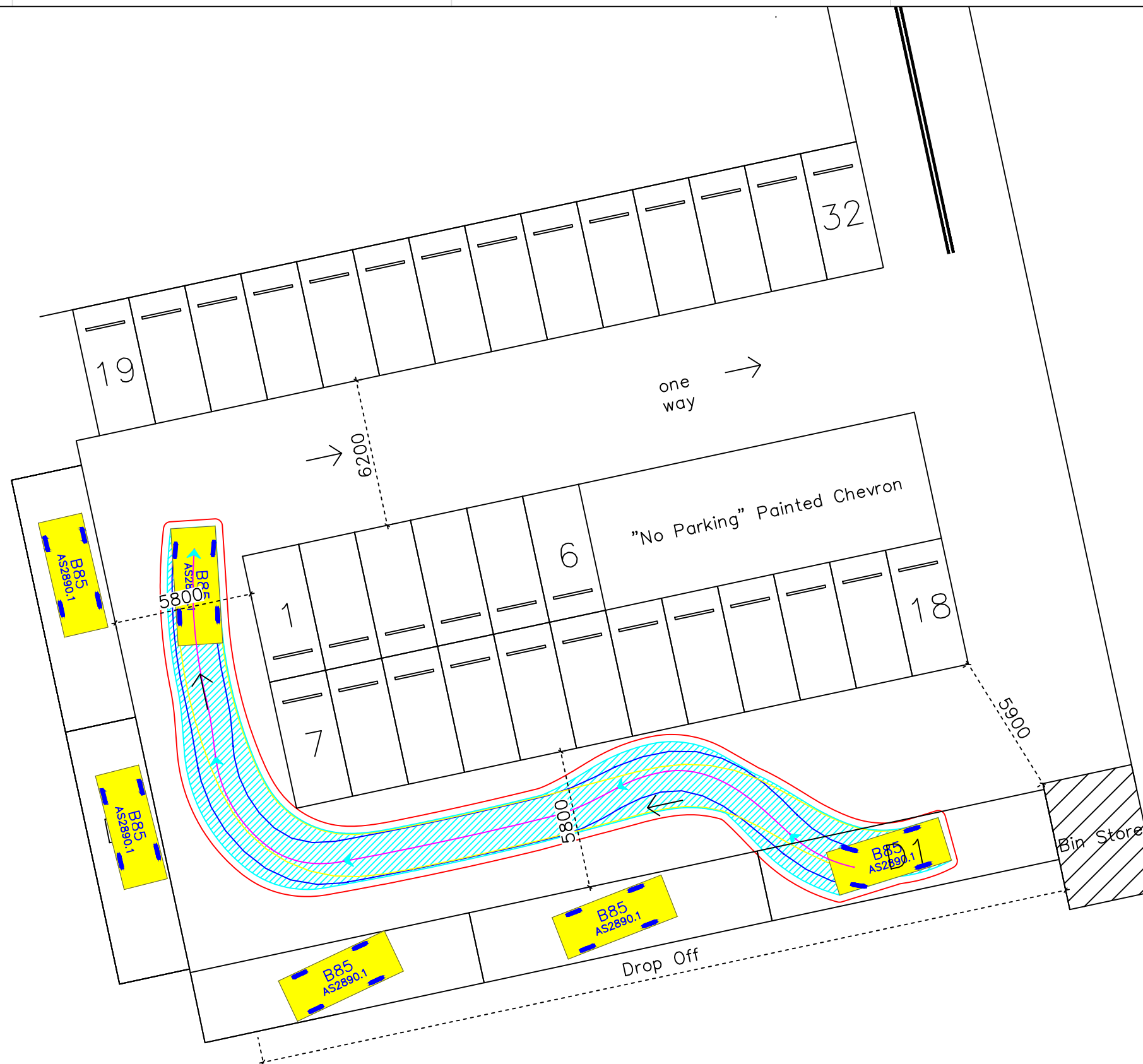
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DESIGN VEHICLE

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003	Swept Path Analysis	C.M	17.06.2019

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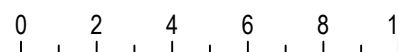
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Title Temporary Carpark Swept Path Analysis Drop-off Space D1 - Entry		Issue 003	



