

# ***45 Portman Street, Oakleigh***

Transport Impact Assessment

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20 March 2020

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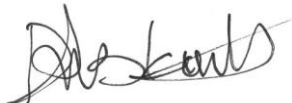
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# 1 INTRODUCTION

onemilegrid has been requested by C&K Architecture to undertake a Transport Impact Assessment of the proposed mixed-use development at 45 Portman Street, Oakleigh.

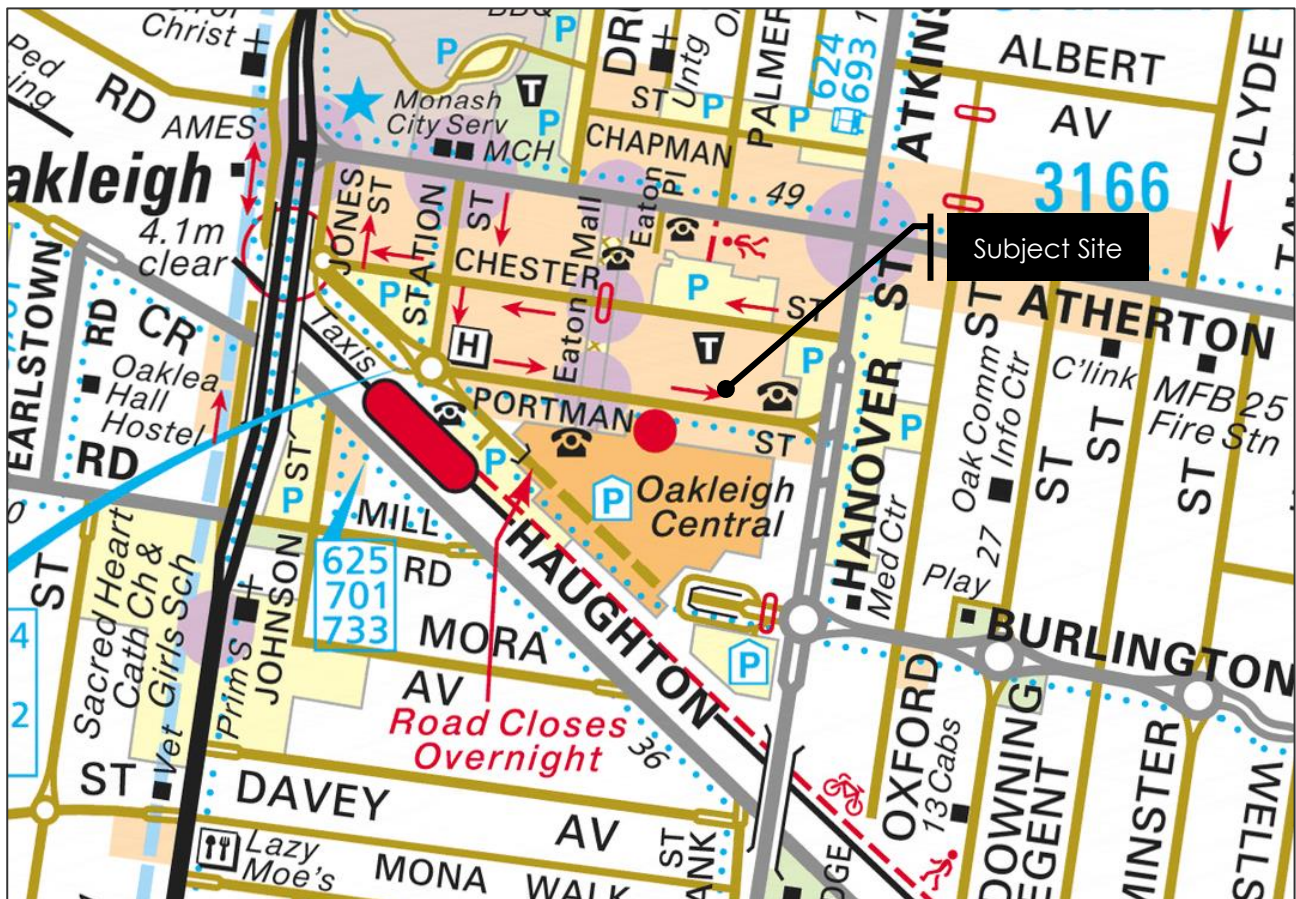
As part of this assessment the subject site has been inspected with due consideration of the development proposal, data has been sourced and relevant background reports have been reviewed.

## 2 EXISTING CONDITIONS

### 2.1 Site Location

The subject site is located at 45 Portman Street, Oakleigh, on the northern side of Portman Street between Hanover Street to the east and Station Street to the west, as shown in Figure 1.

Figure 1 Site Location



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The site is currently occupied by a mixed-use development comprising a ground level retail tenancy fronting Portman Street and residential dwellings to the rear of the site.

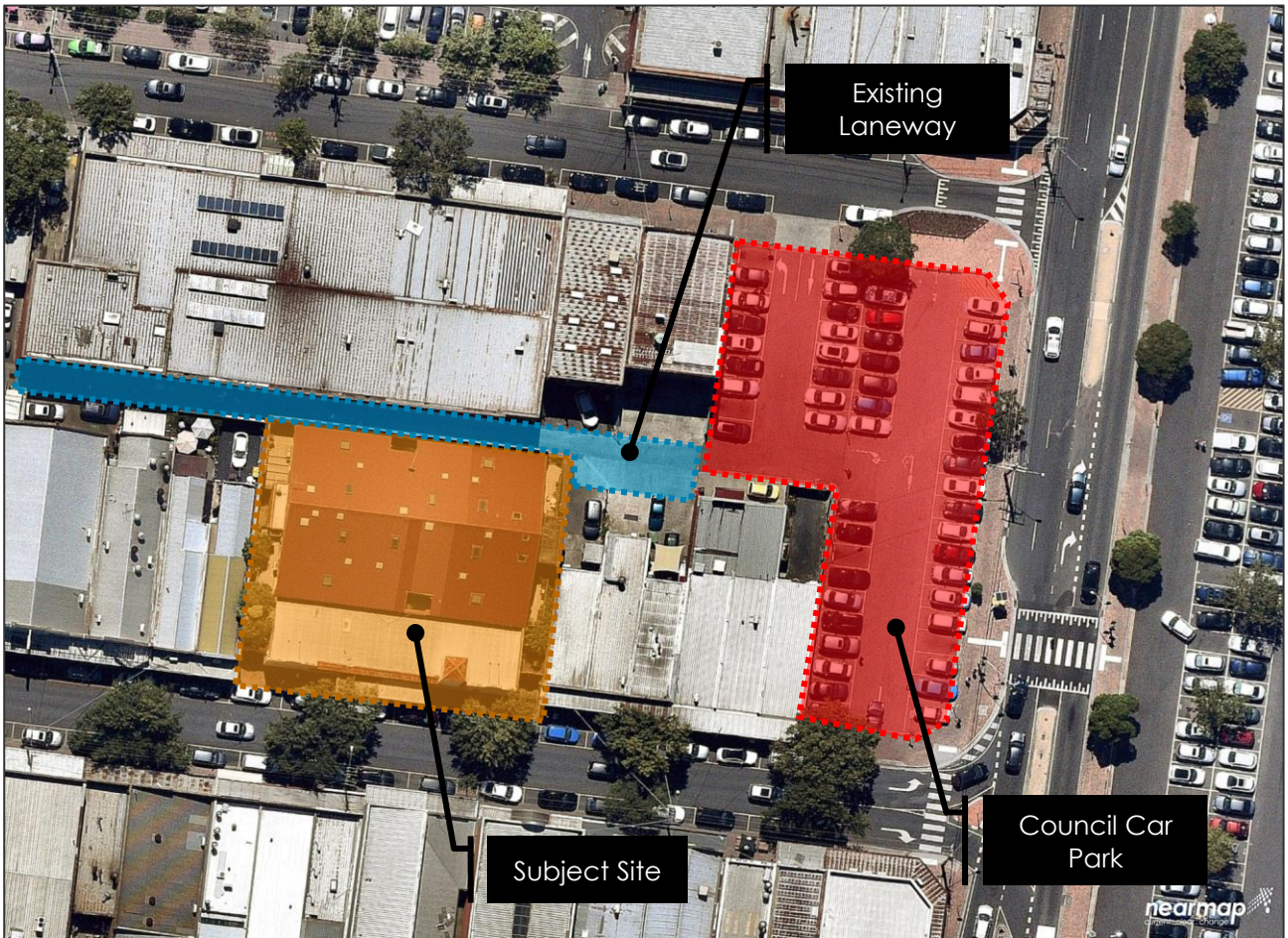
Land use in the immediate vicinity of the site is generally mixed in nature, comprising predominantly commercial and retail uses and includes Oakleigh Central Shopping Centre to the south.

Vehicle access to the site is provided via a laneway to the rear of the site, which connects to Chester Street and Hanover Street via the Council car park.



An aerial view of this arrangement and the subject site is provided in Figure 2.

**Figure 2** Site Context



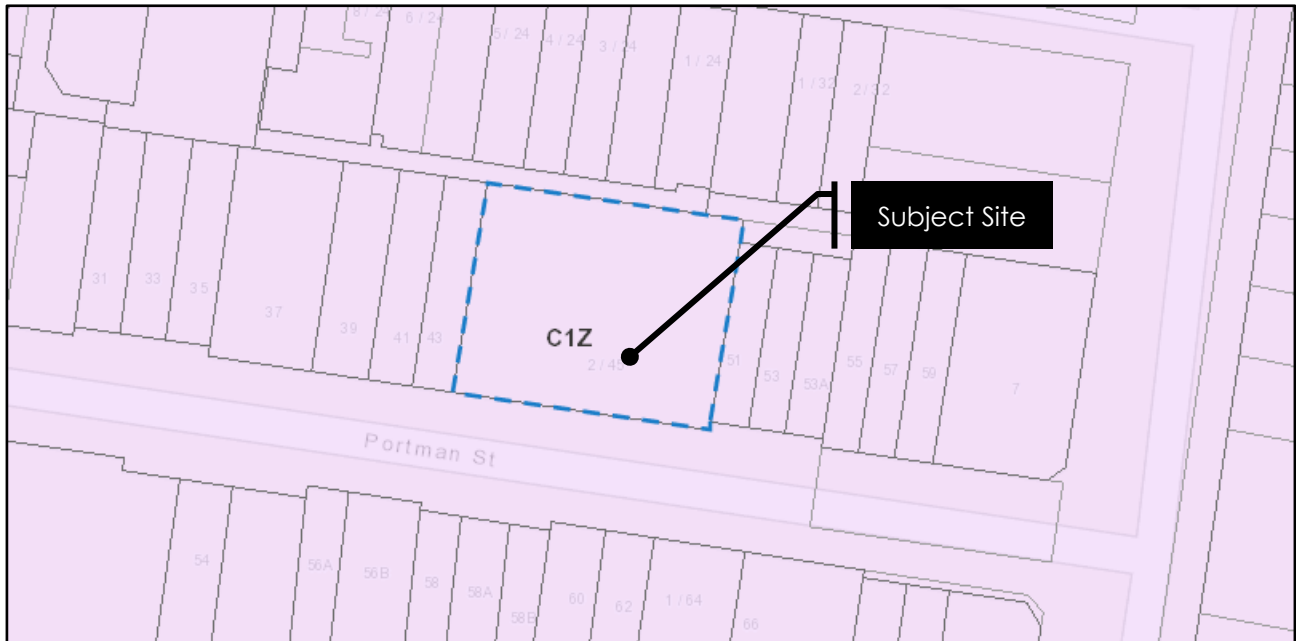
Copyright Nearmap

## 2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a Commercial 1 Zone (C1Z).

It is also noted the site is also located within the Principal Public Transport Network (PPTN) area.

**Figure 3 Planning Scheme Zones**



## 2.3 Road Network

### 2.3.1 Portman Street

Portman Street is a local road generally aligned east-west, running between Hanover Street and Station Street.

Portman Street is a one-way street and provides a single eastbound traffic lane adjacent to the site. Kerbside parking is provided on both sides of the road and is generally time restricted. The default 50km/h speed limit applies to Portman Street in the vicinity of the site.

The cross-section of Portman Street at the frontage of the site is shown in Figure 4.



**Figure 4 Portman Street, looking east**



### 2.3.2 Chester Street

Chester Street is a local road generally aligned east-west, running between Hanover Street and Jones Street.

Chester Street is a one-way street and provides a single westbound traffic lane. Kerbside parking is provided on both sides of the road and is generally time restricted.

The cross-section of Chester Street at the frontage of the site is shown in Figure 5.

**Figure 5 Chester Street**





### 2.3.3 Council Car Park/Laneway

As previously outlined, access to the site (and neighbouring uses) is provided from a laneway running along the site's northern boundary between the existing Council operated car parking facility and Chester Street.

The existing car park is accessed via an exit only from Portman Street as well as an entry and exit to Chester Street (noting the one-way configuration of both Portman Street and Chester Street).

Views of the existing vehicle access arrangements are provided in Figure 6 to Figure 8 .

