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Sam Crawford Architects
Unit 4, 30 Wilson Street
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Attention: Shane Marshall

Dear Shane,

3 - 5 KELLOWAY AVENUE TRAFFIC AND PARKING IMPACT ASSESSMENT

Cardno now Stantec (Stantec), has been engaged by Sam Crawford Architects on behalf of Land and Housing Corporation (LAHC) to undertake a traffic and parking assessment for the proposed boarding house development located at 3 – 5 Kelloway Avenue, Camden.

The development will occupy a total of 1274m^2 of land from lot 17/DP 219782 and lot 18/DP 219782 combined, which will provide for the boarding house and all required parking and services.

The development site is in the proximity of the Camden South Public School and within 50m of the Old Hume Highway/Kelloway Avenue intersection. School Zone speed limits of 40km/h apply to Kelloway Avenue during the hours of 8-9:30am and 2:30-4pm.

An overview of the development site and its surroundings is shown in **Figure 1-1**.

Figure 1-1 Development site and surrounding environment

For the assessment of traffic and parking, the following reference documents were used:

- AS2890: Australian Standards Parking Facilities;
- Guide to Traffic Generating Developments (Transport for NSW, 2002);
- State Environmental Planning Policy (Housing) 2021;
- Disability (Access to Premises – Buildings) Standards 2010;
- Camden Development Control Plan 2019.

1 Proposed Development

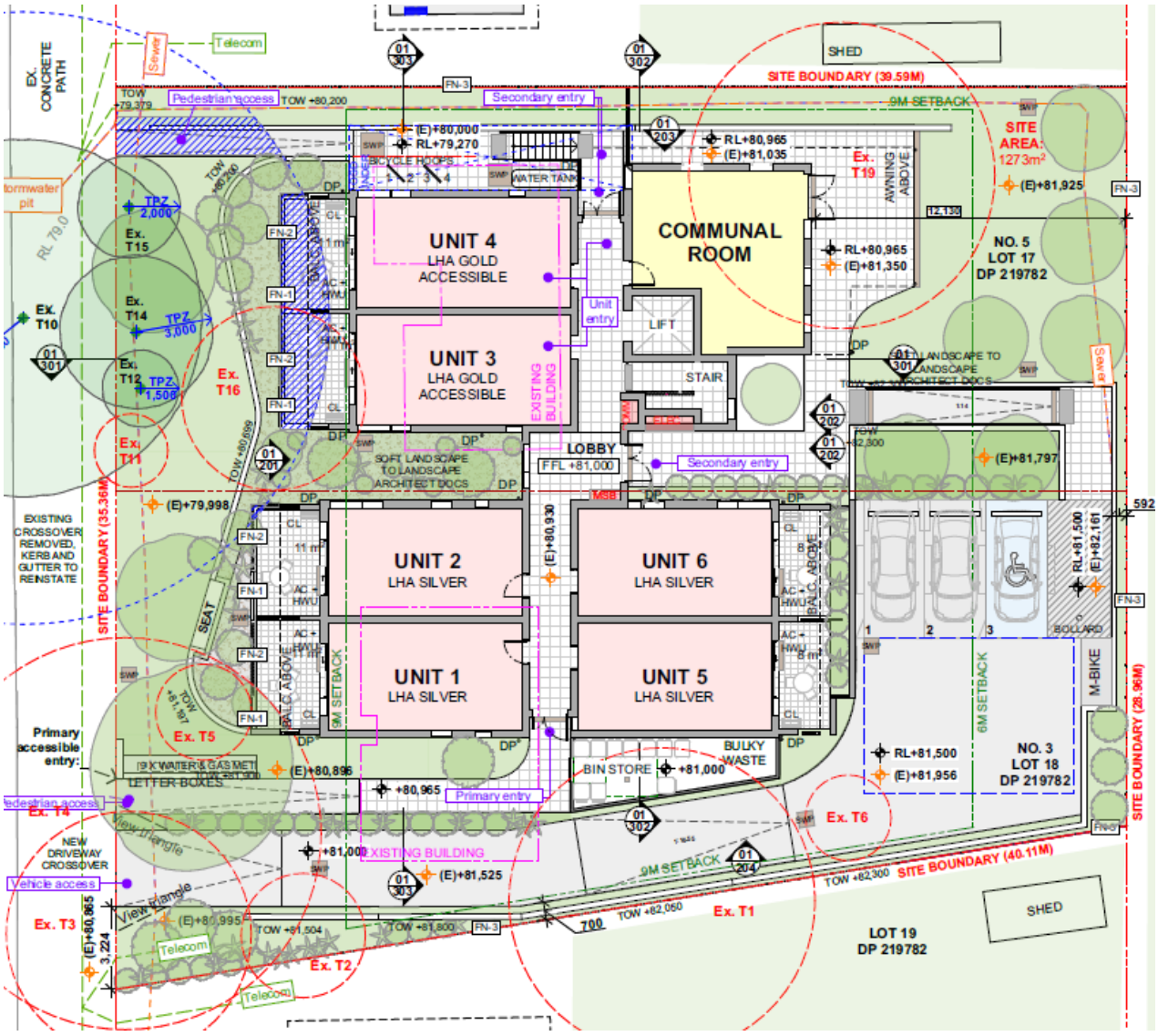
The proposed development involves a 12-unit boarding house construction, with each unit being a single bedroom. 2 of the 12 units will be accessible units and designed to Livable Housing Australia (LHA)'s Gold Level. The remaining 10 units will be designed to LHA's Silver Level.