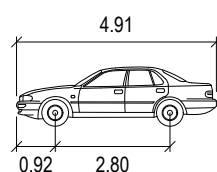
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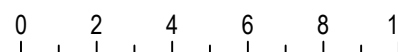
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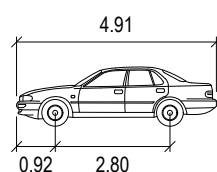
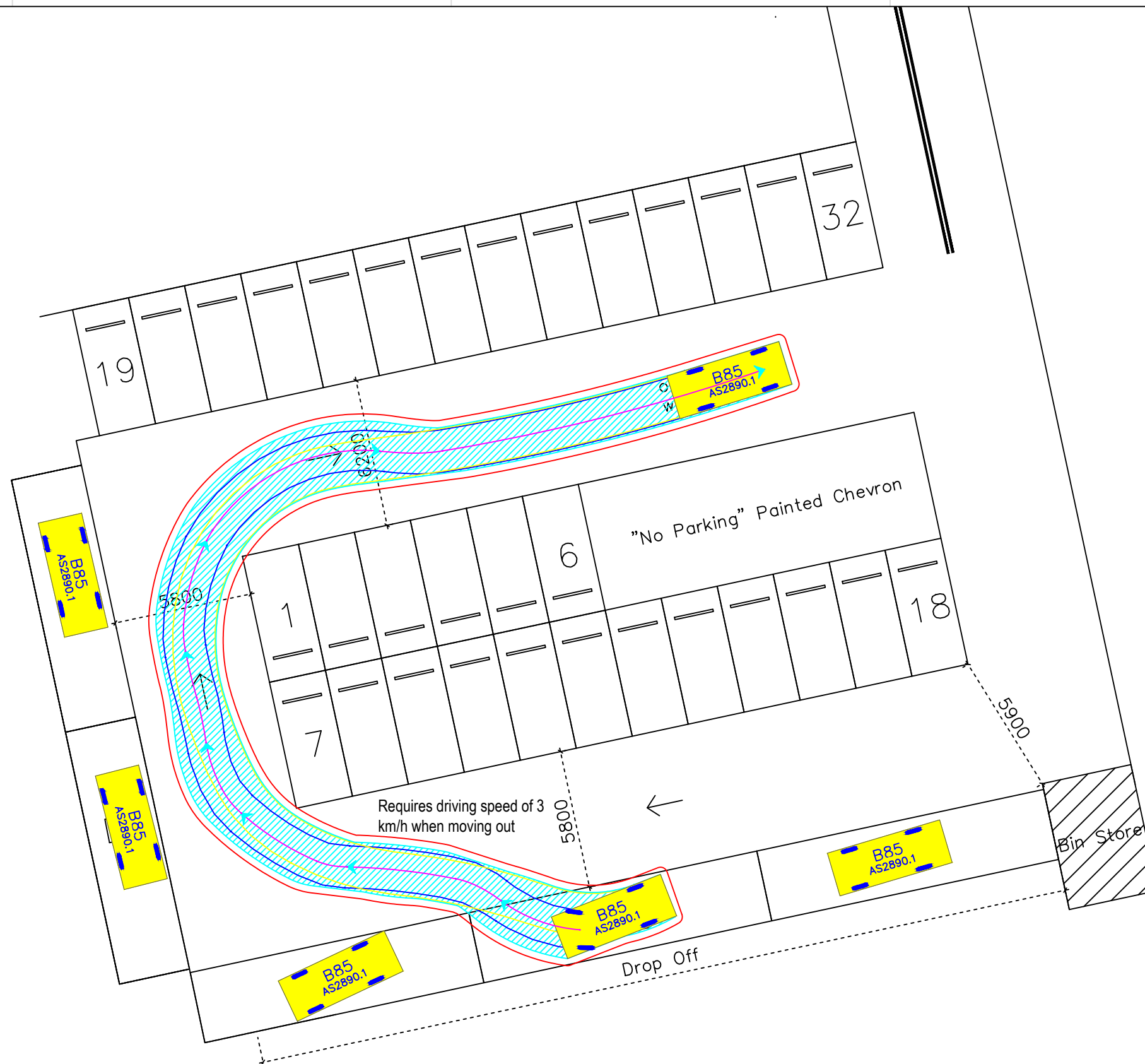
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			Date 17.06.2019
			Issue 003



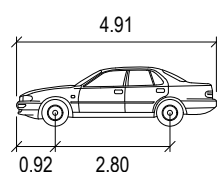
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003	Swept Path Analysis	C.M	17.06.2019

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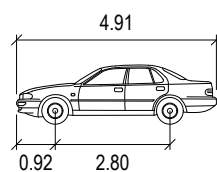
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003	Swept Path Analysis	C.M	17.06.2019

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	Date 17.06.2019		
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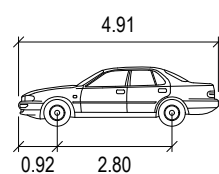
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003	Swept Path Analysis	C.M	17.06.2019

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	FOR INFORMATION ONLY		
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Drop-off Space D3 - Exit	Project Number P3405	Sheet Number 107	Issue 003