**Figure 6 Laneway looking towards the site from the Council car park**





Figure 7 Council Car Park looking south towards Portman Street egress



Figure 8 Council Car Park looking north towards Chester Street access



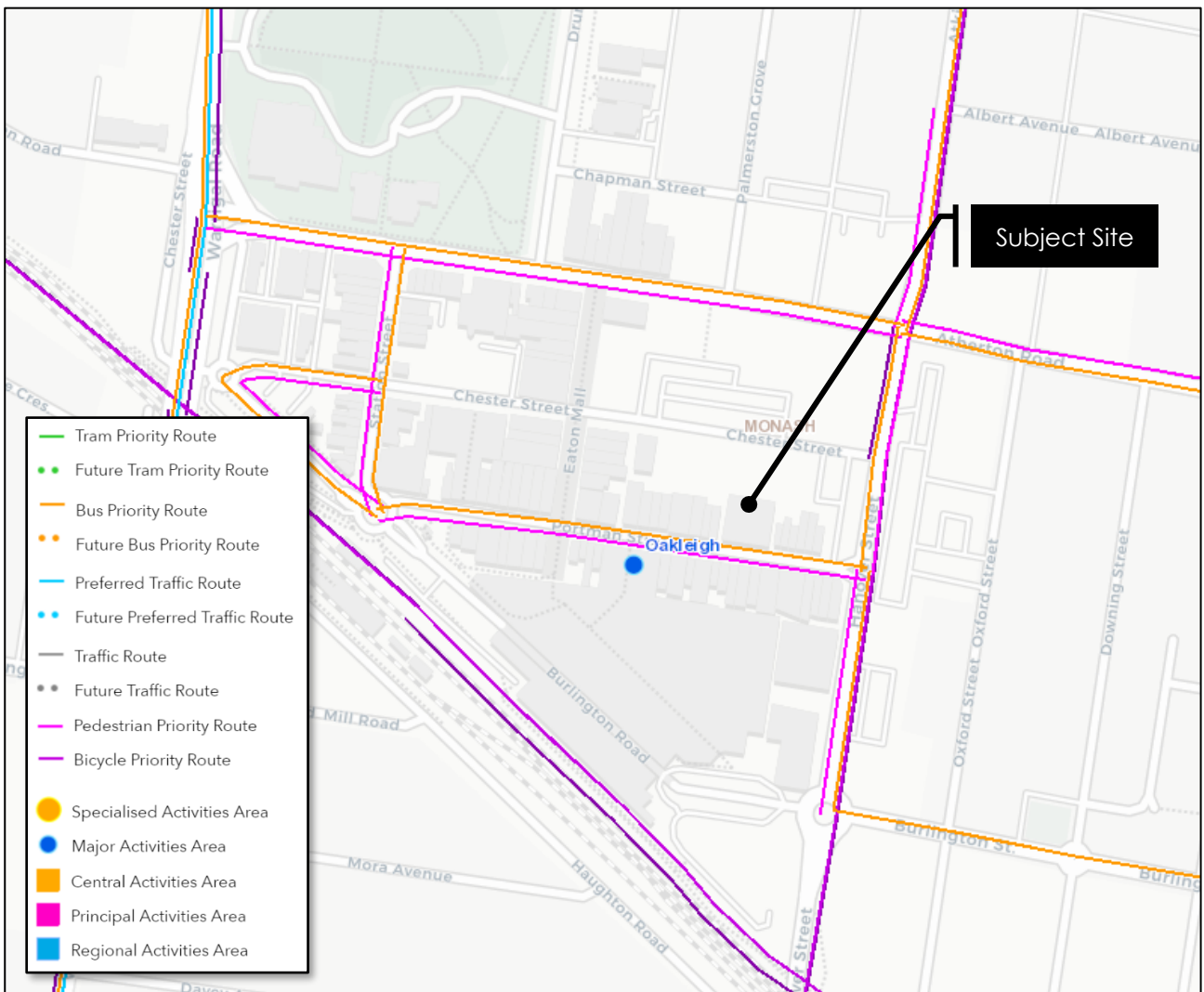
## 2.4 SmartRoads Road User Hierarchy Maps

In mid-2011 VicRoads developed the SmartRoads Road User Hierarchy Maps which aim to 'manage competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day.'

The SmartRoads map, reproduced in Figure 9, identifies the priority modes on each arterial road in the vicinity of the site, and indicates that Portman Street is a Bus Priority Route and Pedestrian Priority Area.

Furthermore, a Bicycle Priority Route (Rosstown Rail Trail) is located to the south of the site.

**Figure 9 SmartRoads Road User Hierarchy Map**



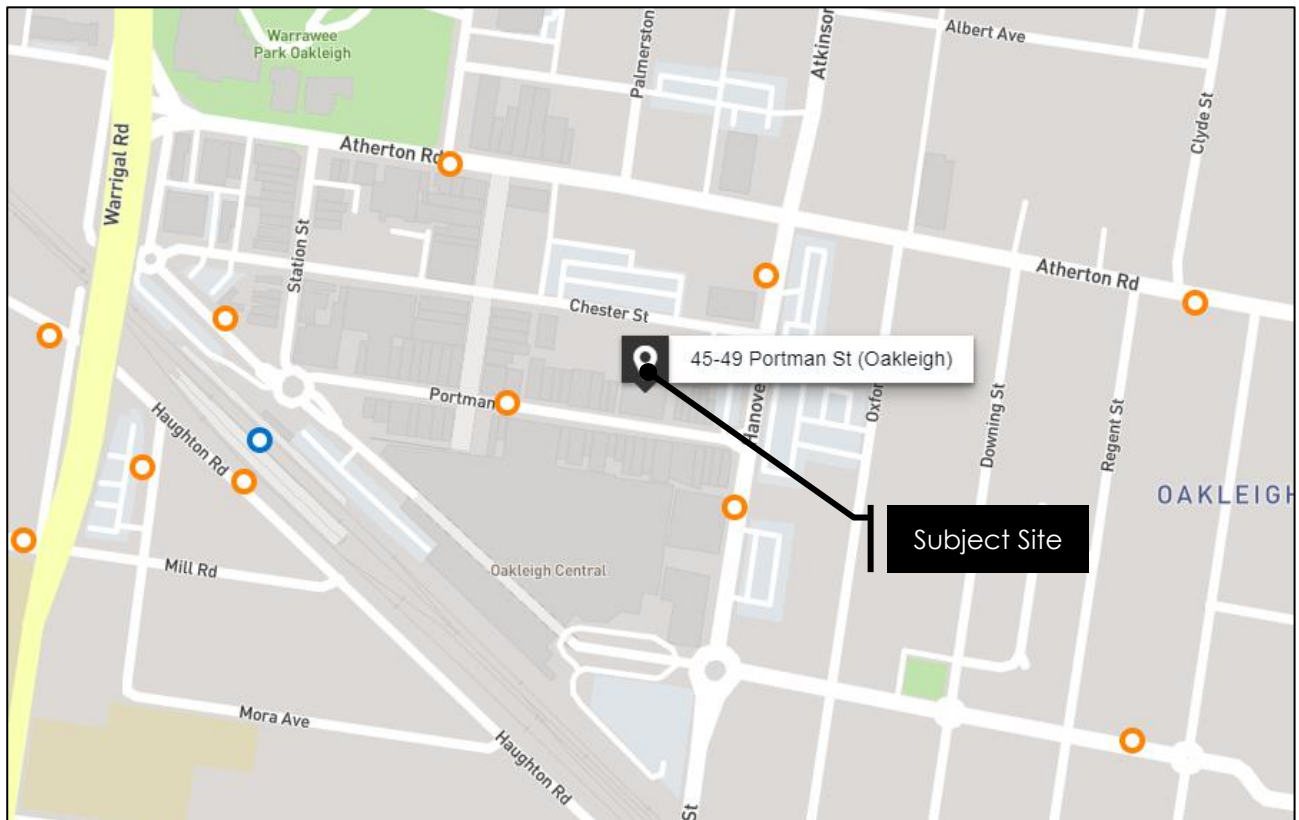


## 2.5 Sustainable Transport

### 2.5.1 Public Transport

The full public transport provision in the vicinity of the site is shown in Figure 10 and detailed in Table 1.

**Figure 10 Public Transport Provision**



**Table 1 Public Transport Provision**

Mode	Route No	Route Description	Nearest Stop/Station
Train		Cranbourne Line	Oakleigh Station
		Pakenham Line	Oakleigh Station
Bus	624	Kew - Oakleigh via Caulfield, Carnegie, Darling and Chadstone	Portman Street
	693	Belgrave - Oakleigh via Ferntree Gully, Brandon Park	Oakleigh Station
	704	East Clayton - Oakleigh via Clayton, Huntingdale	Hanover Street
	742	Eastland - Chadstone via Vermont South, Glen Waverley, Oakleigh	Hanover Street
	802+804+862	Dandenong - Chadstone via Mulgrave, Oakleigh	Hanover Street
	900	Stud Park SC (Rowville) - Caulfield via Monash University, Chadstone (SMARTBUS Service)	Oakleigh Station
	903	Altona - Mordialloc (SMARTBUS Service)	Oakleigh Station

The site has excellent public transport accessibility, with a wide variety of transport modes and services servicing the immediate vicinity of the site.

## 2.5.2 Bicycle Facilities

The Principal Bicycle Network (PBN) is a “network of existing and proposed cycle routes identified to help people ride to major destinations around metropolitan Melbourne”. The PBN was originally established in 1994. VicRoads undertook an extensive review of the PBN between 2009 and 2012 and identified numerous improvements.

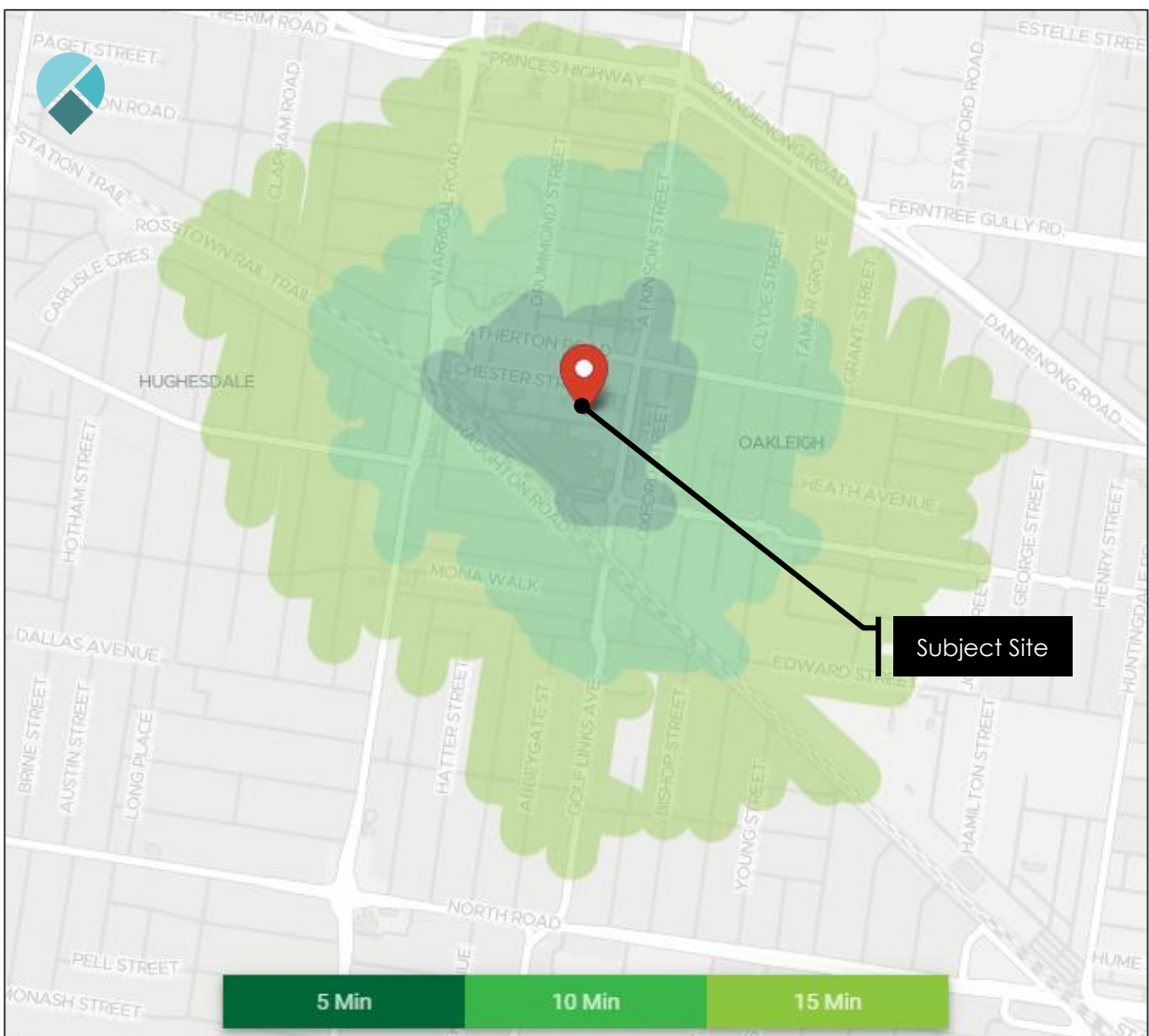
The PBN also includes Bicycle Priority Routes (BPR), which are priority sections of the PBN, and which are also included on the SmartRoads Road User Hierarchy plans, as shown in Figure 9. The Rosstown Rail Trail and Warrigal Road are identified cycle routes.

## 2.5.3 Pedestrian Accessibility

In addition to having good access to public transport modes, the site is well-located for pedestrian accessibility, with a number of recreation, education, shopping and employment uses located within 10 - 15 minutes’ walk of the site.

Figure 11 shows a pedestrian walk time map for the site.

**Figure 11 Pedestrian Walk-Time Map**



Courtesy of [Targomo](#)

Walkability is a measure of how friendly an area is to walking. Walkability has many health, environmental, and economic benefits. Factors influencing walkability include the presence or absence and quality of footpaths or other pedestrian rights-of-way, traffic and road conditions, land use patterns, building accessibility, and safety.

The website, [www.walkscore.com](http://www.walkscore.com), provides a convenient tool for assessing a sites walkability, with the website giving the subject site a Walk Score rating of 94/100 or 'Walkers Paradise', with daily errands not requiring a car.



### 3 DEVELOPMENT PROPOSAL

#### 3.1 General

It is proposed to develop the subject site for the purposes of a mixed-use development, containing both serviced apartments and a small retail use, as shown in Table 2.