Key transport-related features associated with the boarding house include:

- 2 standard car parking spaces;
- 1 accessibility parking space;
- 3 motorcycle parking spaces;
- 12 bicycle parking spaces;
- 1 driveway leading to the car parking area from Kelloway Avenue;
- 3 pedestrian entry points into the boarding house, 2 facing Kelloway Avenue and 1 accessible from the carpark area.

Figure 1-2 shows the proposed site layout.

Figure 1-2 Proposed development site layout



2 Parking Assessment

2.1 Council Parking Rate Requirements

The development site is within Camden Council and is subject to their planning controls. The *Camden Council 2019 DCP Section 2.18.2* states that the parking rates for a boarding house should follow the *State Environmental Planning Policy (Affordable Rental Housing) 2009 (AFR SEPP 2009)*.

The Affordable Rental Housing SEPP has been superseded by the *State Environmental Planning Policy (Housing) 2021 (Housing SEPP 2021),* and rates from the updated document have been adopted.

2.1.1 Car Parking Rates

Chapter 2, Division 2 clause 24 of the Housing SEPP states the following requirements:

"If a relevant planning instrument does not specify a requirement for a lower number of parking spaces—at least supply the following number of parking spaces

(i) for development on land within an accessible area—0.2 parking spaces for each boarding room,

(ii) otherwise—0.5 parking spaces for each boarding room"

The definition of an accessible area in the housing SEPP is the land within 400m walking distance of a bus stop used by a regular bus service that has at least 1 bus per hour servicing the bus stop between

- 6am and 9pm each day from Monday to Friday, both days inclusive, and
- 8am and 6pm on each Saturday and Sunday.

The proposed development is approximately 80m (measured along the footpath) from the Camden South Public School, Old Hume Highway bus stop. Services depart from the Old Hume Highway bus stop at a frequency of 1 bus per 10 – 20 minutes on weekdays and 1 bus per hour on weekends, as such the development is within an accessible area, and will follow the parking rates for an accessible area.

Therefore, based on the above rates, the car parking requirement for the proposed development is summarised in **Table 2-1**.

Table 2-1 Car Parking Requirements

Land Use	Parking Rates	Required Parking	Parking Provided	Assessment Outcome
Boarding House: 12 single occupancy rooms	0.2 parking spaces for each boarding room.	3 parking spaces	3 parking space (including one disabled)	✓ satisfies requirement

2.1.2 Accessible Parking Rates

The Council DCP does not provide disabled car parking rates for boarding houses. Under section 2.18.2 of the DCP it is though stated that parking provision must comply with the Building Code of Australia.

Reference was made to *Section D3.5* of the *Disability (Access to Premises – Buildings) Standards 2010*, the following accessible parking requirements are listed for boarding houses:

"To be calculated by multiplying the total number of carparking spaces by the percentage of:

(a) accessible sole-occupancy units to the total number of sole-occupancy units; or

(b) accessible bedrooms to the total number of bedrooms; and

the calculated number is to be taken to the next whole figure".

The development proposes 2 accessible units out of 12, the car parking requirement for the proposed development the rate to be multiplied by for accessible parking is 0.17. The accessible parking rates assessment is present as per **Table 2-2.**

Table 2-2 Accessible Parking Requirements

Parking Rates	Required Parking	Parking Provided	Assessment Outcome
0.17 of total parking to be accessible parking	1 Accessible parking	1 accessible parking space	✓ satisfies requirement

2.1.3 Bicycle and Motorbike Parking Rates

In accordance with Chapter 2, Division 2 clause 25 of the Housing SEPP 2021, section (1)(i) states that

"the boarding house will include adequate bicycle and motorcycle parking spaces".