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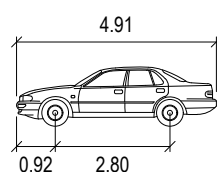
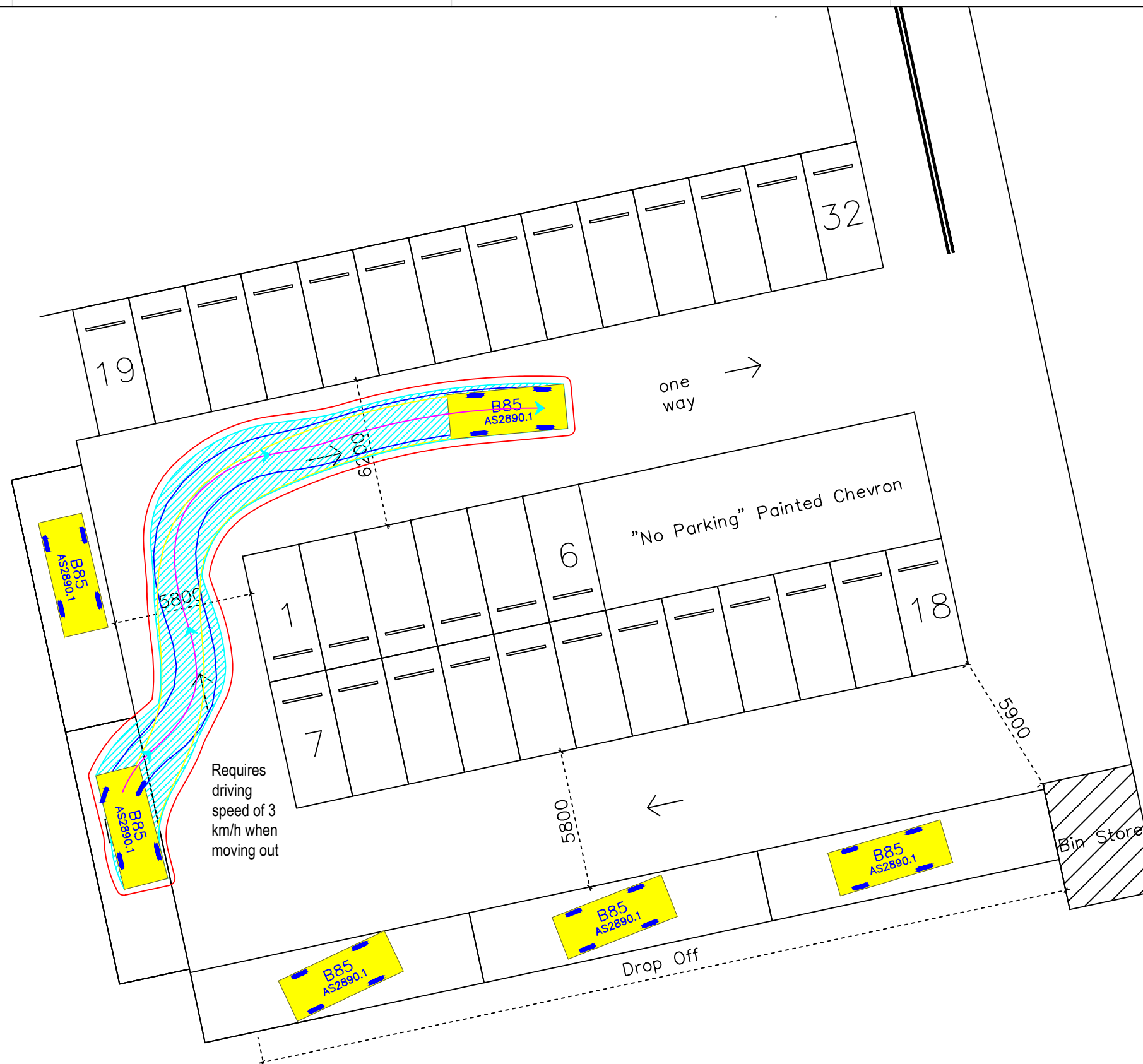
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003	Swept Path Analysis	C.M	17.06.2019

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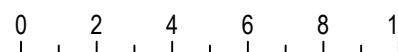
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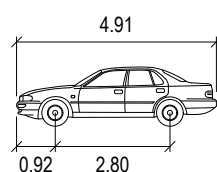
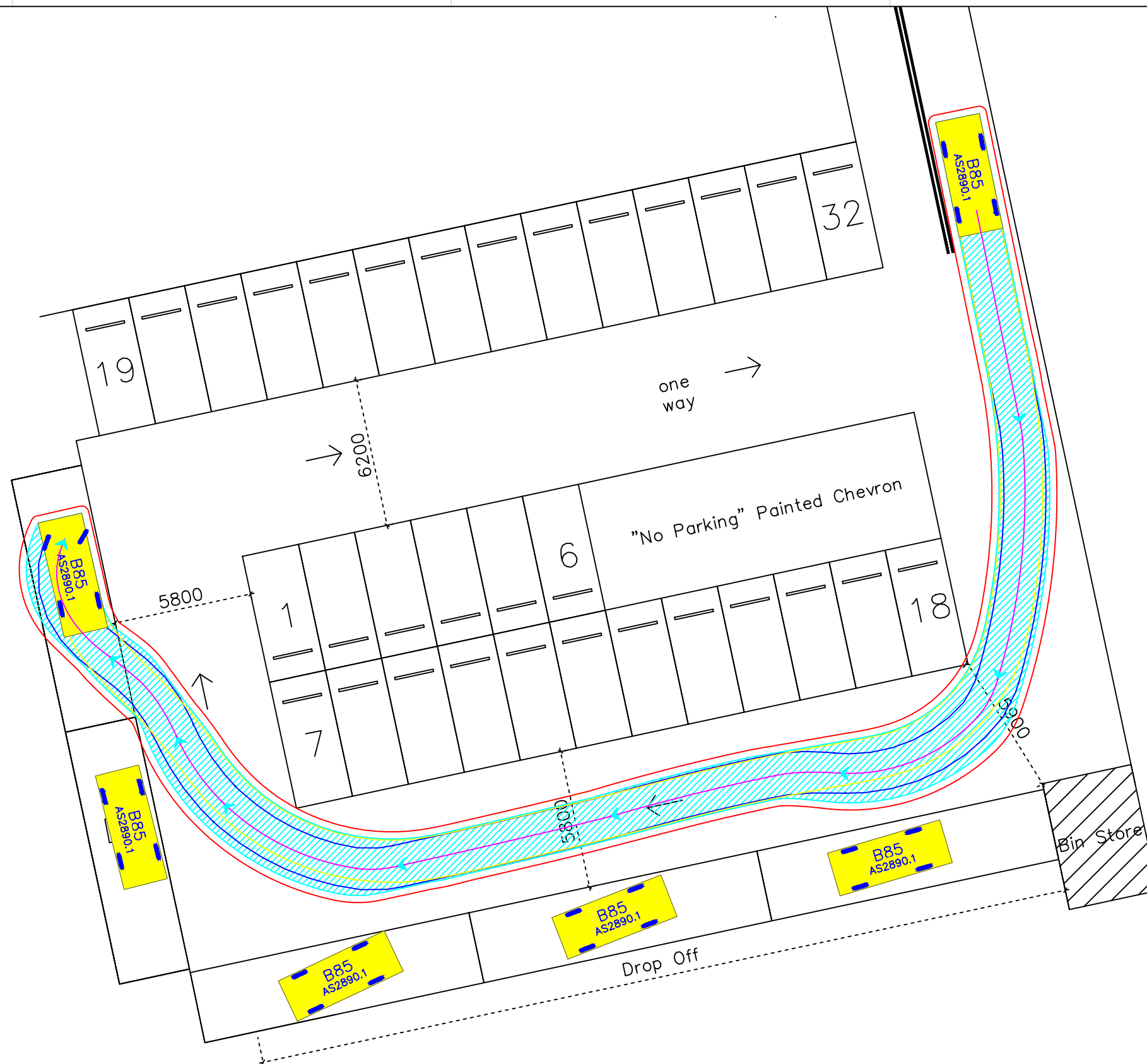
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			Issue 003