**Table 2 Proposed Development**

Component	No/Area
Total Apartments	55
Retail	111m <sup>2</sup>

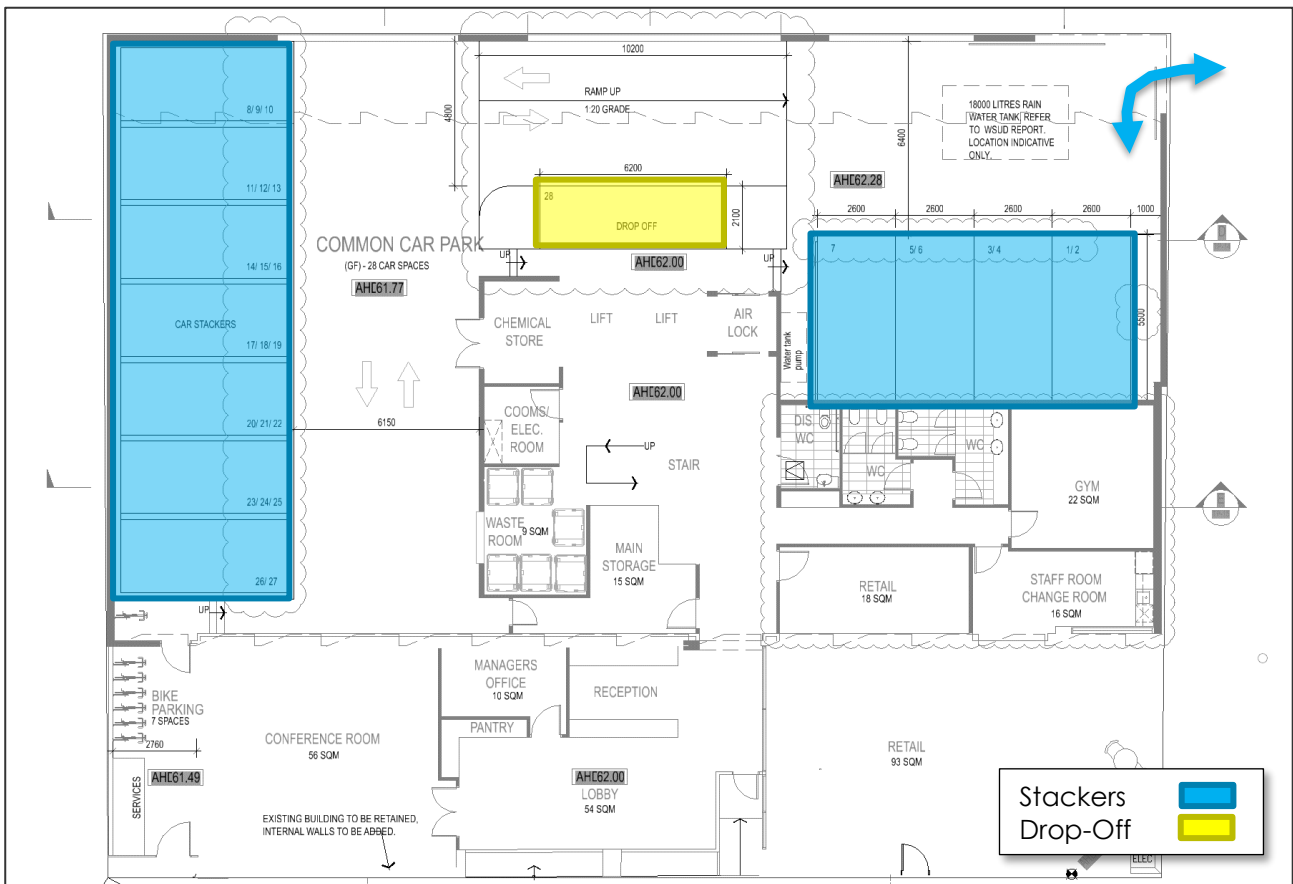
#### 3.2 Car Parking & Vehicular Access

A total of 28 car spaces are proposed in an undercroft car park, including one at-grade car space and 27 independent car stacker spaces.

Twenty (20) spaces will be provided at the western end of the site within a Klaus Trendvario 4300 system (or similar), and an additional seven spaces provided at the eastern end of the site within a Klaus Trendvario 4100 system (or similar).

Vehicle access is proposed via the laneway at the rear of the site (as shown in Figure 12).

**Figure 12 Vehicle Access & Car Parking**



On arrival, guests of the serviced apartment who drive to the site will enter and park within the at-grade space, operating as a pick-up/drop-off space. They will proceed directly to reception with

their bags, and enter their accommodation. Staff will then park the guests' car within the stacker spaces, in a valet arrangement.

On departure, the serviced apartment staff will retrieve the guests' car, and park it within the pick-up/drop-off space ready for the guests to depart.

One parking space will be allocated for exclusive use by the retail tenancy (staff), with the balance of parking (27 spaces) made available for serviced apartment staff and guests.

### **3.3 Bicycle Parking**

It is proposed to provide seven bicycle parking spaces for guest and staff use, within a secure area at the site's south-western corner.

### **3.4 Waste Collection & Loading**

Waste collection activity will be undertaken on-site, with a mini (6.4m) rear-lift collection truck entering the site from the laneway, turning around within the car park, and exiting again to the laneway in a forwards direction.

Further details of waste management are provided within the Waste Management Plan prepared by **onemilegrid**.

Loading activity will be accommodated within the on-site pick-up/drop-off space, or on-street, using the existing Loading Zones servicing the Activity Centre.

## 4 DESIGN CONSIDERATIONS

### 4.1 Monash Planning Scheme – Clause 52.06

onemilegrid has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed within Clause 52.06-9 of the Planning Scheme. A review of those relevant Design Standards is provided in the following section.

#### 4.1.1 Design Standard 1 – Accessways

A summary of the assessment for Design Standard 1 is provided in Table 3.

**Table 3 Clause 52.06-9 Design Assessment – Design Standard 1**

<i>Requirement</i>	<i>Comments</i>
Be at least 3 metres wide	Satisfied – Minimum width of access is 4.8 metres
Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide	Satisfied – Access measures in excess of 4.2 metres width at changes of direction
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre	N/A – Private car park
Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres	Satisfied – Height clearances in excess of 2.2 metres are achieved
If the accessway serves four or more car spaces or connects to a road in a Road Zone, the accessway must be designed so that cars can exit the site in a forward direction	Satisfied – All vehicles may exit forwards
Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Road Zone	N/A – Does not connect to a road zone
Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Not satisfied – due to a number of site constraints the provision of compliant pedestrian splays for the site cannot be achieved. The appropriateness of the proposed arrangement is detailed in Section 4.1.1.1
If an accessway to four or more car parking spaces is from land in a Road Zone, the access to the car spaces must be at least 6 metres from the road carriageway.	Satisfied

##### 4.1.1.1 Pedestrian Sight Distances

It is noted that the vehicular access point to the rear laneway does not provide the required pedestrian sight distance triangles specified within the Planning Scheme.

In this instance, this is considered appropriate, given:

- The wide (6m) width of the accessway, providing partial splays for a car propped centrally;



- The very low observed usage of the laneway by pedestrians;
- The likelihood that pedestrians will walk down the centre of the laneway (hence providing improved sight distances);
- The presence of a roller door which will highlight to pedestrians the likely movement of vehicles from the site;
- The very low traffic speeds occurring; and
- The very low traffic movements expected to be generated.

Finally, a warning light system or convex mirror could be provided to further improve the visibility of the site access.

#### **4.1.2 Design Standard 2 – Car Parking Spaces**

Car parking on-site is proposed to be provided in a mixture of standard at-grade spaces and car stacker spaces.

A single parallel drop-off space is proposed with a minimum width of 2.4m, length of 6.7m and is accessed from an aisle of no less than 4.8m in accordance with Planning Scheme requirements. It is noted that the parallel space will be linemarked with 4.9m in length however 6.7m will be available for parking.

The remaining car spaces will be within one of two mechanical parking systems (stackers), the details of which are discussed within Section 4.1.4 below.

#### **4.1.3 Design Standard 3 – Gradients**

Gradients within the site comply with Planning Scheme and Australian Standard requirements.

#### **4.1.4 Design Standard 4 – Mechanical Parking**

As outlined above, it is proposed to utilise two mechanical parking systems to accommodate 27 of the 28 car spaces within the development. The development will utilise the Klaus Trendvario 4300 system along the western boundary (20 spaces) and the Klaus Trendvario 4100 towards the northeast of the site (7 spaces).

The 4300 system is arranged in a grid of three levels, with platforms at below ground, ground level and above ground. Platforms on the ground-level move horizontally, allowing platforms on the upper and lower levels to move vertically and shuffle platforms to the ground-level as required. A vacant space (i.e. no platform) remains clear on the ground-level at all times to facilitate this mechanism.

The 4100 system operates in the same manner, albeit without the below ground level.

When storing a vehicle within the system, a driver will approach the stacker system and prop in front of their designated parking row. They will then 'call' the platform, using either a remote control or pressing the appropriate button on a control panel, and the empty space will be shuffled from within the system to the ground-level.

The gates will then open and permit access onto the car platform. Once the driver has parked, they will exit their vehicle and walk outside of the stacker, the doors will close, and the car will be shuffled into position for storage.

When retrieving a vehicle, the system will operate in the same manner, albeit in reverse, with the staff member 'calling' their vehicle

The specification sheet for the Klaus Trendvario 4300 car stacker system is attached in Appendix A. The proposed specifications allow for a useable platform width of 2.4m for each platform, all spaces will have a length of 5.5m capable of accommodating vehicles up to 5.0m in length. The proposed car stacker spaces will be accessed via an aisle of 6.150m width.

The specification sheet for the Klaus Trendvario 4100 car stacker system is attached in Appendix A. The proposed specifications allow for a useable platform width of 2.4m for each platform, all spaces will have a length of 5.5m capable of accommodating vehicles up to 5.0m in length. The proposed car stacker spaces will be accessed via an aisle of 6.150m width.

Whilst it is acknowledged that the dimensions for the Trendvario 4300 and 4100 do not strictly accord with those specified in the Planning Scheme for standard car spaces, the Planning Scheme states that the design and operation of stackers is to the satisfaction of the responsible authority. In this regard, swept path diagrams have been prepared, and are attached within Appendix B demonstrating satisfactory access to critical car spaces with a B85 design vehicle (85<sup>th</sup> percentile length passenger car).

It is further noted that parking within the stacker system will be undertaken as part of a valet arrangement.

#### 4.1.4.1 Clause 52.06-9

A review of the stacker design against the specific Planning Scheme requirements is provided in Table 4 below.

**Table 4 Clause 52.06-9 Design Assessment – Design Standard 4**

Requirement	Comments
At least 25 per cent of the mechanical car parking spaces can accommodate a vehicle clearance height of at least 1.8 metres.	Satisfied – The undercroft parking area will provide a clear height of 3.6 metres, allowing height clearances greater than 1.8 metres for the entire 4100 system, equating to 26% of mechanical parking spaces.
Car parking spaces that require the operation of the system are not allocated to visitors unless used in a valet parking situation.	Satisfied – Stacker spaces will operate via a valet system for guests of the serviced apartment use or be allocated to staff.

## 4.2 Waste Collection

A bin storage area is located within the car park. Bins will be collected from within the car park on collection days via a mini (6.4m) rear loader vehicle.

Swept paths have been prepared demonstrating this arrangement and are provided in Appendix B. It is noted that the stairs adjacent to the chemical store will need to be replaced with a ramped area to facilitate the waste truck manoeuvres.

Refer to the Waste Management Plan prepared by **onemilegrid** for further information.

## 4.3 Bicycle Parking

It is proposed to provide vertically mounted and staggered bicycle racks within a storage area on the ground floor of the development accommodating seven bicycles.

The individual bicycle racks are separated by 500mm, which provides a separation of 800mm between bicycles at the same level, in excess of the Planning Scheme requirements, and in accordance with typical advice from Bicycle Network Victoria.

## 5 LOADING CONSIDERATIONS

Clause 65 (Decision Guidelines) of the Monash Planning Scheme identifies that "Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts."

Given the size of the retail use, it is not considered practical or necessary to provide an on-site loading bay. In addition, the loading required by the serviced apartment use is anticipated to predominately occur via small delivery vans (e.g. linen service) and as such will be able to be accommodated within the on-site car parking via the use of the drop-off area.

Furthermore, an existing on-street loading area is provided along Chester Street to the north of the site adjacent the car park access, which is considered appropriate to accommodate the required loading operations for the proposed development.

The provision for loading is therefore considered appropriate for the proposed use.

## 6 BICYCLE PARKING CONSIDERATIONS

### 6.1 Statutory Bicycle Parking Requirements

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Monash Planning Scheme, which specifies the following requirements for the different components of the proposed development.

**Table 5 Clause 52.34 – Bicycle Parking Requirements**

Component	No/Area	Requirement	Total
Residential Building (four or more storeys)	55 rooms	1 space per 10 rooms for employees	6
		1 space per 10 rooms for guests	6
Retail	111 m <sup>2</sup>	1 space per 300m <sup>2</sup> for employees	0
		1 space per 500m <sup>2</sup> for visitors	0
<b>Total</b>		<b>Employees</b>	<b>6</b>
		<b>Guests</b>	<b>6</b>
		<b>Visitors</b>	<b>0</b>

Furthermore, where 5 or more employee bicycle spaces are provided, employee facilities are required in accordance with Clause 52.34 of the Monash Planning Scheme, as identified below.

**Table 6 Clause 52.34 – Bicycle Facility Requirements**

Facility	Employee Bicycle Spaces	Requirement	Total
Showers	6 spaces	1 shower for the first 5 employee bicycle spaces; plus 1 to each 10 employee bicycle spaces thereafter	1

Showers must have access to a communal change room, or combined shower and change room

As shown above, the development triggers a requirement for 12 bicycle parking spaces, comprising six spaces for employees and six spaces for guests.



## 6.2 Proposed Bicycle Parking Provision

It is proposed to provide seven bicycle parking spaces for the use, which will be made available to staff and guests of the use. Shower and changeroom facilities will be provided for staff.

This provision therefore represents a waiver of six guest spaces from the statutory requirements.

A permit may be granted to vary, reduce or waive any requirement of Clause 52.34-3. Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider a number of factors including:

- Whether the proposed number, location and design of bicycle facilities meets the purpose of this clause.
- The location of the proposed land use and the distance a cyclist would need to travel to reach the land.
- The users of the land and their opportunities for bicycle travel.
- Whether showers and change rooms provided on the land for users other than cyclists are available to cyclists.
- The opportunities for sharing of bicycle facilities by multiple uses, either because of variation of bicycle parking demand over time or because of efficiencies gained from the consolidation of shared bicycle facilities.
- Australian Standard AS 2890.3 1993 Parking facilities Part 3: Bicycle parking facilities.
- Any relevant bicycle parking strategy or equivalent.

The serviced apartment use, by nature, is very unlikely to attract guests who bring a bicycle to the site, and therefore is not anticipated to generate any appreciable level of associated bicycle parking demands.

The proposal will incorporate seven bicycle parking spaces for use by staff, which is considered sufficient to accommodate even conservatively large estimates of demand.

Noting this, the provision of bicycle parking on-site is considered appropriate.

## 7 CAR PARKING CONSIDERATIONS

### 7.1 Statutory Car Parking Requirements

The car parking provision requirements for the subject site are detailed within Clause 52.06 of the Monash Planning Scheme.

As the site is located within the PPTN area, the Column B car parking rates of Table 1 apply.

It is noted that Clause 52.06 does not specify a parking requirement for residential hotels, and as such the provision of car parking for the serviced apartment use must be provided to the satisfaction of the responsible authority.

The relevant parking requirements are therefore outlined within Table 7 below.