Based on advice provided by LAHC, it has been determined that the bicycle and motorbike parking required is as listed in **Table 2-3.**

Table 2-3 Parking Rate Requirement and Supply Comparison

Parking Rates	Required Parking	Parking Provided	Assessment Outcome
Adequate number of bicycle parking spaces (as determined by LAHC)	4 bike parking spaces	4 bike parking spaces	✓ satisfies requirement
Adequate number of motorcycle parking spaces (as determined by LAHC)	1 motorcycle parking space	1 motorcycle parking space	✓ satisfies requirement

2.2 Design Requirements

Camden Council DCP Section 2.18.2 specifies that parking design must comply with the relevant Australian Standards, hence a review of the parking against Australian Standards has been conducted. The review includes an assessment of parking dimensions, placement and access.

2.2.1 Car Parking Design

In accordance with AS/NZS 2890.1:2004, User Class 1A parking is used for residential, domestic and employee parking requirements and User Class 4 parking is used for parking requirements of people with disabilities with restrictions specified in AS/NZS2890.6:2009.

Key car parking design requirements for the User Classes in accordance with AS/NZS 2890.1:2004 and AS/NZS2890.6:2009 respectively are as follows:

- User class 1A parking dimension for 90-degree parking to a wall or high kerb not allowing overhang is 5400mm (L - length) x 2400mm (W - width);
- User class 1A minimum aisle width is 5800m.
- Accessible car spaces must be accompanied by a shared area of 5400mm (L - length) x 2400mm (W - width) to one side (left or right) of the designated parking and 2400mm (L - length) x 2400mm (W - width) to one end (front or rear) of the designated parking;
- For accessible car spaces, bollards are to be provided to prohibit parking within the shared zone.
- The maximum gradient within a parking module including a motorcycle parking area shall be 1 in 20 (5%) measured parallel to the angle of parking, 1 in 16 (6.25%) measured in any other direction. The minimum gradient shall be 1 in 100(1.0%) for outdoor areas for drainage.

The car parking proposed in the development was assessed against the criteria listed above, the outcomes of the assessment are shown in **Table 2-4.**

Table 2-4 Car Parking Design Assessment

Design Aspect	Development Provision	Assessment Outcome
Car Park Space User class 1A	▪ Parking Dimension: 5400mm (L) x 2400mm (W); ▪ Aisle Width 5800mm.	▪ Parking dimension satisfactory; ▪ The aisle width is satisfactory.
Car Park Space User class 4 (accessible parking)	▪ Dimension: 5400mm (L) x 2400mm (W); ▪ Shared Zone: 5400mm (L) x 2400mm (W) to the right, 2400mm (L) x 2400mm (W) non-marked share area available at rear.	▪ Parking dimension satisfactory; ▪ Shared zone satisfactory; ▪ Bollard in shared zone is satisfactory.
Car Park Gradient	▪ Maximum gradient 1 in 20 (5%) measured parallel to the angle of parking; ▪ Maximum gradient 1 in 16 (6.25%) measured in any other direction not parallel to angle of parking; ▪ Minimum gradient shall 1 in 100(1.0%) for outdoor parking modules for drainage.	▪ Relatively flat and considered satisfactory

Based on the outcomes shown in the table above the carpark dimensions satisfy the AS2890.1 design requirements.

2.2.2 Car Park Access

With regard to the car park access *AS2890.1:2004* specifies the following requirements for car parking access width and gradient:

- For a carpark with less than 25 spaces accommodating user class 1A, the entry width shall be 3.0m – 5.5m depending on traffic generation. Driveway separation will not be required.

- The maximum gradient of associated access driveway across a property line or building alignment shall be 1 in 20 (5%) and across a footpath. For straight ramps in private or residential carparks longer than 20m, maximum permissible grade is 1in 5 (20%). Changes in gradient shall not exceed 12.5% (1 in 8) for summit grade changes;
- As a guide, 30 or more movements in a peak hour (in and out combined) would usually require provision for two vehicles to pass on the driveway, i.e. a minimum of width of 5.5m
- A 2.0m x 2.5m splay is required for pedestrian sightlines on both sides of the driveway.

The car parking access was assessed against the criteria listed above, the outcomes of the assessment are shown in **Table 2-5.**

Table 2-5 Car Park Access

Design Aspect	AS2890.1 Requirement	Development provision	Assessment Outcome
Access Path	▪ Entry width 3.0m – 5.5m, no separation required. ▪ Maximum gradient of associated access driveway shall be 1 in 20 (5%) and across a footpath; ▪ Maximum gradient for Straight ramps of private & residential carparks longer than 20m shall be 1 in 5 (20%); ▪ Grade changes shall not exceed 12.5% (1 in 8) for summit grade changes;	▪ Driveway width 3.0m with no separation. ▪ Driveway access gradient 1: 29.55; ▪ Straight ramp with changing gradients, maximum gradient 1:16.1 ▪ Grade changes from 1:29.55 to 10m flat zone then 1:16.1 slope. ▪ Development will generate very low volumes of traffic ▪ Pedestrian splays provided	▪ Access path width satisfactory for minimum width ▪ Driveway maximum gradient and gradient changes satisfactory.