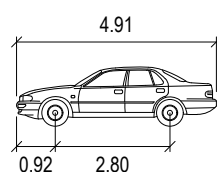
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003	Swept Path Analysis	C.M	17.06.2019

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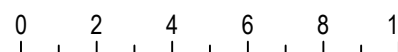
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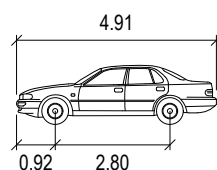
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DESIGN VEHICLE

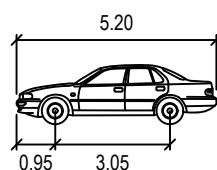
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003	Swept Path Analysis	C.M	17.06.2019

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	FOR INFORMATION ONLY		
Title Temporary Carpark Swept Path Analysis Drop-off Space D5 - Exit	Project Number P3405	Sheet Number 111	Date 17.06.2019
			Issue 003



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Track : 1.77
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Steering Angle : 38.5



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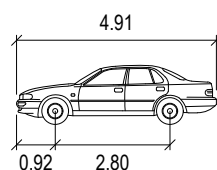
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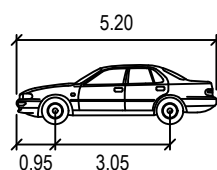
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	FOR INFORMATION ONLY		
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Access Driveway - 1	Project Number P3405	Sheet Number 112	Issue 003



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Lock to Lock Time : 6.0
Steering Angle : 38.5

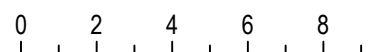


B99 meters
Width : 1.94
Track : 1.84
Lock to Lock Time : 6.0
Steering Angle : 38.0

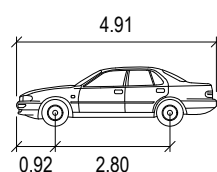
DESIGN VEHICLE



REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

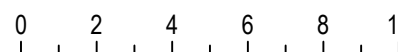
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Access Driveway - 2	Project Number P3405	Sheet Number 113	Issue 003



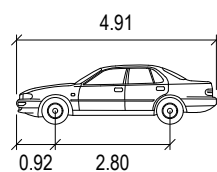
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

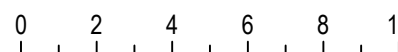
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Title Temporary Carpark Swept Path Analysis Space 18 - Reverse Entry	Project Number P3405	Sheet Number 114
			Date 17.06.2019
			Issue 003



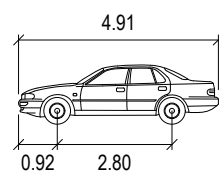
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Space 14 - Reverse Entry	Project Number P3405	Sheet Number 115	Issue 003