**Table 7 Clause 52.06 – Car Parking Requirements**

Use	No/Area	Rate	Car Parking Measure	Total
Residential Hotel (Serviced Apartment)	55 rooms	-	-	-
Shop (Retail)	111m <sup>2</sup>	3.5	to each 100m <sup>2</sup> of leasable floor area	3
<b>Total</b>				<b>3</b>

In light of the above, the development requires three car spaces to be provided on-site, plus those required by Council for the residential hotel use.

In order to confirm the suitability of the proposed parking supply, an assessment of the car parking demands associated with the development has been undertaken below .

### 7.2 Car Parking Demand Assessment

#### 7.2.1 Serviced Apartments

In order to establish likely parking demands for the service apartment use, **onemilegrid** undertook a case-study of the nearby Punthill Apartment Hotels (at 1384 Dandenong Road, Oakleigh), the prospective operator of the proposed development.

Punthill staff undertook surveys of the on-site car parking over a one-week period from Thursday 2<sup>nd</sup> May to Wednesday 8<sup>th</sup> May, and established an average overnight demand for 0.54 parking spaces per occupied room, inclusive of staff demands. Occupancy ranged from 38% to 82% over the course of the week.

It is noted that the surveyed site does not enjoy as good access as the subject site to public transport and amenities, and is anticipated to therefore generate demand at a higher rate. For comparison, surveys of similar serviced apartment facilities in East Melbourne and Carlton identified parking demand ratios of 0.27 and 0.35 spaces per apartment.

For the purposes of this assessment, it will be assumed that the use generates demand at a rate of 0.4 spaces per occupied room, and that 95% of rooms are occupied. This equates to anticipated demand for 21 parking spaces.

#### 7.2.2 Retail

With respect to the ground floor retail tenancy, it is anticipated that the bulk of patronage will be generated by guests of the serviced apartments, and others already visiting the Oakleigh Activity Centre.

As a result, most parking demands are expected to be attributable to staff. Noting the small size of the tenancy, it is expected that demands for only one staff space will be generated.

### **7.2.3 Anticipated Parking Demand**

Based on the above, it is anticipated the proposed development may typically generate a demand for approximately 22 parking spaces.

It is proposed to provide a total of 28 car parking spaces on-site, which is expected to meet the anticipated parking demand outlined above.

Nevertheless, a review of the car parking provision has been provided below.

## **7.3 Review of Car Parking Provision**

### **7.3.1 Alternative Modes of Transport**

As indicated in Section 2.5, the site has excellent access to Public Transport, with numerous train, and bus services in the immediate vicinity. The provision of excellent public transport ensures that guests and staff will have practical alternatives to travel to the site other than by car,

### **7.3.2 Other Considerations**

As outlined in Section 2.2, the site is located within the PPTN area and as such reduced car parking provision rates are applicable to a range of uses on the site. In this respect, although no specific rate for serviced apartments is contained within the Planning Scheme, there is a clear mandate for reduced car parking provisions on-sites within the PPTN in general.

Though all parking demands are anticipated to be satisfied, by not oversupplying car parking on-site, users will be encouraged to choose more sustainable transport options.

### **7.3.3 Operational Parking Management**

The booking system and website will provide guests with a summary of alternative transport options when travelling to the site, outlining the excellent accessibility by means other than car.

When booking, guests of the serviced apartments will indicate if they require a car space, providing advance warning of the demand for car parking on-site.

Noting there may be a shortfall of car parking on the odd occasion where all apartments are booked, or a disproportionate number of guests drive to the site, car parking will be managed, and alternative locations for car parking will be arranged by the operator.

### **7.3.4 Adequacy of Proposed Car Parking Provision**

It is expected that the proposed supply of car parking is appropriate for the proposed development, considering the following:

- The proposed development provides bicycle parking on-site, offering an alternate means of transportation for staff and guests;
- The development is within easy walking distance of amenities, including shops, education, entertainment and recreational facilities;
- The site has excellent access to public transport, with numerous train and bus services in the immediate vicinity, providing alternative access options for guests and employees who do not drive to the site;

- Existing parking restrictions are managed to limit the impact of overflow parking on other users within the Activity Centre;
- The site is located within the PPTN, with the Planning Scheme clearly indicating its location as an area for reduced car parking provisions; and
- Operational measures will be put in place to limit impacts of overflow parking.



## 8 TRAFFIC CONSIDERATIONS

### 8.1 Traffic Generation

#### 8.1.1 Retail

With regard to the retail use, it is anticipated that the sole allocated parking space may generate one inbound trip during the AM peak period, and one outbound trip during the PM peak period, equivalent to 1 vehicle trip per hour.

#### 8.1.2 Serviced Apartments

TTM Consultants have undertaken case-study of a comparable serviced apartment at 139 Chetwynd Street, North Melbourne, with 67 No. 1 and 2-bedroom apartments, and a limited supply of on-site parking.

Over a 6:00AM-9:00PM period, the case-study identified traffic generation rates of 0.57 movements car park entry/exit movements per apartment, and 0.70 pick-up/drop-off movements per apartment.

Applying these same rates to the 55 apartments proposed, equates to an anticipated traffic generation of 31 car park entry/exit movements, and 39 pick-up/drop-off movements.

Both types of traffic movements are evenly split between inbound and outbound directions.

While details of the timing of traffic movements were not provided within the case-study, it is anticipated that approximately 10% of daily movements associated with the serviced apartments will occur during AM and PM peak periods.

#### 8.1.3 Total

Based on the above, the anticipated traffic generated by the proposed development is shown in Table 8.

**Table 8 Anticipated Traffic Generation**

<i>Period</i>	<i>Inbound</i>	<i>Outbound</i>	<i>Total</i>
AM Peak	3	1	4
PM Peak	2	3	5

### 8.2 Traffic Impact

As indicated above, the development is expected to generate between 4 and 5 peak-hour vehicle movements, equivalent to one additional traffic movement each 12-15 minutes.

The traffic volumes generated by the proposed development are very low, and are expected to be easily absorbed into the surrounding road network, with limited impact on the function of the existing Council car park, not the surrounding roads.

It is noted that only guests and staff who park on-site will ultimately access the site from the rear, with the majority of traffic (associated with pick-up/drop-off activity) will likely occur along Portman Street.

## 9 CONCLUSIONS

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It is proposed to develop the site for a mixed service apartment and retail use, with 22 parking spaces provided in a car park accessed from the site's rear.

Considering the analysis presented above, it is concluded that:

- The proposed car parking and access design is considered appropriate;
- The bicycle parking provision is considered appropriate for the use;
- The proposed supply of car parking is appropriate for the proposed development;
- The proposed development is expected to have a negligible impact on the surrounding road network when compared to the existing operation.

# ***Appendix A Car Stacker Specifications***



**Loadable up to 2600 kg!**

Single parking spaces can also be upgraded to handle heavier loads at a later date!

### Dimensions

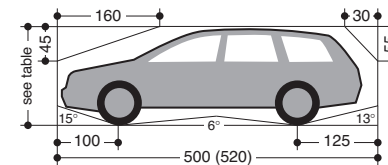
Tolerances for space requirements  $+3_0$ <sup>3</sup>  
Dimensions in cm.

### Suitable for

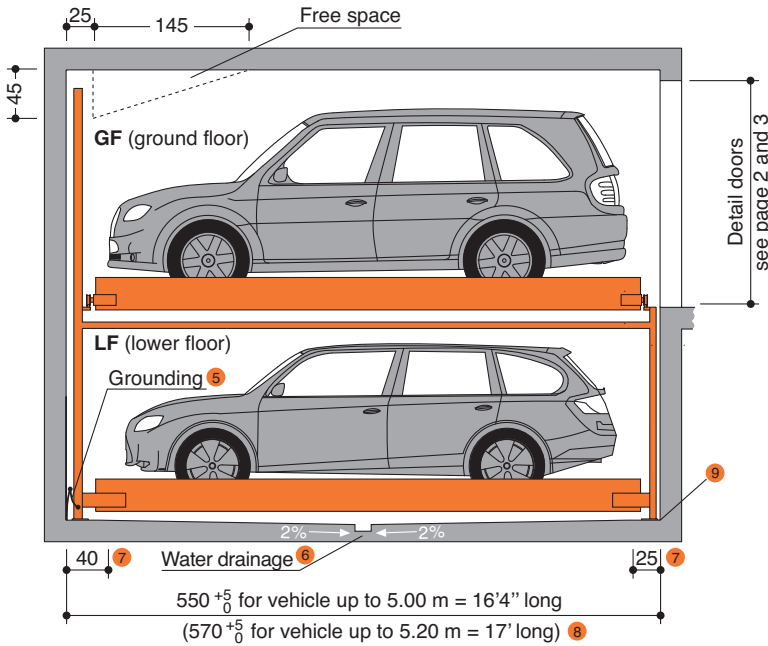
Standard passenger cars:  
Limousine, station wagon, SUV, van  
according to clearance and maximal surface load.

	Standard	Special <sup>2</sup>
Width	190 cm <sup>4</sup>	190 cm <sup>4</sup>
Weight	max. 2000 kg	max. 2600 kg
Wheel load	max. 500 kg	max. 650 kg

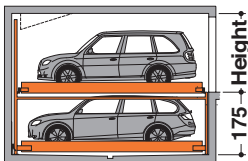
### Clearance profile



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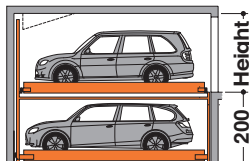


**4100-175**



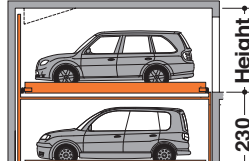
Height	Car height	
	GF	LF
220	205	150
230	215	150

**4100-200**



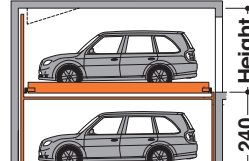
Height	Car height	
	GF	LF
220	205	175
230	215	175
235	220	175
240	225	175
250	235	175

**4100-230**



Height	Car height	
	GF	LF
235	220	205
240	225	205
245	230	205
250	235	205
260	245	205

**4100-240**



Height	Car height	
	GF	LF
245	230	215
250	235	215
260	245	215

- 1 Standard type
  - 2 Special system: maximum load for extra charge.
  - 3 To follow the minimum finished dimensions, make sure to consider the tolerances according to VOB, part C (DIN 18330 and 18331) and the DIN 18202.
  - 4 Car width for platform width 230 cm. If wider platforms are used it is also possible to park wider cars.
  - 5 Potential equalization from foundation grounding connection to system (provided by the customer).
  - 6 Slope with drainage channel and sump.
  - 7 These floor areas need to be horizontal and on equal level across the full width of the pit
  - 8 For convenient use of your parking space and due to the fact that the cars keep becoming longer we recommend a pit length of 570 cm.
  - 9 At the transition section between pit floor and walls no hollow mouldings/coves are possible. If hollow mouldings/coves are required, the systems must be designed smaller or the pits accordingly wider.
- !** If sprinklers are required make sure to provide the necessary free spaces during the planning stage.



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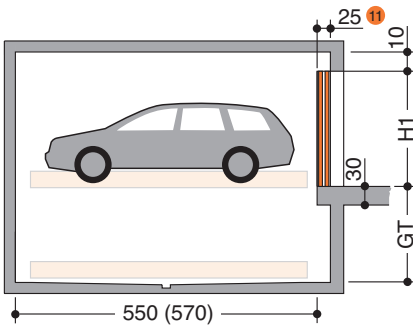
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## Garages with sliding doors (standard) | Widths dimensions

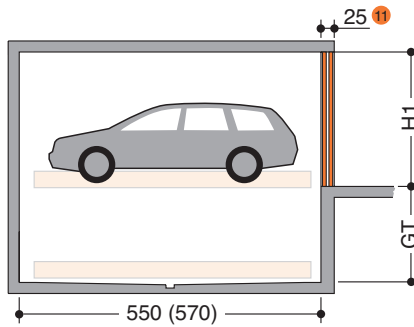
### Sliding door behind columns



Typ 4100 GT: 175/200/230/240

Car height GF	H1
205	210
215	220
220	225
225	230
230	235
235	240
245	250

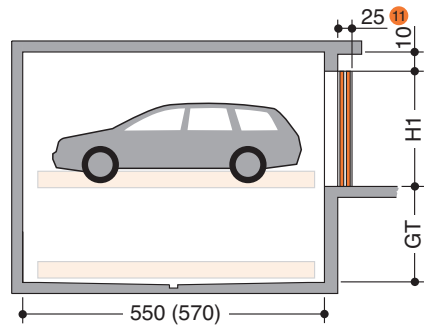
### Sliding door between columns



Typ 4100 GT: 175/200/230/240

Car height GF	H1
205	220
215	230
220	235
225	240
230	245
235	250
245	260

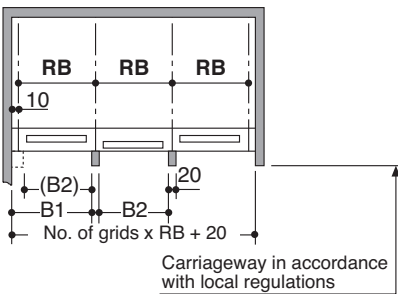
### Sliding door in front of columns



Typ 4100 GT: 175/200/230/240

Car height GF	H1
205	210
215	220
220	225
225	230
230	235
235	240
245	250

### Columns per each grid unit

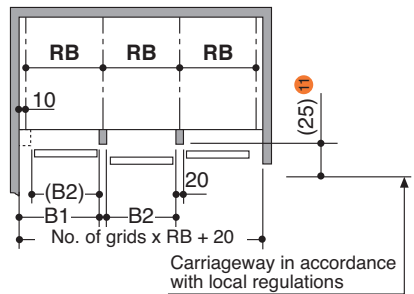


Usable platform width	RB <sup>10</sup>	B1	B2
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

### Columns per each grid unit

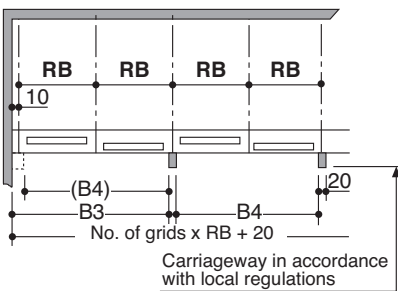
Not available!