The dimensions of the driveway satisfy minimum requirements, which will allow for one-way traffic only at any one time. The traffic generated by the development as presented in **Section 3** is relatively low and this minimum width can be considered satisfactory, as the driveway is sufficient for the development needs as assessed against development requirements for dimensions and gradient.

Swept paths for B85 passenger vehicle circulation in the parking area are shown in **Appendix A**.

2.2.3 Motorcycle Parking

The motorcycle parking within the development area shares the same driveway entry as the carparking spaces, as such assessment of the motorcycle parking design will focus on the parking space only as the parking access has been evaluated above.

In accordance with AS/NZS 2890.1:2004, key motorcycle parking design requirements for parking spaces are as follows:

- The design space of a motorcycle shall follow the dimensions of 2500mm (L - length) x 1200mm (W - width);
- The maximum gradient within a parking module including a motorcycle parking area shall be 1 in 20 (5%) measured parallel to the angle of parking, 1 in 16 (6.25%) measured in any other direction. The minimum gradient shall be 1 in 100(1.0%) for outdoor areas for drainage;
- Motorcycle parking areas should not be located so that parked motorcycles are vulnerable to being struck by a manoeuvring car.

The proposed development has one motorcycle parking space near the parking area, as seen in **Figure 1-2**.

Assessment of the requirements for the motorcycle parking spaces against AS2890.1:2004 is shown in **Table 2-6.**

Table 2-6 Motorcycle Parking Design Requirement

Design Aspect	Development Provision	Assessment Outcome
Motorbike Parking Dimension: ▪ 2500mm (L) x 1200mm (W)	Parking Dimension: ▪ 2500mm (L) x 1200mm (W)	▪ Dimension Satisfactory
Gradient: ▪ Maximum gradient 1 in 20 (5%) measured parallel to the angle of parking; ▪ Maximum gradient 1 in 16 (6.25%) measured in any other direction not parallel to angle of parking; ▪ Minimum gradient shall 1 in 100(1.0%) for outdoor areas for drainage.	▪ Relatively flat	▪ Satisfactory
Location: ▪ Not vulnerable to being struck by a manoeuvring car.	▪ Indented away from car circulation	▪ Satisfactory

2.2.4 Bicycle Parking and Access

In accordance with AS2890.3:2015, key bicycle parking design requirements are as follows:

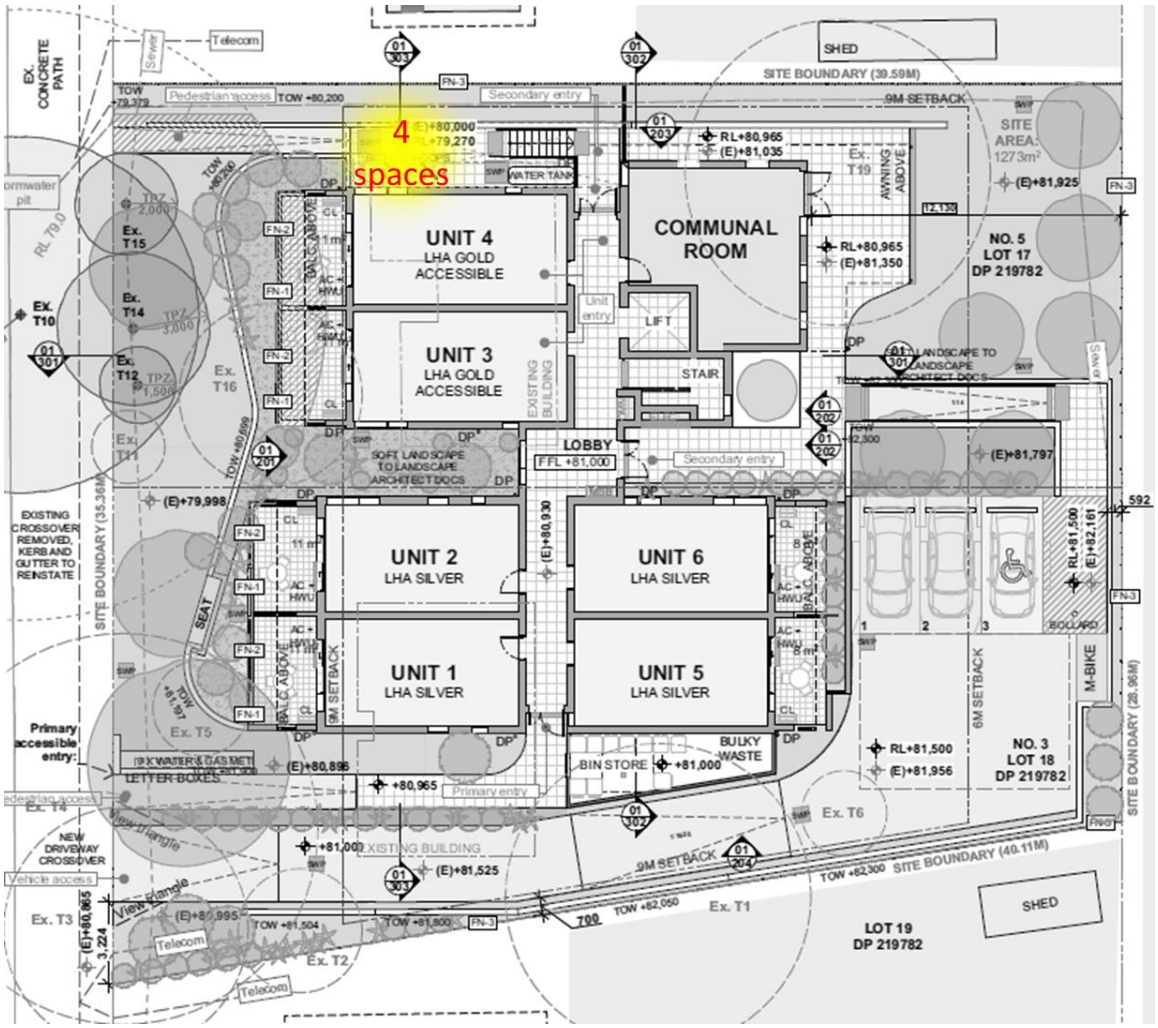
> Dimension: The design space of a standard bicycle shall follow the dimensions of 1800mm (L - length) x 1200mm (H - height) x 500mm (W - width);