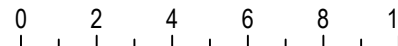


B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

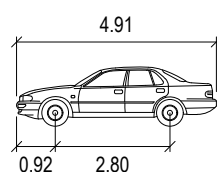
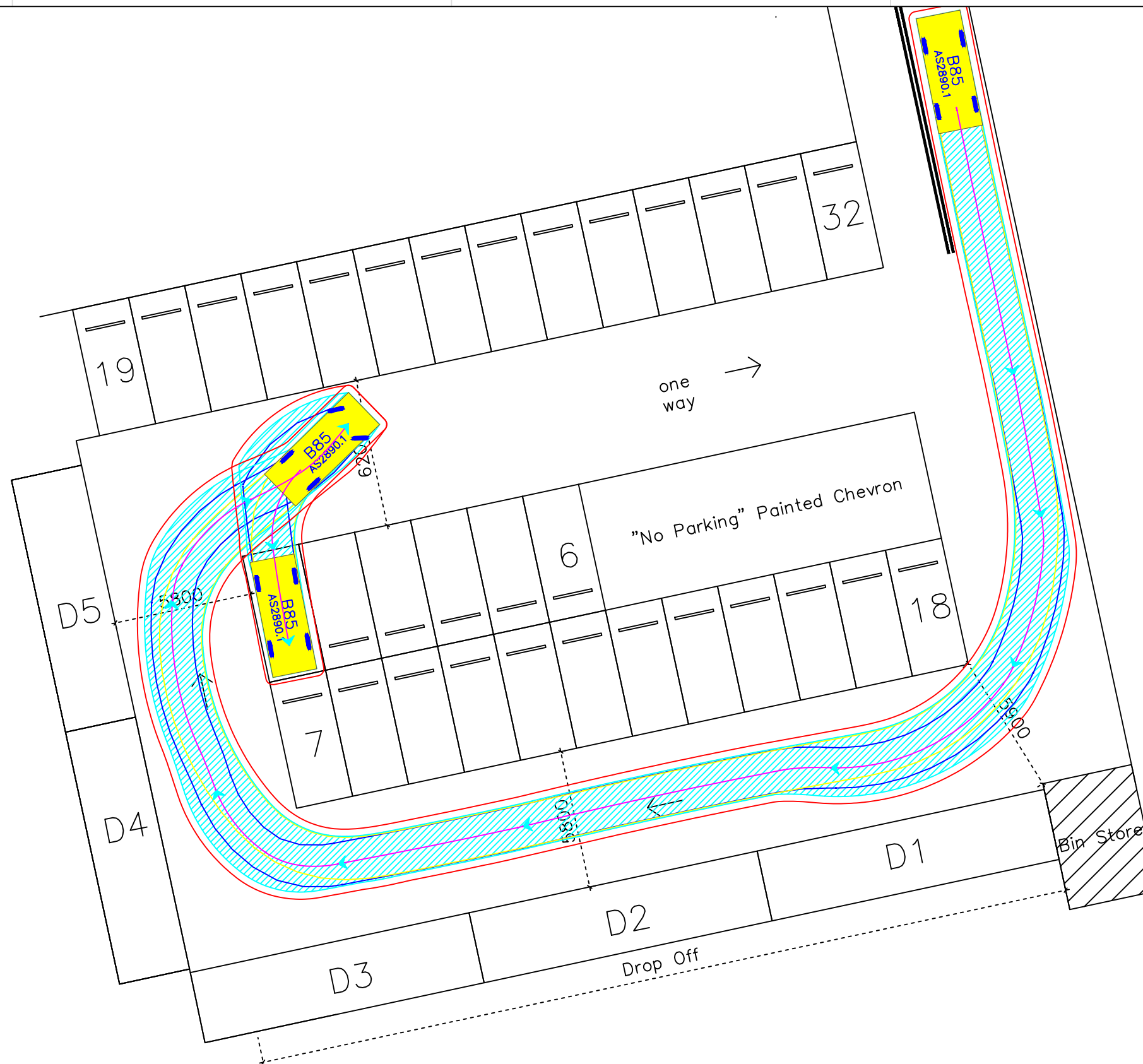
DESIGN VEHICLE



REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

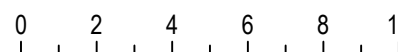
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
Title Temporary Carpark Swept Path Analysis Space 7 - Reverse Entry	Project Number P3405	Sheet Number 116	Date 17.06.2019
			Issue 003



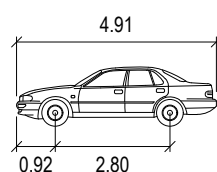
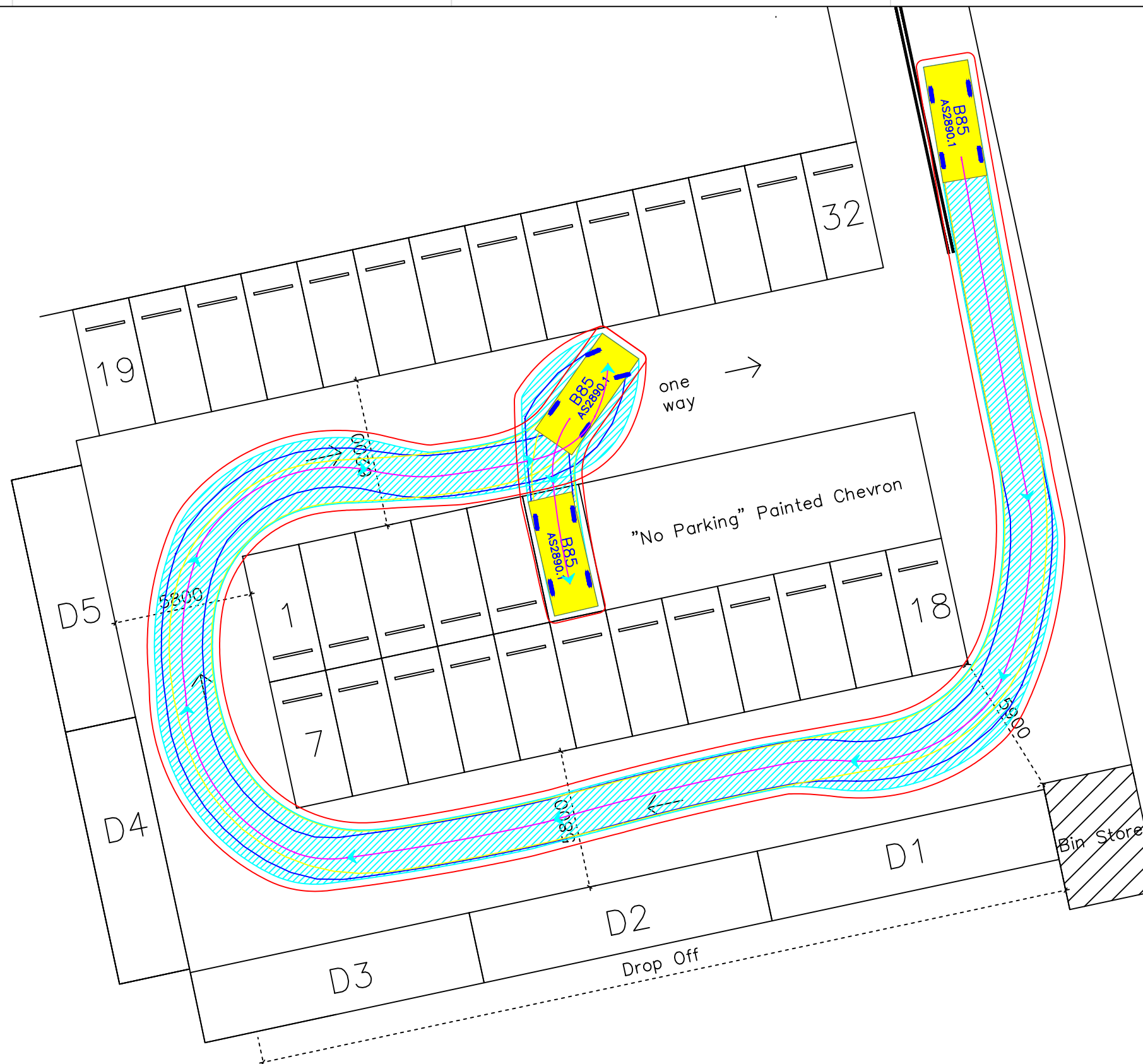
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