### Columns per each grid unit



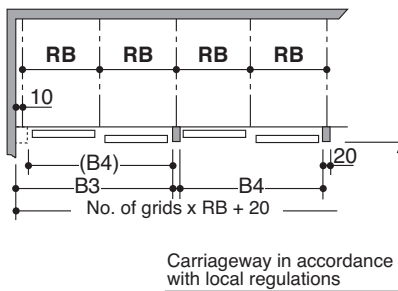
Usable platform width	RB <sup>10</sup>	B1	B2
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

### Columns every second grid unit



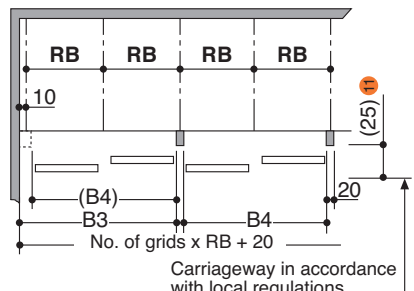
Usable platform width	RB <sup>10</sup>	B3	B4
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

### Columns every second grid unit



Usable platform width	RB <sup>10</sup>	B3	B4
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

### Columns every second grid unit



Usable platform width	RB <sup>10</sup>	B3	B5
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

**!** According to the BGR 232, an inspection book is required for the commercial use of a gate with electric drive. Prior to commissioning, and then once a year, the gate has to be inspected by an expert and the findings entered in the inspection book. The inspection has to be carried out independent of any maintenance work.

For parking boxes on the edges and boxes with intermediate walls we recommend our maximum platform width of 270 cm. Please consider adjoining grids. Problems may occur if smaller platform widths are used (depending on car type, access and individual driving behaviour and capability).

For larger limousines and SUV wider driveways are necessary (in particular on the boxes on the sides due to the missing manoeuvring radius).

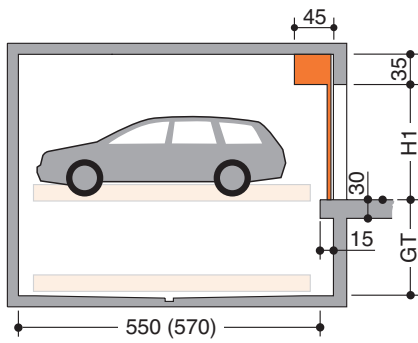
<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

<sup>11</sup> Only applies to manually operated doors. The electrically driven doors must have 35 cm.

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## Garages with roll doors | Widths dimensions

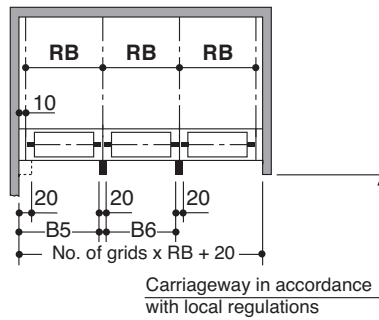
### Roll door behind columns



**Typ 4100 GT: 175/200/230/240**

Car height GF	H1
205	210
215	220
220	225
225	230
230	235
235	240
245	250

### Columns per each grid unit



Usable platform width	RB <sup>10</sup>	B5	B6
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

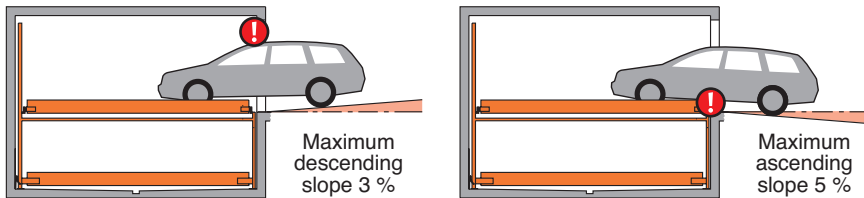
**!** According to the BGR 232, an inspection book is required for the commercial use of a gate with electric drive. Prior to commissioning, and then once a year, the gate has to be inspected by an expert and the findings entered in the inspection book. The inspection has to be carried out independent of any maintenance work.

For parking boxes on the edges and boxes with intermediate walls we recommend our maximum platform width of 270 cm. Please consider adjoining grids. Problems may occur if smaller platform widths are used (depending on car type, access and individual driving behaviour and capability).

For larger limousines and SUV wider driveways are necessary (in particular on the boxes on the sides due to the missing manoeuvring radius).

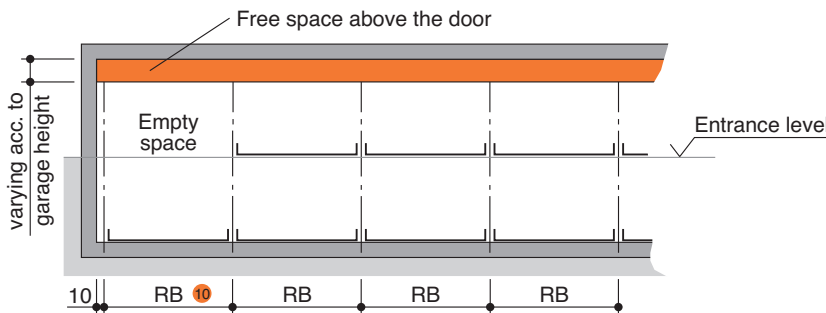
<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

## Approach



**!** The illustrated maximum approach angles must not be exceeded. Incorrect approach angles will cause serious manoeuvring & positioning problems on the parking system for which the local agency of KLAUS Multiparking accepts no responsibility.

## Longitudinal free space



<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

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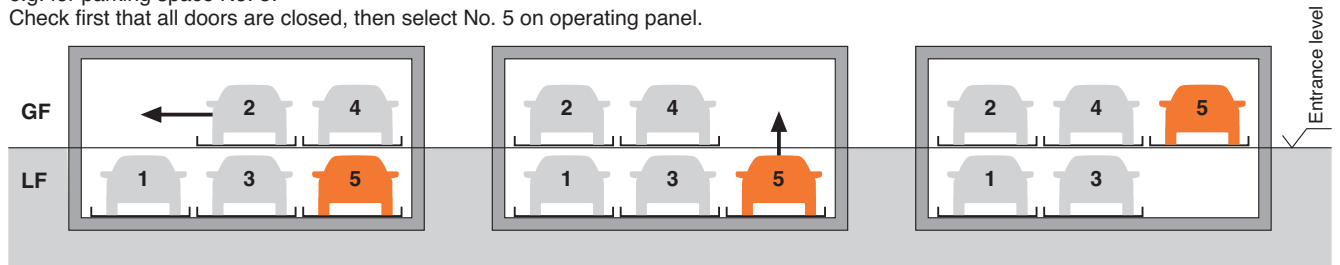
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## Function with standard numbering and identification of parking levels

e.g. for parking space No. 5:  
Check first that all doors are closed, then select No. 5 on operating panel.

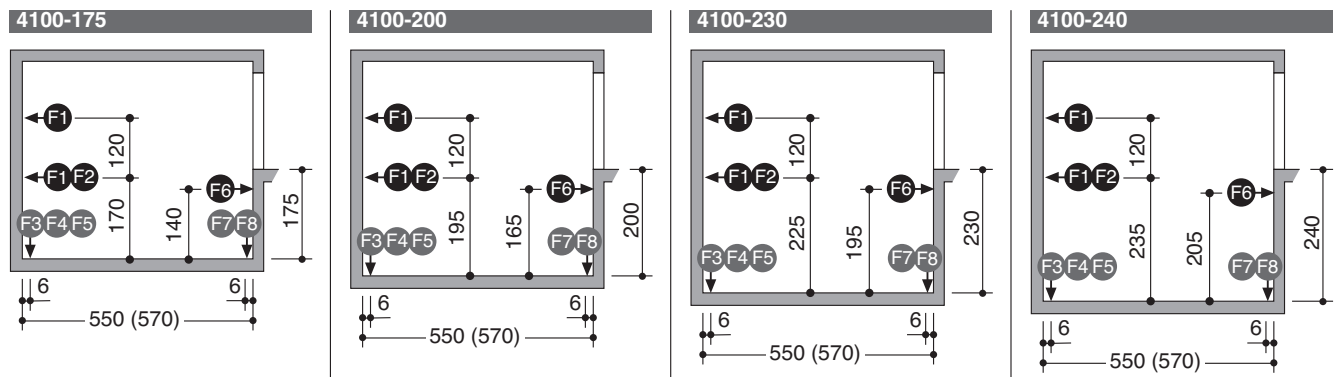


For driving the vehicle off platform No. 5 the upper parking platforms are shifted to the left.

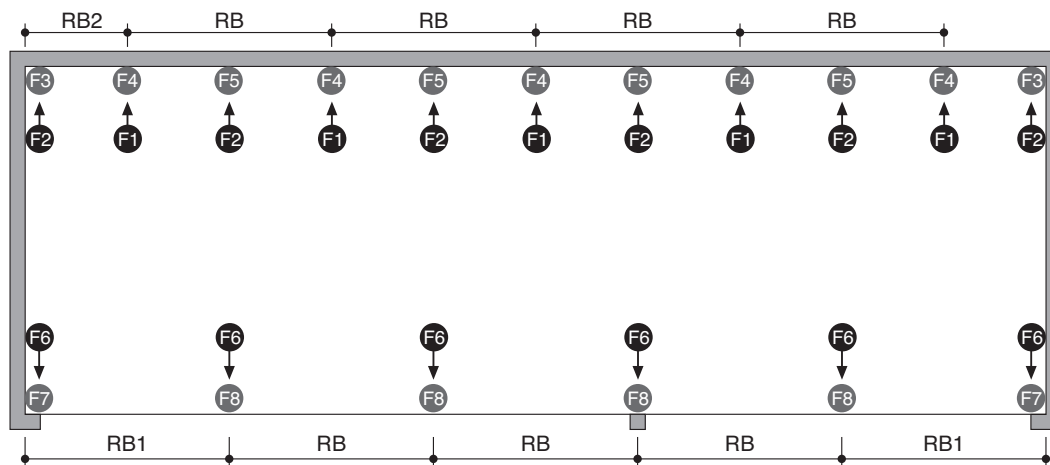
The empty space is now below the vehicle which shall be driven off the platform. The platform No. 5 will be lifted.

The vehicle on platform No. 5 can now be driven off the platform.

## Load plan



### Load plan – top view



Usable platform width	RB <sup>10</sup>	RB1	RB2	Platform load	F1	F2	F3	F4	F5	F6	F7	F8
230	250	260	135	2000 kg	±5	±2,5	±9	+40	±18	±2,5	±15	+30
240	260	270	140	2600 kg	±5	±2,5	±9	+45	±18	±2,5	±23	+46
250	270	280	145									
260	280	290	150									
270	290	300	155									

**!** The system is dowelled to floor and walls. The drilling depth in the floor is approx. 15 cm. The drilling depth in the walls is approx. 12 cm.

Floor and walls are to be made of concrete (grade of concrete min. C20/25)!

The dimensions for the points of support are rounded values. If the exact position is required, please contact KLAUS Multiparking.

<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

<sup>12</sup> All forces in kN

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## Technical data

### Field of application

By default, the system can only be used for a fixed number of users.

If different users use the system (e.g. short-time parkers in office buildings or hotels) the Multiparking system needs to be adjusted. If required, would you please contact us.

### Available documents

- wall recess plans
- maintenance offer/contract
- declaration of conformity
- test sheet on airborne and slid-borne sound

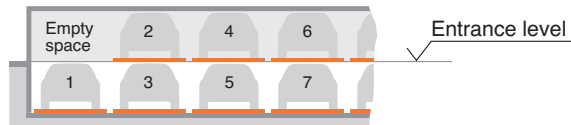
### Environmental conditions

Environmental conditions for the area of multiparking systems: Temperature range –10 to +40° C. Relative humidity 50% at a maximum outside temperature of +40° C.

If lifting or lowering times are specified, they refer to an environmental temperature of +10° C and with the system set up directly next to the hydraulic unit. At lower temperatures or with longer hydraulic lines, these times increase.

### Numbering

Standard numbering of the parking spaces:



Initial position: lower floor platform No. 1 at entrance level (covering of pit; safety regulation).

Different numbering is only possible at extra cost

Please take note of the following specifications:

- In general, the empty space must be arranged to the left.
- The numbers must be provided 8 – 10 weeks before the delivery date.

### Sound insulation

According to DIN 4109 (Sound insulation in buildings), para. 4, annotation 4, KLAUS Multiparkings are part of the building services (garage systems).

#### Normal sound insulation:

DIN 4109, para. 4, Sound insulation against noises from building services.

Table 4 in para. 4.1 contains the permissible sound level values emitted from building services for personal living and working areas. According to line 2 the maximum sound level in personal living and working areas must not exceed 30 dB (A).

*Noises created by users are not subject to the requirements (see table 4, DIN 4109).*

The following measures are to be taken to comply with this value:

- Sound protection package according to offer/order (KLAUS Multiparking GmbH)
- Minimum sound insulation of building  $R'_w = 57$  dB (to be provided by customer)

#### Increased sound insulation (special agreement):

Draft DIN 4109-10, Information on planning and execution, proposals for increased sound insulation.

Agreement: Maximum sound level in personal living and working areas 25 dB (A). *Noises created by users are not subject to the requirements (see table 4, DIN 4109).*

The following measures are to be taken to comply with this value:

- Sound protection package according to offer/order (KLAUS Multiparking GmbH)
- Minimum sound insulation of building  $R'_w = 62$  dB (to be provided by customer)

Note: User noises are noises created by individual users in our Multiparking systems. These can be noises from accessing the platforms, slamming of vehicle doors, motor and brake noises.

### Electrically driven doors

In accordance with BGR 232 commercially used power-driven doors must be subjected to annual inspections. We urgently recommend concluding a maintenance agreement that includes this service for the entire system.

### Building application documents

According to LBO and GaVo (garage regulations) the Multiparking systems are subject to approval. We will provide the required building application documents.

### Care

To avoid damages resulting from corrosion, make sure to follow our cleaning and care instructions and to provide good ventilation of your garage.

### Corrosion protection

See separate sheet regarding corrosion protection.

### CE Certification

The systems on offer comply with DIN EN 14010 and EC Machine Directive 2006/42/EC. Furthermore, this system underwent voluntary conformity testing by TÜV SÜD.