> Access: Access path width for a low-speed cyclist or pedestrian pushing a bicycle shall be 1500mm for one-way access or 2500mm for two-way access. Ramp gradient should be limited to 1:12 where possible for ease of bicycle accessibility;

> Location: All bicycle parking should be accessible from a road, driveway or footpath via a bicycle-friendly access path, away from the desired walking line of pedestrians and as close as possible to the cyclist's destination.

The proposed development has one allocated bicycle parking area which is street access via a footpath, as seen in the following figure.

Figure 2-1 Bicycle Parking Locations



The area is located within the boarding house and is thus considered satisfactory in regards to the placed location.

Assessment of the dimensional requirement for the bicycle parking area against AS2890.3:2015 is shown in **Table 2-7.**

Table 2-7 Bicycle Parking Design Requirement

Assessment Criteria	Development Provision	Assessment Outcome
Parking Dimension: 1800mm (L) x 500mm (W)	Parking Dimension: ▪ 1800mm (L) x 500mm (W)	▪ Dimension satisfactory
Access Path: ▪ 1500mm one -way or 2500mm two–way; ▪ Ramp gradient limited to 1:12 where possible.	▪ 1.5m paths ▪ 1:20 (5%) gradients	▪ Dimension satisfactory

3 Traffic Generation

Traffic generation for the development has been calculated following the *Guide to Traffic Generating Developments (TfNSW, 2002)*.

The guide provides traffic generation rates based on survey results. Boarding house does not have a specific generation rate within the guide, however, the scale of the proposed development does fit the medium density residential flat building category which is defined as a building containing at least 2 but less than 20 dwellings.

The development includes 12 single-occupancy units within the boarding house, the corresponding traffic generation rate from Section 3.3.2 of the guide for smaller units and flats up to 2 bedrooms are specified below:

Medium Density Residential Flat Buildings (TfNSW Guide to Traffic Generating Developments 2002)

4 – 5 daily vehicle trips per dwelling

0.4 – 0.5 weekday peak-hour vehicle trips

Based on the above rates, there will be a total of 60 daily vehicle trips generated from the development, with a maximum of 5 trips in peak hours. Howeverm, this is considered to be conservative given the low level car ownership and parking provision on-site compared to typical residential flat buildings and occupants.

Calculated trip generation is minor at peak hours and thus shall not significantly impact traffic on the surrounding road network.

The TfNSW guidelines also specify that the traffic generation of public housing may be lower than the rates listed, and thus the adopted 5 peak hour trips are considered to be conservative.

4 Conclusion

Cardno, now Stantec (Stantec), has been engaged by Sam Crawford Architects to undertake a traffic and parking assessment for the proposed boarding house development located at 3 – 5 Kelloway Avenue, Camden.