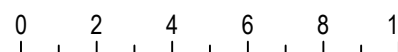
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Title Temporary Carpark Swept Path Analysis Space 1 - Reverse Entry	Project Number P3405	Sheet Number 117
		Issue 003	Date 17.06.2019



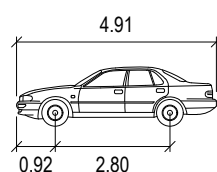
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS		Drawn	Date
Issue	Revisions/Descriptions		
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

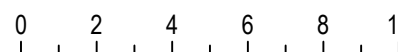
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
Title Temporary Carpark Swept Path Analysis Space 6 - Reverse Entry	Project Number P3405	Sheet Number 118	Date 17.06.2019
			Issue 003



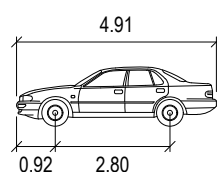
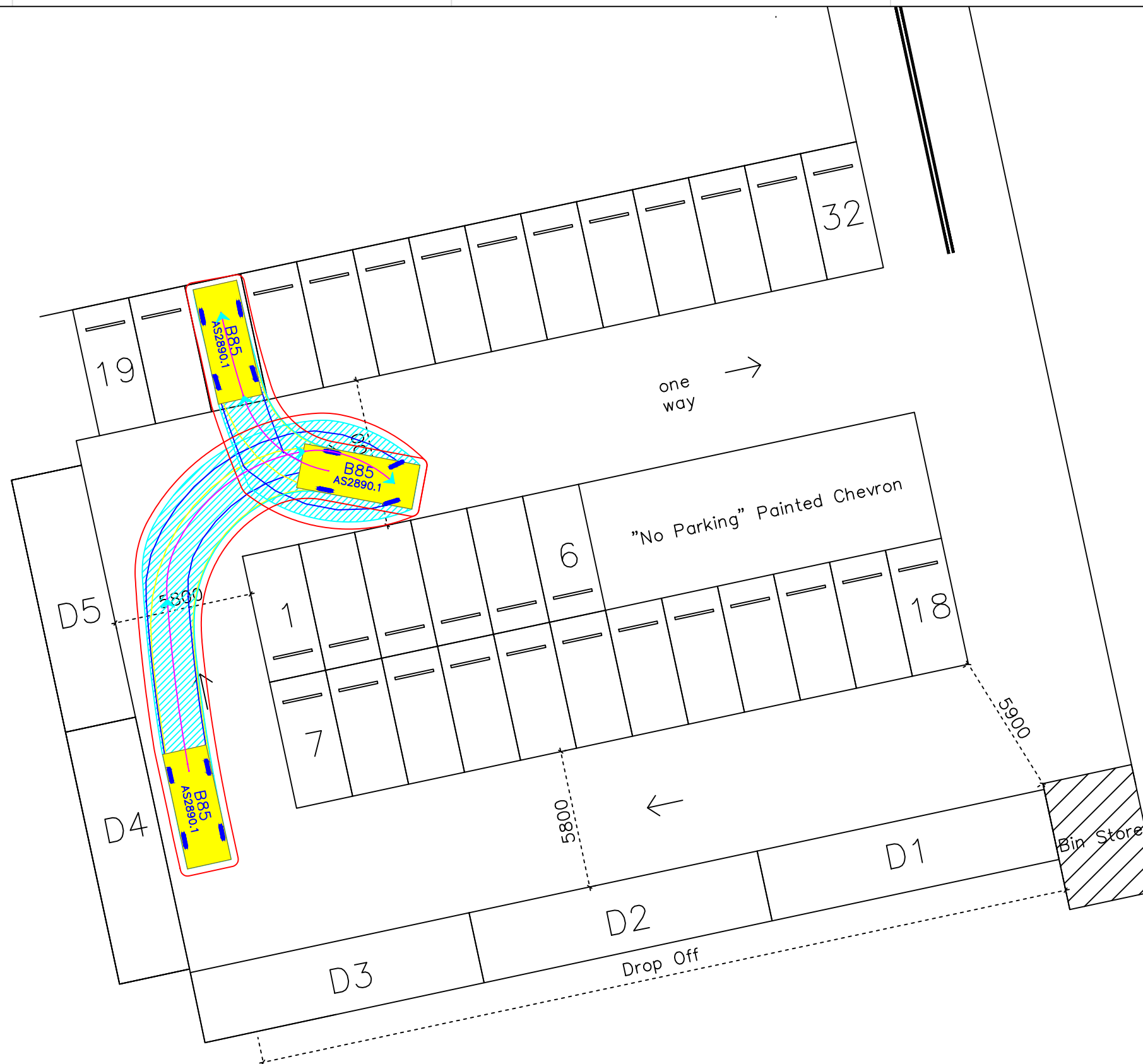
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS		Drawn	Date
Issue	Revisions/Descriptions		
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