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT



### Certificate concerning the examination of conformity

<b>Certificate no:</b>	<b>KP 194</b>
<b>Certification body:</b>	TÜV SÜD Industrie Service GmbH Zertifizierungsstelle für Produkte der Fördertechnik Westendstr. 199 80686 München - Germany
<b>Applicant / Certification holder:</b>	Klaus Multiparking GmbH Hermann-Krum-Str. 2 88319 Altrach - Germany
<b>Date of application:</b>	2012-03-09
<b>Manufacturer:</b>	Klaus Multiparking GmbH Hermann-Krum-Str. 2 88319 Altrach - Germany
<b>Product:</b>	Equipment for power driven parking of motor vehicles
<b>Type:</b>	<b>TrendVario 4100 2.000 kg and 2.600 kg</b> <b>TrendVario 4300 2.000 kg and 2.600 kg</b>
<b>Test laboratory:</b>	TÜV SÜD Industrie Service GmbH Prüflaboratorium für Produkte der Fördertechnik Prüfbereich Maschinen der Fördertechnik Gottlieb-Daimler-Str. 7 70794 Filderstadt – Germany
<b>Date and number of the test report / mark of conformity:</b>	2014-01-22 <b>TÜ SW-12-230 DG</b>
<b>Test specifications:</b>	- 2006 / 42 / EC, Annex I - DIN EN 14010
<b>Validity:</b>	<b>This Certificate is valid until 2019-02-13</b>
<b>Result:</b>	The equipment fulfills the requirements of the test specifications for the respective scope of application stated in the annex (page 1) of this certificate, keeping the mentioned conditions.
<b>Date of issue:</b>	2014-02-14

Certification body for lifts and cranes




Chadi Nouredine





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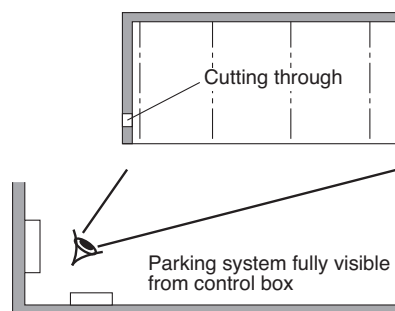
## Electrical data

### Control box

The control box must be accessible at all times from outside!

Dimensions approx. 100 x 100 x 30 cm.

Cutting through of wall from control box to parking system (contact the local agency of KLAUS Multiparking for clarification).



### Electrical supply to the control box / Foundation earth connector

Suitable electrical supply min. 5 x 2,5 mm<sup>2</sup> (3 PH+N+PE) to control box with mains fuse 3 x 16 A slow or over-current cut-out 3 x 16 A trigger characteristic K or C. DIN/VDE and local regulations must be taken into consideration.

Suitable electrical supply to the control box must be provided by the customer during installation. The functionality can be monitored on site by our fitters together with the electrician. If this cannot be done during installation for some reason for which the customer is responsible, the customer must commission an electrician at their own expense and risk.

In accordance with DIN EN 60204 (Safety of Machinery. Electrical Equipment), grounding of the steel structure is necessary, provided by the customer (distance between grounding max. 10 m).

### Operating device

Easy-to-survey positioning (e.g. on column).

Protection against unauthorized use.

May also be recessed in wall if required.

## To be performed by the customer

### Safety fences

Any constraints that may be necessary according to DIN EN ISO 13857 in order to provide protection for the park pits for pathways directly in front, next to or behind the unit. This is also valid during construction.

### Numbering of parking spaces

Consecutive numbering of parking spaces.

### Building services

Any required lighting, ventilation, fire extinguishing and fire alarm systems as well as clarification and compliance with the relevant regulatory requirements.

### Drainage

For the middle area of the pit we recommend a drainage channel, which you connect to a floor drain system or sump (50 x 50 x 20 cm). The drainage channel may be inclined to the side, however not the pit floor itself (longitudinal incline is available). In the interests of environmental protection we recommend painting the pit floor. Oil and petrol separators must be provided according to the statutory provisions when connecting to the public sewage system!

### Wall cuttings

Any necessary wall cuttings.

### Strip footings

If due to structural conditions strip footings must be effected, the customer shall provide an accessible platform reaching to the top of the said strip footings to enable and facilitate themounting work.

### Electrical supply to the control box / Foundation earth connector

Suitable electrical supply to the control box must be provided by the customer during installation. The functionality can be monitored on site by our fitters together with the electrician. If this cannot be done during installation for some reason for which the customer is responsible, the customer must commission an electrician at their own expense and risk.

In accordance with DIN EN 60204 (Safety of Machinery. Electrical Equipment), grounding of the steel structure is necessary, provided by the customer (distance between grounding max. 10 m).

### Door suspension

The lintel height H2 (see page 2) is absolutely necessary. With differing heights, additional fixings are required for extra charge.

### Door shields

Door shields that may be necessary. If desired, they can be ordered from KLAUS Multiparking for an additional charge.

### If the following are not included in the quotation, they will also have to be provided / paid for by the customer:

– Costs for final technical approval by an authorized body

## Description

### General description:

Multiparking system providing independent parking spaces for cars, one on top of the other and side by side.

Dimensions are in accordance with the underlying dimensions of parking pit, height and width.

The parking bays are accessed horizontally (installation deviation  $\pm 1\%$ ).

Along the complete width of the parking automat an approach lane (driving lane in accordance with local regulations) must be available.

Parking spaces are arranged on two different levels, one level on top of the other.

The platforms of the lower floor (LF) are moved vertically, the platforms on the ground floor (GF) horizontally. At approach level there is always one parking space less available. This vacant space is used for shifting the ground floor (GF) parking spaces sideways, thus enabling the lower platform (LF) parking space located below to be lifted to approach/ground level. Consequently, a unit of three parking spaces (1 on the ground floor, 2 on the lower floor) is the smallest unit available for this parking system.

The TrendVario 4100 allows parking of passenger cars and station wagons.

For safety reasons the platforms can only be moved behind locked doors.

All necessary safety devices are installed. This consists mainly of a chain monitoring system, locking lever for the lower platforms and locked doors. The doors can only be opened if the selected parking space has reached the park position and all openings are secured.

### A steel framework mounted inside the pit, consisting of

- Seriated supports
- Steel pillars with sliding platform supports
- Cross and longitudinal members
- running rails for the transversely movable ground floor (GF) platforms

### Platforms consisting of:

- Side members
- Cross members
- Platform base sections
- 1 wheel stop (on the right per parking space)
- Screws, small parts, etc.

### Lifting device for upper floor (UF) platforms:

- Hydraulic cylinder with solenoid valve
- Chain wheels
- Chains
- Limit switches
- The platforms are suspended on four points and guided along the supports using plastic sliding bearings.

### Drive unit of transversely movable platforms on the ground floor (GF):

- Gear motor with chain wheel
- Chains
- Running and guide rollers (low-noise)
- Power supply via cable chain

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## Description

### Hydraulic unit consisting of:

- Hydraulic power unit (low-noise, installed onto a console with a rubber-bonded-to-metal mounting)
- Hydraulic oil reservoir
- Oil filling
- Internal geared wheel pump
- Pump holder
- Clutch
- 3-phase-AC-motor (3.0 kW, 230/400 V, 50 Hz)
- Motor circuit breaker
- Test manometer
- Pressure relief valve
- Hydraulic hoses (which reduce noise transmission onto the hydraulic pipe)

### Control system:

- Central control panel (operating device) used to select the desired parking space
- With series installation, the doors are opened manually  
If desired, this can also be done using electric motors
- Electric wiring is made from the electric cabinet by the manufacturer

### Roller doors:

#### Size

Dimensions modified based on width and height measurements.

#### Shutter box

- 2-piece, roll formed aluminium box 45° consisting of upper and lower part
- lacquered type

#### Guide rails

- extruded aluminium guide rails with brush insert
- lacquered type

#### Gate type

- aluminium gate type, roll formed
- end rod with electronic safety strip
- lacquered type

#### Colour options

Shutter box, guide rails and gate type are available with the following colour options:

- RAL 9010 (white)
- RAL 7038 (light grey)
- RAL 9006 (aluminium metallic)

#### Door actuation

Powered electrically by means of tube motor in the shaft.

For safety reasons the movement of the platforms is always made behind locked doors. Position sensing, i.e. "door open" and "door closed" is effected by electric signalers.

### Sliding doors:

#### Size

Sliding door, dimensions: approx. 2500 mm x 2000 mm (width x height).

#### Frame

- Frame construction with vertical centre stay bar made from extruded aluminium profiles (anodized, layer thickness approx 20 µm).
- To open the doors a recessed grip is integrated in the aluminium profile.
- A rubber lip is used for the finishing of the closing edge to the building.

#### Standard door panel

- Perforated steel plate
- Thickness 1mm, RV 5/8, galvanized, layer thickness: approx. 20 µm
- Ventilation cross-section of the panel approx. 40%
- Not suitable for outdoor garages

#### Alternative door panel

- Perforated aluminium plate
- Thickness 2mm, RV 5/8 E6/EV1, anodized, layer thickness: approx. 20 µm
- Ventilation cross-section of the panel approx. 40%

#### Beaded steel plate

- Thickness 1mm, galvanized, layer thickness: approx. 20 µm.
- additional power coating, layer thickness: approx. 25 µm on the outside and approx. 12 µm on the inside
- Colour options for the outside (building view):  
RAL 1015 (light ivory), RAL 3003 (ruby),  
RAL 5014 (pigeon blue), RAL 6005 (moss green),  
RAL 7016 (charcoal grey), RAL 7035 (light grey),  
RAL 7040 (window grey), RAL 8014 (sepia),  
RAL 9006 (white aluminium), RAL 9016 (traffic white)
- Inside of the gates in light grey

#### Plain aluminium sheet

- Thickness 2mm, E6/EV1, anodized, layer thickness: approx. 20 µm

#### Wooden panelling

- Nordic spruce in grade A
- vertical tongue and groove boards
- preimpregnated colourless

#### Laminated safety glass

- Laminated safety glass made from single pane safety glass 8/4mm

#### Wire grating

- Mesh size 12 x 12 mm
- Mesh size 40 x 40 mm (for manual sliding gates only)

#### Running rails

- The running gear of each door consists of 2 twin-pair rolling gadgets, adjustable in height
- The running rails of the doors are fixed to brackets or the concrete lintel, or on a building-specific door suspension using ceiling fittings
- The guide consists of 2 plastic rollers mounted to a base plate, which is dowelled to the floor
- Running rails, ceiling fittings and guide roller base plate are hot-dip galvanized

#### Door actuation

##### Standard:

- Manually, i.e. the door is opened and closed by hand

##### Alternatively:

- Electric drive via electric motor mounted to the rail system at the turning point of the sliding doors. The drive pinion engages into the chain mounted to the door.

For safety reasons the movement of the platforms is always made behind locked doors. Position sensing, i.e. "door open" and "door closed" is effected by electric signalers.

#### Separation (if necessary):

- Upon request

#### Please note:

Door panels (on the side, cover for running rails, etc.) and door suspensions are not included in the standard version but can be delivered against surcharge as special equipment.

## We reserve the right to change this specification without further notice

KLAUS Multiparking reserves the right in the course of technical progress to use newer or other technologies, systems, processes, procedures or standards in the fulfillment of their obligations other than those originally offered provided the customer derives no disadvantage from their so doing.

**Loadable up to 2600 kg!** Single parking spaces can also be upgraded to handle heavier loads at a later date!

### Dimensions

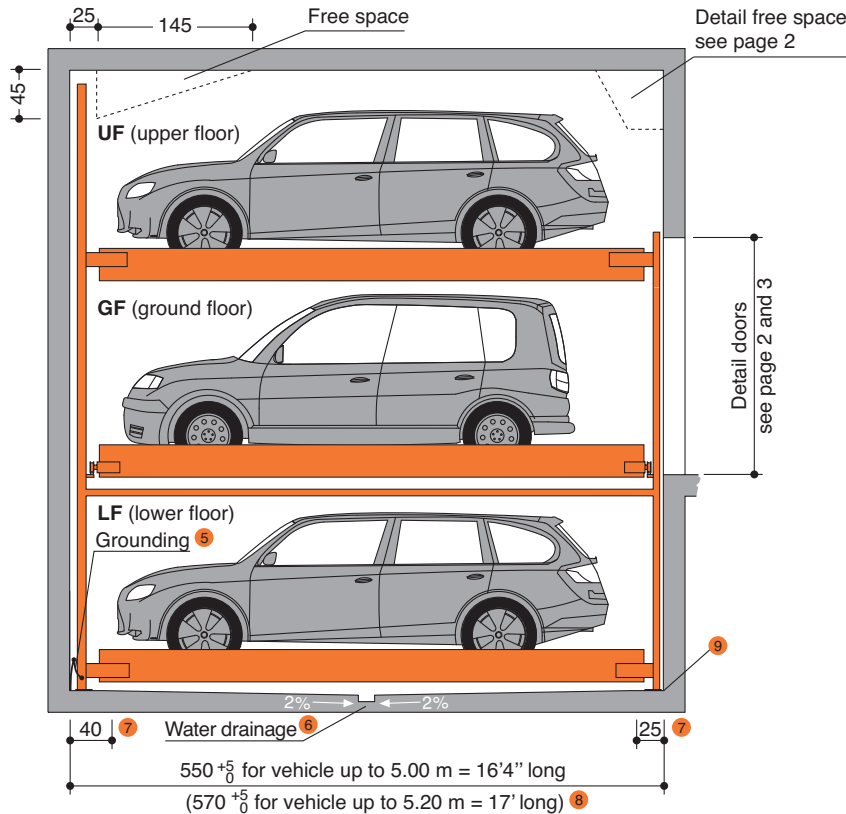
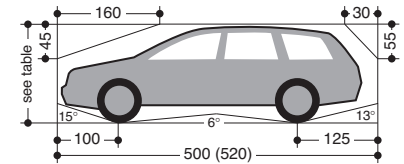
Tolerances for space requirements  $+3_0$  ③  
Dimensions in cm.

### Suitable for

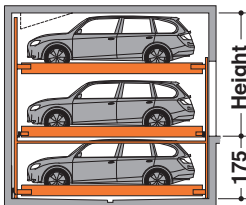
Standard passenger cars:  
Limousine, station wagon, SUV, van  
according to clearance and maximal  
surface load.