- The proposal provides 3 car parking spaces including 1 accessible car space which satisfies the Camden Council DCP parking requirements. The proposal meets the bicycle and motorbike parking requirements.
- The carpark dimensions satisfy the AS2890.1:2004 design requirement, but gradients will need to be marked up for the car spaces satisfying minimum and maximum gradient requirements.
- The accessible carpark dimensions satisfy the AS2890.6:2009 design requirement.
- The dimensions of the driveway satisfy the AS2890.1:2004 requirement, which will allow for one-way traffic at any one time.
- The proposed motorcycle dimensions satisfy the AS2890.1 requirement.
- Bike parking spaces satisfy AS2890.3:2015 requirements.
- The traffic generated from the development will be 60 vehicles trips per day, with 5 vehicle trips at peak hours, which will be of minimal impact on the road network.

Yours sincerely,

Hayden Calvey
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for Cardno
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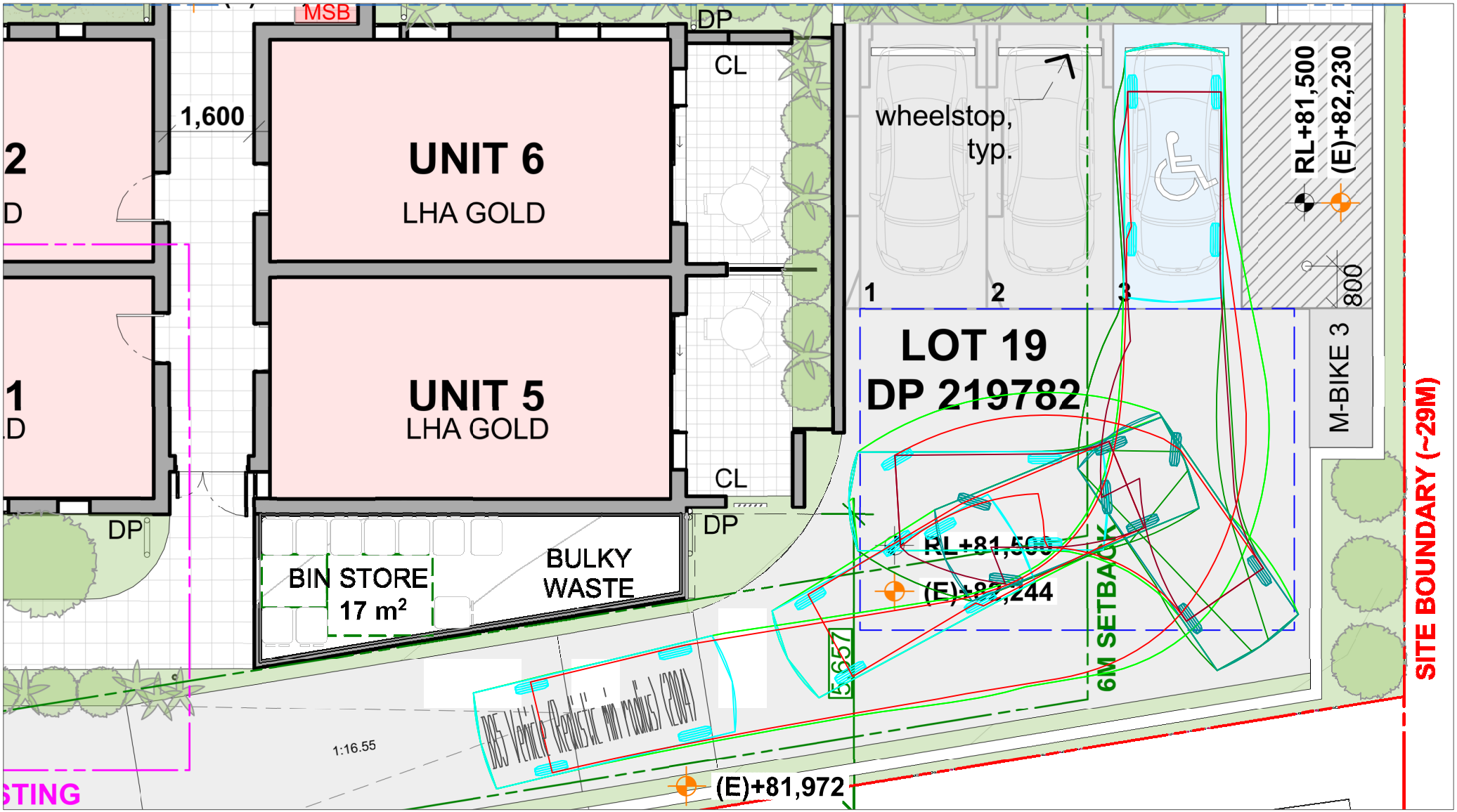
APPENDIX