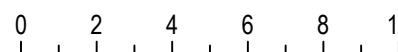
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
Title Temporary Carpark Swept Path Analysis Space 19 - Forward Entry & Reverse Exit	Project Number P3405	Sheet Number 119	Date 17.06.2019
			Issue 003



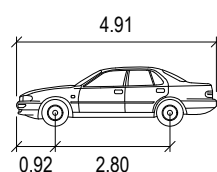
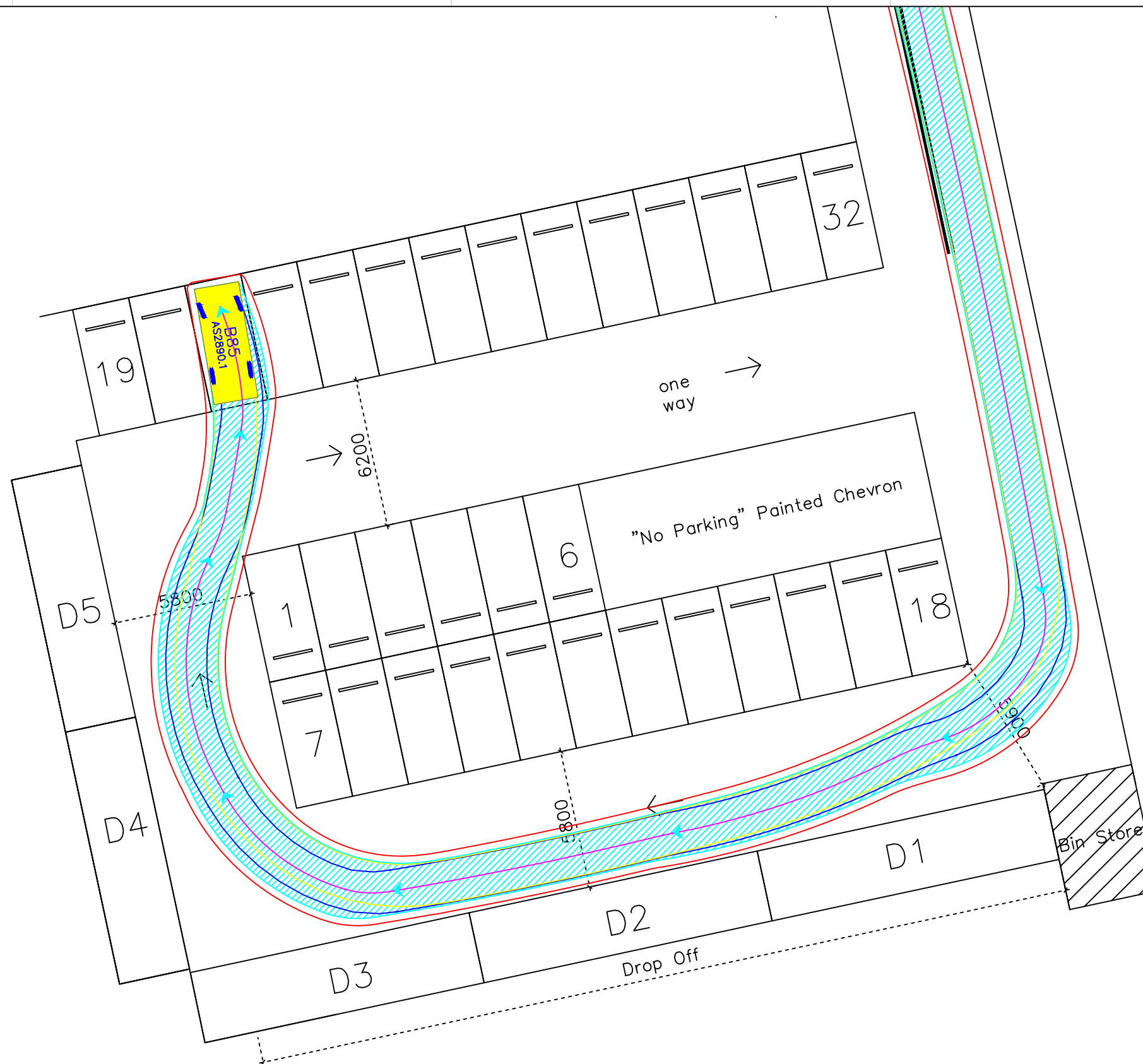
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

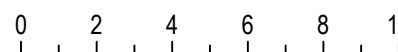
Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Space 21 - Reverse Entry	Project Number P3405	Sheet Number 120	Issue 003
	FOR INFORMATION ONLY		



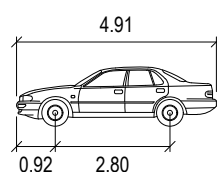
B85 meters
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Date 17.06.2019		
Title Temporary Carpark Swept Path Analysis Space 21 - Forward Entry	Project Number P3405	Sheet Number 121	Issue 003