	Standard	Special ②
Width	190 cm ④	190 cm ④
Weight	max. 2000 kg	max. 2600 kg
Wheel load	max. 500 kg	max. 650 kg

### Clearance profile

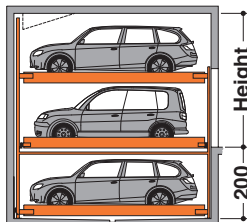


4300-175



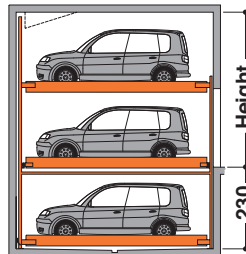
Height	Car height		
	UF	GF	LF
325	150	150	150
345	150	170	150
365	150	190	150
365	170	170	150
380	150	205	150
405	190	190	150
435	205	205	150

4300-200



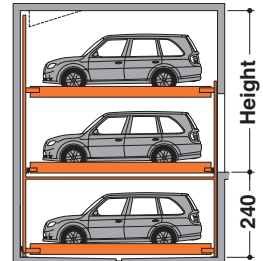
Height	Car height		
	UF	GF	LF
350	150	175	175
375	175	175	175
380	150	205	175
405	175	205	175
435	205	205	175

4300-230



Height	Car height		
	UF	GF	LF
380	150	205	205
405	175	205	205
420	190	205	205
435	205	205	205

4300-240



Height	Car height		
	UF	GF	LF
390	150	215	215
405	165	215	215
415	175	215	215
435	195	215	215
445	205	215	215
455	215	215	215

- ① Standard type
- ② Special system: maximum load for extra charge.
- ③ To follow the minimum finished dimensions, make sure to consider the tolerances according to VOB, part C (DIN 18330 and 18331) and the DIN 18202.
- ④ Car width for platform width 230 cm. If wider platforms are used it is also possible to park wider cars.
- ⑤ Potential equalization from foundation grounding connection to system (provided by the customer).
- ⑥ Slope with drainage channel and sump.
- ⑦ These floor areas need to be horizontal and on equal level across the full width of the pit

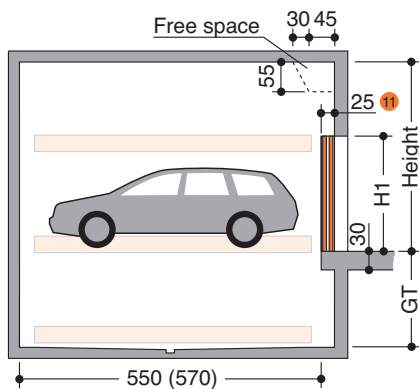
- ⑧ For convenient use of your parking space and due to the fact that the cars keep becoming longer we recommend a pit length of 570 cm.
- ⑨ At the transition section between pit floor and walls no hollow mouldings/coves are possible. If hollow mouldings/coves are required, the systems must be designed smaller or the pits accordingly wider.

**!** If sprinklers are required make sure to provide the necessary free spaces during the planning stage.

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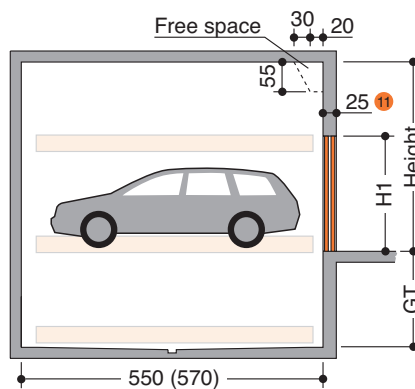
## Garages with sliding doors (standard) | Widths dimensions

### Sliding door behind columns



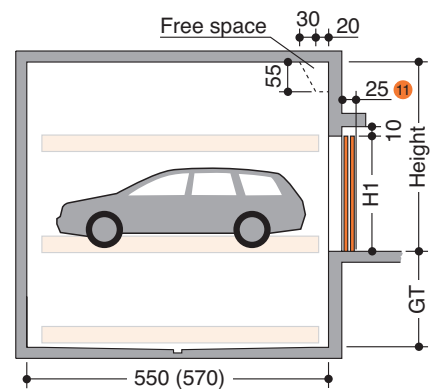
Type	GT	Height	H1
4300	175	325/345/365/405	210
4300	175	380/435	220
4300	200	350/375	210
4300	200	380/405/435	220
4300	230	380/405/420/435	220
4300	240	390/405/415/435/445/455	230

### Sliding door between columns



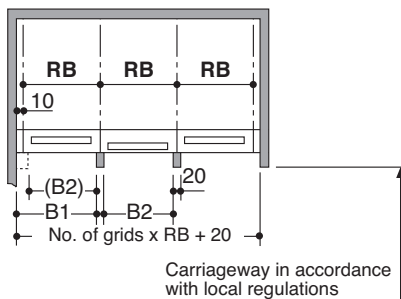
Type	GT	Height	H1
4300	175	325/345/365/405	220
4300	175	380/435	230
4300	200	350/375	220
4300	200	380/405/435	230
4300	230	380/405/420/435	230
4300	240	390/405/415/435/445/455	240

### Sliding door in front of columns



Type	GT	Height	H1
4300	175	325/345/365/405	220
4300	175	380/435	230
4300	200	350/375	220
4300	200	380/405/435	230
4300	230	380/405/420/435	230
4300	240	390/405/415/435/445/455	240

### Columns per each grid unit

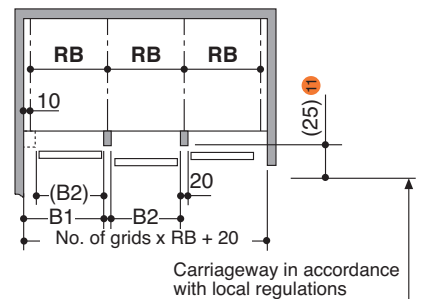


Usable platform width	RB <sup>10</sup>	B1	B2
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

### Columns per each grid unit

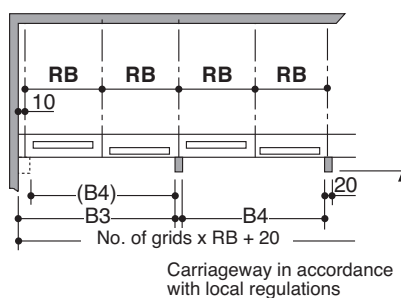
Not available!

### Columns per each grid unit



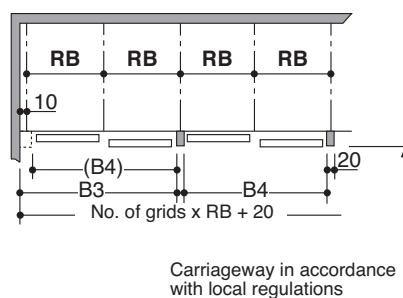
Usable platform width	RB <sup>10</sup>	B1	B2
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

### Columns every second grid unit



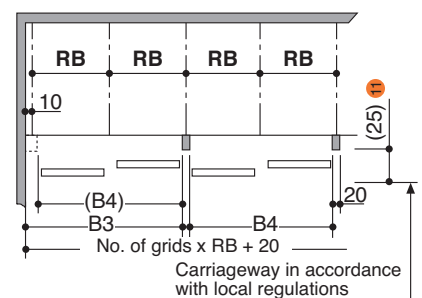
Usable platform width	RB <sup>10</sup>	B3	B4
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

### Columns every second grid unit



Usable platform width	RB <sup>10</sup>	B3	B4
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

### Columns every second grid unit



Usable platform width	RB <sup>10</sup>	B3	B5
230	250	500	480
240	260	520	500
250	270	540	520
260	280	560	540
270	290	580	560

**!** According to the BGR 232, an inspection book is required for the commercial use of a gate with electric drive. Prior to commissioning, and then once a year, the gate has to be inspected by an expert and the findings entered in the inspection book. The inspection has to be carried out independent of any maintenance work.

For parking boxes on the edges and boxes with intermediate walls we recommend our maximum platform width of 270 cm. Please consider adjoining grids. Problems may occur if smaller platform widths are used (depending on car type, access and individual driving behaviour and capability).

For larger limousines and SUV wider driveways are necessary (in particular on the boxes on the sides due to the missing manoeuvring radius).

<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

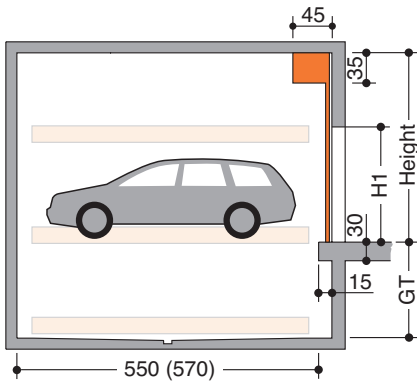
<sup>11</sup> Only applies to manually operated doors. The electrically driven doors must have 35 cm.



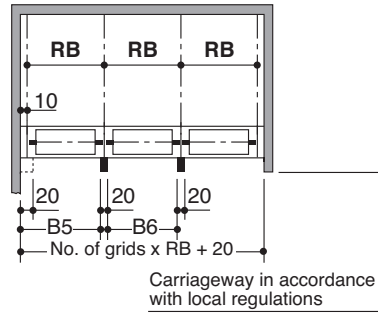
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## Garages with roll doors | Widths dimensions

### Roll door behind columns



### Columns per each grid unit



Type	GT	Height	H1
4300	175	325/345/365/405	210
4300	175	380/435	220
4300	200	350/375	210
4300	200	380/405/435	220
4300	230	380/405/420/435	220
4300	240	390/405/415/435/445/455	230

Usable platform width	RB <sup>10</sup>	B5	B6
230	250	250	230
240	260	260	240
250	270	270	250
260	280	280	260
270	290	290	270

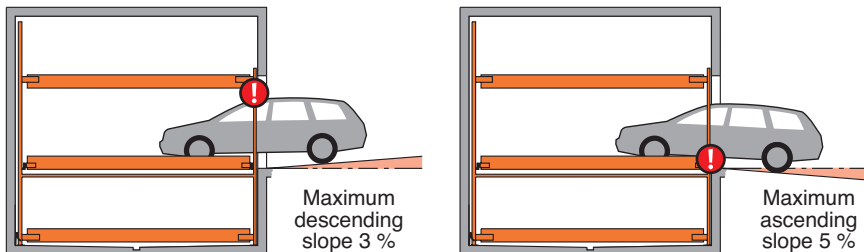
**!** According to the BGR 232, an inspection book is required for the commercial use of a gate with electric drive. Prior to commissioning, and then once a year, the gate has to be inspected by an expert and the findings entered in the inspection book. The inspection has to be carried out independent of any maintenance work.

For parking boxes on the edges and boxes with intermediate walls we recommend our maximum platform width of 270 cm. Please consider adjoining grids. Problems may occur if smaller platform widths are used (depending on car type, access and individual driving behaviour and capability).

For larger limousines and SUV wider driveways are necessary (in particular on the boxes on the sides due to the missing manoeuvring radius).

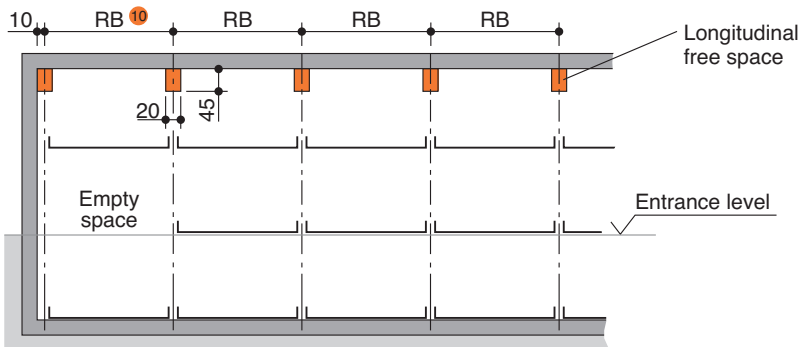
<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

## Approach



**!** The illustrated maximum approach angles must not be exceeded. Incorrect approach angles will cause serious manoeuvring & positioning problems on the parking system for which the local agency of KLAUS Multiparking accepts no responsibility.

## Longitudinal free space



<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

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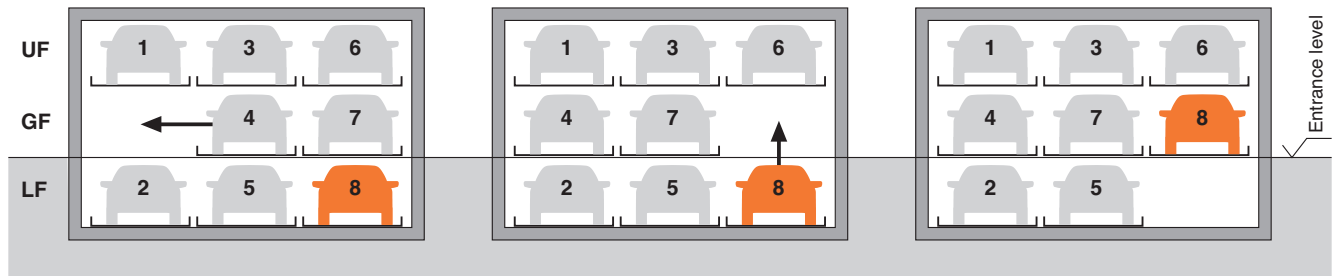
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## Function with standard numbering and identification of parking levels

e.g. for parking space No. 8:  
Check first that all doors are closed, then select No. 8 on operating panel.



For driving the vehicle off platform No. 8 the ground floor parking platforms are shifted to the left.

The empty space is now below the vehicle which shall be driven off the platform. The platform No. 8 will be lifted.

The vehicle on platform No. 8 can now be driven off the platform.

## Load plan

### 4300-175

Type 4300-175			
Height	Car height		
	GF	H3	H4
325	150	130	245
345	170	150	265
365	190	170	285
365	170	150	265
380	205	185	300
405	190	170	285
435	205	185	300

### 4300-200

Type 4300-200			
Height	Car height		
	GF	H3	H4
350	175	155	270
375	175	155	270
380	205	185	300
405	205	185	300
435	205	185	300

### 4300-230

Type 4300-230			
Height	Car height		
	GF	H3	H4
380	205	185	300
405	205	185	300
420	205	185	300
435	205	185	300

### 4300-240

Type 4300-240			
Height	Car height		
	GF	H3	H4
390	215	195	310
405	215	195	310
415	215	195	310
435	215	195	310
445	215	195	310
455	215	195	310

## Load plan – top view

Usable platform width	RB <sup>10</sup>	RB1	RB2	Platform load	F1	F2	F3	F4	F5	F6	F7	F8	F9 <sup>12</sup>
230	250	260	135	2000 kg	±5	±2,5	±14,5	+70	±29	±0,2	±2,5	+25	+50
240	260	270	140	2600 kg	±5	±2,5	±14,5	+80	±29	±0,2	±2,5	+35	+70
250	270	280	145										
260	280	290	150										
270	290	300	155										

**!** The system is dowelled to floor and walls. The drilling depth in the floor is approx. 15 cm. The drilling depth in the walls is approx. 12 cm.

Floor and walls are to be made of concrete (grade of concrete min. C20/25)!

The dimensions for the points of support are rounded values. If the exact position is required, please contact KLAUS Multiparking.