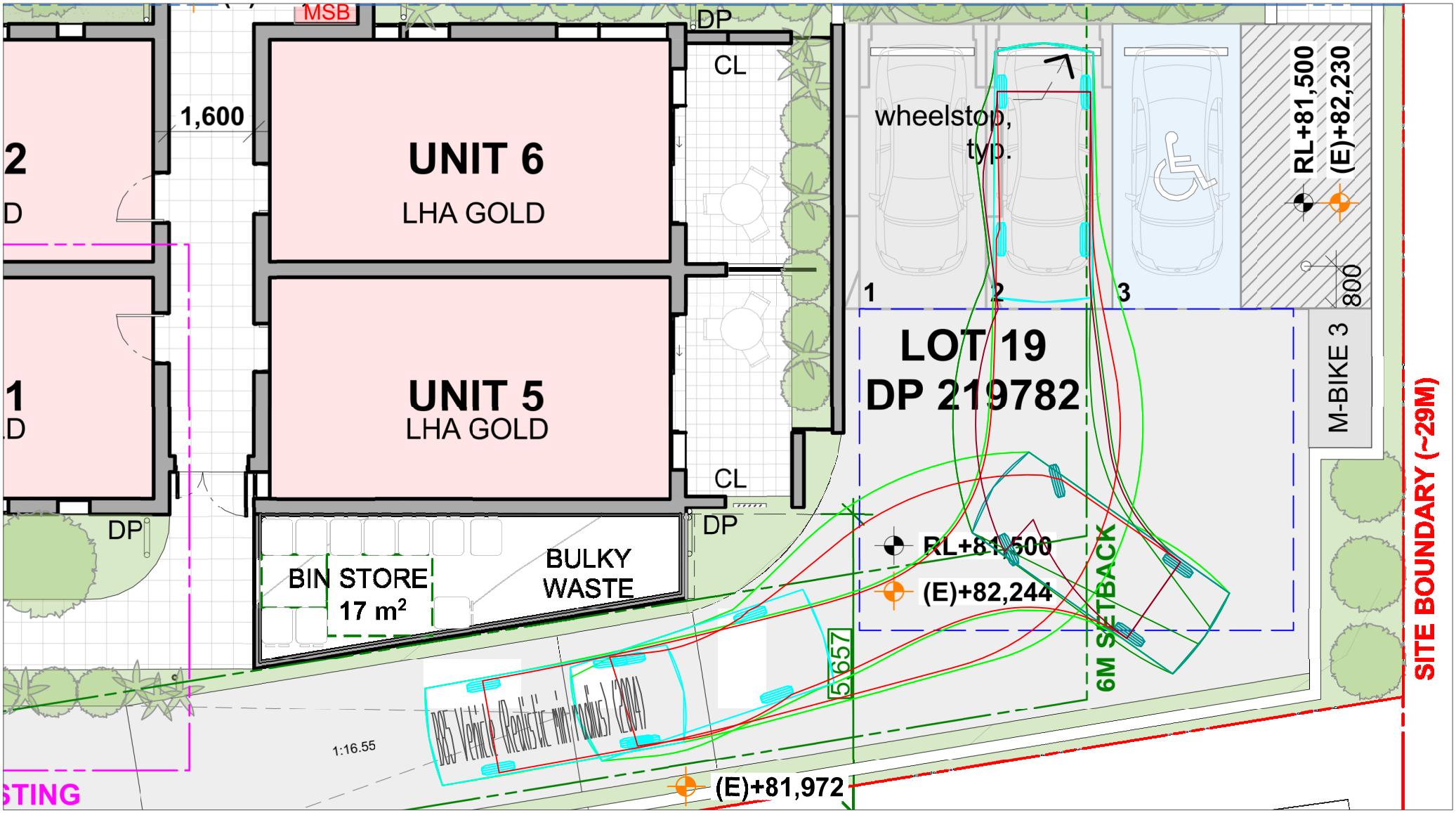
A

Swept Path Analysis

Cardno now Stantec



Scale: 1:100	**VEHICLE LEGEND** VEHICLE WHEEL PATH VEHICLE BODY PATH FORWARD VEHICLE BODY PATH REVERSE	**Preliminary Plan** FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION		Cardno® Shaping the Future Stantec Australia Pty Ltd | ABN 17 007 820 332 Level 9, The Forum, 203 Pacific Highway St. Leonards, NSW 2065 Tel: 02 9496 7700 Fax: 02 9439 5170 Web: www.cardno.com.au	Client: Sam Crawford Architects Project: 3 - 5 Kelloway Avenue Traffic Assessment Title: Accessible Parking Space Swept Path B85 Passenger Vehicle 19/08/2022