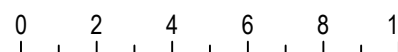


B85 meters

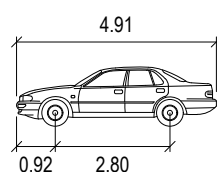
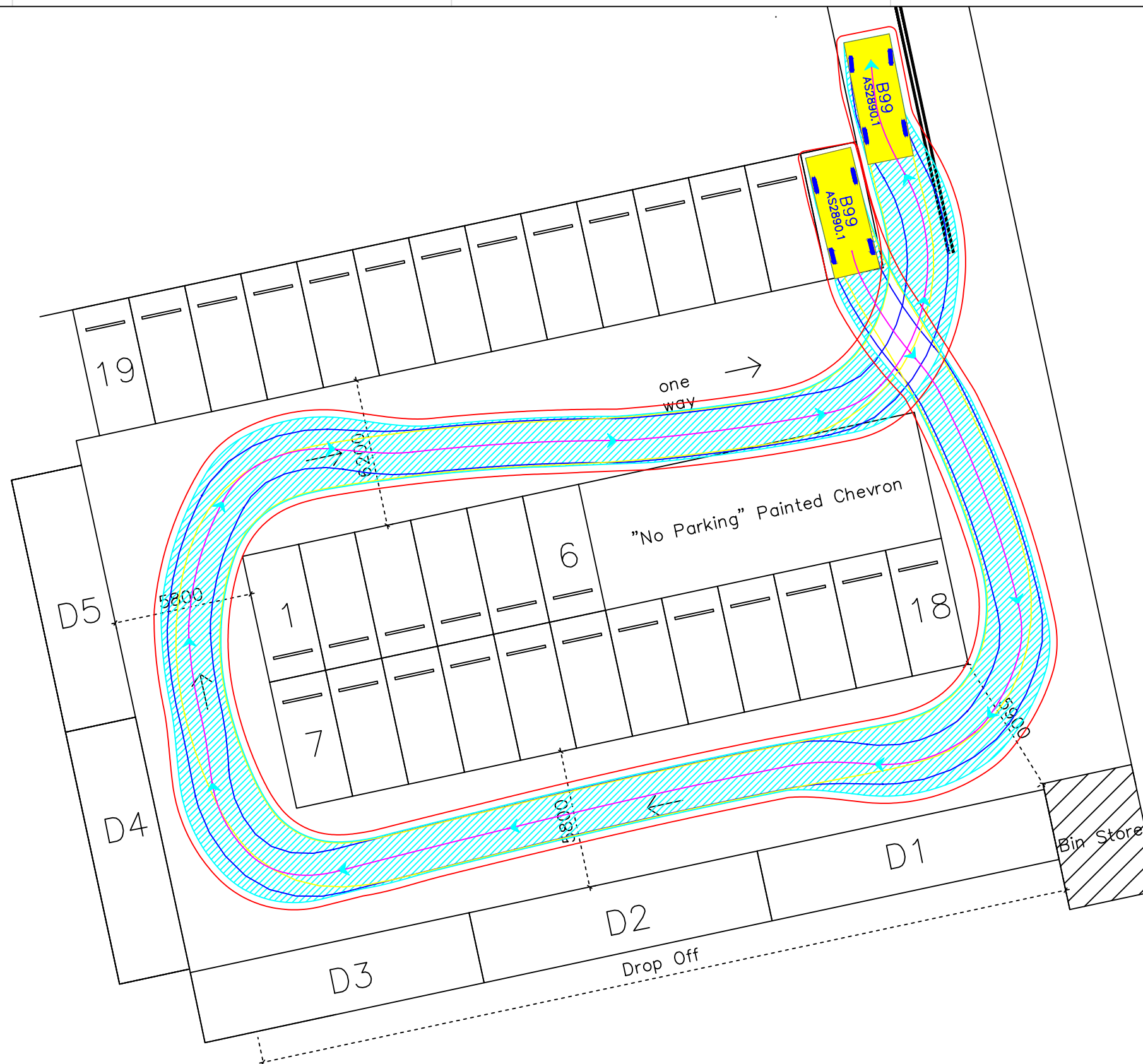
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Title Temporary Carpark Swept Path Analysis Space 32 - Reverse Entry	Project Number P3405	Issue 003
		Sheet Number 122	Date 17.06.2019

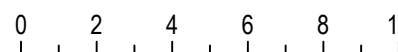


B85 meters

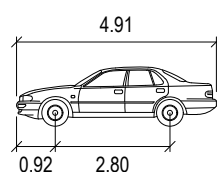
Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
	Title Temporary Carpark Swept Path Analysis Space 32 - Forward Exit	Project Number P3405	Issue 003
		Sheet Number 123	Date 17.06.2019

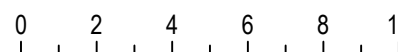


B85 meters

Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 38.5

DESIGN VEHICLE

REVISIONS		Drawn	Date
Issue	Revisions/Descriptions		
001	NOT USED		
002	NOT USED		
003	Swept Path Analysis	C.M	17.06.2019

Scale @ A3  1:200

Project P3405 Schofields Primary School Alex Avenue TIA	Design C.M	Drawn C.M	Checked A.G
	FOR INFORMATION ONLY		
Title Temporary Carpark Swept Path Analysis Space 29 - Forward Exit	Project Number P3405	Sheet Number 124	Date 17.06.2019
			Issue 003