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VEHICLE LEGEND

- VEHICLE WHEEL PATH
- VEHICLE BODY PATH FORWARD
- VEHICLE BODY PATH REVERSE

Preliminary Plan

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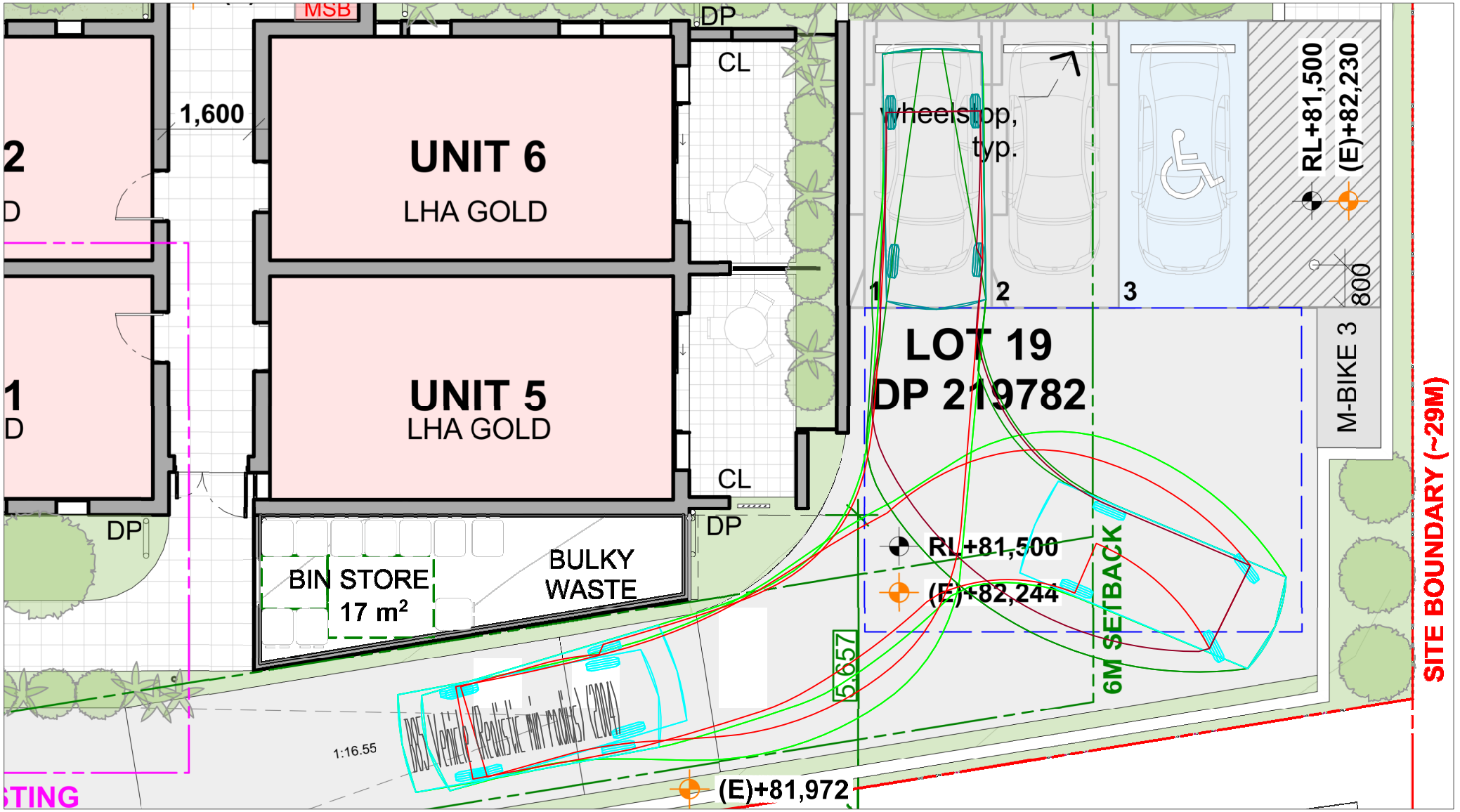
Client: Sam Crawford Architects

Project: 3 - 5 Kelloway Avenue Traffic Assessment

Title: Middle Parking Space Swept Path
B85 Passenger Vehicle
19/08/2022



Scale: 1:100	**VEHICLE LEGEND** VEHICLE WHEEL PATH VEHICLE BODY PATH FORWARD VEHICLE BODY PATH REVERSE	**Preliminary Plan** FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION		Cardno® Shaping the Future Stantec Australia Pty Ltd | ABN 17 007 820 332 Level 9, The Forum, 203 Pacific Highway St. Leonards, NSW 2065 Tel: 02 9496 7700 Fax: 02 9439 5170 Web: www.cardno.com.au	Client: Sam Crawford Architects Project: 3 - 5 Kelloway Avenue Traffic Assessment Title: Left Parking Space Swept Path B85 Passenger Vehicle 19/08/2022