<sup>10</sup> RB = Grid unit width **must** strictly conform to dimensions quoted!

<sup>12</sup> All forces in kN

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## Technical data

### Field of application

By default, the system can only be used for a fixed number of users.

If different users use the system (e.g. short-time parkers in office buildings or hotels) the Multiparking system needs to be adjusted. If required, would you please contact us.

### Available documents

- wall recess plans
- maintenance offer/contract
- declaration of conformity
- test sheet on airborne and slid-borne sound

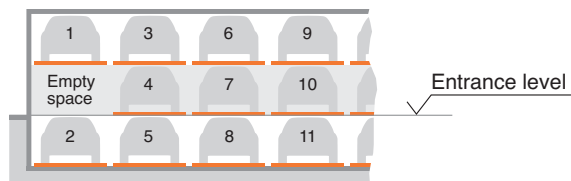
### Environmental conditions

Environmental conditions for the area of multiparking systems: Temperature range  $-10$  to  $+40^{\circ}\text{C}$ . Relative humidity 50% at a maximum outside temperature of  $+40^{\circ}\text{C}$ .

If lifting or lowering times are specified, they refer to an environmental temperature of  $+10^{\circ}\text{C}$  and with the system set up directly next to the hydraulic unit. At lower temperatures or with longer hydraulic lines, these times increase.

### Numbering

Standard numbering of the parking spaces:



Initial position: lower floor platform No. 2 at entrance level (covering of pit; safety regulation).

Different numbering is only possible at extra cost

Please take note of the following specifications:

- In general, the empty space must be arranged to the left.
- The numbers must be provided 8 – 10 weeks before the delivery date.

### Sound insulation

According to DIN 4109 (Sound insulation in buildings), para. 4, annotation 4, KLAUS Multiparkers are part of the building services (garage systems).

#### Normal sound insulation:

DIN 4109, para. 4, Sound insulation against noises from building services.

Table 4 in para. 4.1 contains the permissible sound level values emitted from building services for personal living and working areas. According to line 2 the maximum sound level in personal living and working areas must not exceed 30 dB (A).

*Noises created by users are not subject to the requirements (see table 4, DIN 4109).*

The following measures are to be taken to comply with this value:

- Sound protection package according to offer/order (KLAUS Multiparking GmbH)
- Minimum sound insulation of building  $R'_w = 57$  dB (to be provided by customer)

#### Increased sound insulation (special agreement):

Draft DIN 4109-10, Information on planning and execution, proposals for increased sound insulation.

Agreement: Maximum sound level in personal living and working areas 25 dB (A). *Noises created by users are not subject to the requirements (see table 4, DIN 4109).*

The following measures are to be taken to comply with this value:

- Sound protection package according to offer/order (KLAUS Multiparking GmbH)
- Minimum sound insulation of building  $R'_w = 62$  dB (to be provided by customer)

Note: User noises are noises created by individual users in our Multiparking systems. These can be noises from accessing the platforms, slamming of vehicle doors, motor and brake noises.

### Electrically driven doors

In accordance with BGR 232 commercially used power-driven doors must be subjected to annual inspections. We urgently recommend concluding a maintenance agreement that includes this service for the entire system.

### Building application documents

According to LBO and GaVo (garage regulations) the Multiparking systems are subject to approval. We will provide the required building application documents.

### Care

To avoid damages resulting from corrosion, make sure to follow our cleaning and care instructions and to provide good ventilation of your garage.

### Corrosion protection

See separate sheet regarding corrosion protection.

### CE Certification

The systems on offer comply with DIN EN 14010 and EC Machine Directive 2006/42/EC. Furthermore, this system underwent voluntary conformity testing by TÜV SÜD.

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ CERTIFICADO ◆ CERTIFICAT



### Certificate concerning the examination of conformity

<b>Certificate no:</b>	<b>KP 194</b>
<b>Certification body:</b>	TÜV SÜD Industrie Service GmbH Zertifizierungsstelle für Produkte der Fördertechnik Westendstr. 199 80686 München - Germany
<b>Applicant / Certification holder:</b>	Klaus Multiparking GmbH Hermann-Krum-Str. 2 88319 Altrach - Germany
<b>Date of application:</b>	2012-03-09
<b>Manufacturer:</b>	Klaus Multiparking GmbH Hermann-Krum-Str. 2 88319 Altrach - Germany
<b>Product:</b>	Equipment for power driven parking of motor vehicles
<b>Type:</b>	<b>TrendVario 4100 2.000 kg and 2.600 kg</b> <b>TrendVario 4300 2.000 kg and 2.600 kg</b>
<b>Test laboratory:</b>	TÜV SÜD Industrie Service GmbH Prüflaboratorium für Produkte der Fördertechnik Prüfbereich Maschinen der Fördertechnik Gottlieb-Daimler-Str. 7 70794 Filderstadt - Germany
<b>Date and number of the test report / mark of conformity:</b>	2014-01-22 <b>TÜ SW-12-230 DG</b>
<b>Test specifications:</b>	- 2006 / 42 / EC, Annex I - DIN EN 14010
<b>Validity:</b>	<b>This Certificate is valid until 2019-02-13</b>
<b>Result:</b>	The equipment fulfills the requirements of the test specifications for the respective scope of application stated in the annex (page 1) of this certificate, keeping the mentioned conditions.
<b>Date of issue:</b>	2014-02-14

Certification body for lifts and cranes




Chadri Noureddine



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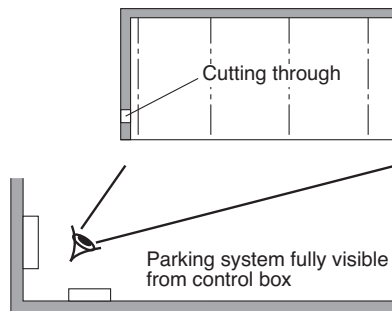
## Electrical data

### Control box

The control box must be accessible at all times from outside!

Dimensions approx. 100 x 100 x 30 cm.

Cutting through of wall from control box to parking system (contact the local agency of KLAUS Multiparking for clarification).



### Electrical supply to the control box / Foundation earth connector

Suitable electrical supply min. 5 x 2,5 mm<sup>2</sup> (3 PH+N+PE) to control box with mains fuse 3 x 16 A slow or over-current cut-out 3 x 16 A trigger characteristic K or C. DIN/VDE and local regulations must be taken into consideration.

Suitable electrical supply to the control box must be provided by the customer during installation. The functionality can be monitored on site by our fitters together with the electrician. If this cannot be done during installation for some reason for which the customer is responsible, the customer must commission an electrician at their own expense and risk.

In accordance with DIN EN 60204 (Safety of Machinery. Electrical Equipment), grounding of the steel structure is necessary, provided by the customer (distance between grounding max. 10 m).

### Operating device

Easy-to-survey positioning (e.g. on column).

Protection against unauthorized use.

May also be recessed in wall if required.

## To be performed by the customer

### Safety fences

Any constraints that may be necessary according to DIN EN ISO 13857 in order to provide protection for the park pits for pathways directly in front, next to or behind the unit. This is also valid during construction.

### Numbering of parking spaces

Consecutive numbering of parking spaces.

### Building services

Any required lighting, ventilation, fire extinguishing and fire alarm systems as well as clarification and compliance with the relevant regulatory requirements.

### Drainage

For the middle area of the pit we recommend a drainage channel, which you connect to a floor drain system or sump (50 x 50 x 20 cm). The drainage channel may be inclined to the side, however not the pit floor itself (longitudinal incline is available). In the interests of environmental protection we recommend painting the pit floor. Oil and petrol separators must be provided according to the statutory provisions when connecting to the public sewage system!

### Wall cuttings

Any necessary wall cuttings.

### Strip footings

If due to structural conditions strip footings must be effected, the customer shall provide an accessible platform reaching to the top of the said strip footings to enable and facilitate themounting work.

### Electrical supply to the control box / Foundation earth connector

Suitable electrical supply to the control box must be provided by the customer during installation. The functionality can be monitored on site by our fitters together with the electrician. If this cannot be done during installation for some reason for which the customer is responsible, the customer must commission an electrician at their own expense and risk.

In accordance with DIN EN 60204 (Safety of Machinery. Electrical Equipment), grounding of the steel structure is necessary, provided by the customer (distance between grounding max. 10 m).

### Door suspension

The lintel height H2 (see page 2) is absolutely necessary. With differing heights, additional fixings are required for extra charge.

### Door shields

Door shields that may be necessary. If desired, they can be ordered from KLAUS Multiparking for an additional charge.

### If the following are not included in the quotation, they will also have to be provided / paid for by the customer:

– Costs for final technical approval by an authorized body

## Description

### General description:

Multiparking system providing independent parking spaces for cars, one on top of the other and side by side.

Dimensions are in accordance with the underlying dimensions of parking pit, height and width.

The parking bays are accessed horizontally (installation deviation  $\pm 1\%$ ).

Along the complete width of the parking automat an approach lane (driving lane in accordance with local regulations) must be available. Parking spaces are arranged on three different levels, one level on top of the other.

The platforms of both the lower floor (LF) and upper floor (UF) are moved vertically, the platforms of the ground floor (GF) horizontally. At approach level (GF) there is always one parking space less available. This vacant space is used for shifting the ground floor (GF) parking spaces sideways, thus enabling an upper floor (UF) parking space or lower floor (LF) parking space to be lowered or lifted to approach level. Consequently, a unit of five parking spaces (2 on the upper floor, 1 on the ground floor, 2 on the lower floor) is the smallest unit available for this parking system.

The TrendVario 4300 allows parking of passenger cars and station wagons.

For safety reasons the platforms can only be moved behind locked doors.

All necessary safety devices are installed. This consists mainly of a chain monitoring system, locking lever for the upper and lower platforms and locked doors. The doors can only be opened if the selected parking space has reached the park position and all openings are secured.

### A steel framework mounted inside the pit, consisting of:

- Seriated supports
- Steel pillars with sliding platform supports
- Cross and longitudinal members
- running rails for the transversely movable ground floor (GF) platforms

### Platforms consisting of:

- Side members
- Cross members
- Platform base sections
- 1 wheel stop (on the right per parking space)
- Screws, small parts, etc.

### Lifting device for upper floor (UF) and lower floor (LF) platforms:

- Hydraulic cylinder with solenoid valve
- Chain wheels
- Chains
- Limit switches
- The platforms are suspended on four points and guided along the supports using plastic sliding bearings.

### Drive unit of transversely movable platforms on the ground floor (GF):

- Gear motor with chain wheel
- Chains
- Running and guide rollers (low-noise)
- Power supply via cable chain

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## Description

### Hydraulic unit consisting of:

- Hydraulic power unit (low-noise, installed onto a console with a rubber-bonded-to-metal mounting)
- Hydraulic oil reservoir
- Oil filling
- Internal geared wheel pump
- Pump holder
- Clutch
- 3-phase-AC-motor (3.0 kW, 230/400 V, 50 Hz)
- Motor circuit breaker
- Test manometer
- Pressure relief valve
- Hydraulic hoses (which reduce noise transmission onto the hydraulic pipe)

### Control system:

- Central control panel (operating device) used to select the desired parking space
- With series installation, the doors are opened manually  
If desired, this can also be done using electric motors
- Electric wiring is made from the electric cabinet by the manufacturer

### Roller doors:

#### Size

Dimensions modified based on width and height measurements.

#### Shutter box

- 2-piece, roll formed aluminium box 45° consisting of upper and lower part
- lacquered type

#### Guide rails

- extruded aluminium guide rails with brush insert
- lacquered type

#### Gate type

- aluminium gate type, roll formed
- end rod with electronic safety strip
- lacquered type

#### Colour options

Shutter box, guide rails and gate type are available with the following colour options:

- RAL 9010 (white)
- RAL 7038 (light grey)
- RAL 9006 (aluminium metallic)

#### Door actuation

Powered electrically by means of tube motor in the shaft.

For safety reasons the movement of the platforms is always made behind locked doors. Position sensing, i.e. "door open" and "door closed" is effected by electric signalers.

### Sliding doors:

#### Size

Sliding door, dimensions: approx. 2500 mm x 2000 mm (width x height).

#### Frame

- Frame construction with vertical centre stay bar made from extruded aluminium profiles (anodized, layer thickness approx 20 µm).
- To open the doors a recessed grip is integrated in the aluminium profile.
- A rubber lip is used for the finishing of the closing edge to the building.

#### Standard door panel

- Perforated steel plate
- Thickness 1mm, RV 5/8, galvanized, layer thickness: approx. 20 µm
- Ventilation cross-section of the panel approx. 40%
- Not suitable for outdoor garages

#### Alternative door panel

- Perforated aluminium plate
- Thickness 2mm, RV 5/8 E6/EV1, anodized, layer thickness: approx. 20 µm
- Ventilation cross-section of the panel approx. 40%

#### Beaded steel plate

- Thickness 1mm, galvanized, layer thickness: approx. 20 µm.
- additional power coating, layer thickness: approx. 25 µm on the outside and approx. 12 µm on the inside
- Colour options for the outside (building view):  
RAL 1015 (light ivory), RAL 3003 (ruby),  
RAL 5014 (pigeon blue), RAL 6005 (moss green),  
RAL 7016 (charcoal grey), RAL 7035 (light grey),  
RAL 7040 (window grey), RAL 8014 (sepia),  
RAL 9006 (white aluminium), RAL 9016 (traffic white)
- Inside of the gates in light grey

#### Plain aluminium sheet

- Thickness 2mm, E6/EV1, anodized, layer thickness: approx. 20 µm

#### Wooden panelling

- Nordic spruce in grade A
- vertical tongue and groove boards
- preimpregnated colourless

#### Laminated safety glass

- Laminated safety glass made from single pane safety glass 8/4mm

#### Wire grating

- Mesh size 12 x 12 mm
- Mesh size 40 x 40 mm (for manual sliding gates only)

#### Running rails

- The running gear of each door consists of 2 twin-pair rolling gadgets, adjustable in height
- The running rails of the doors are fixed to brackets or the concrete lintel, or on a building-specific door suspension using ceiling fittings
- The guide consists of 2 plastic rollers mounted to a base plate, which is dowelled to the floor
- Running rails, ceiling fittings and guide roller base plate are hot-dip galvanized

#### Door actuation

##### Standard:

- Manually, i.e. the door is opened and closed by hand

##### Alternatively:

- Electric drive via electric motor mounted to the rail system at the turning point of the sliding doors. The drive pinion engages into the chain mounted to the door.

For safety reasons the movement of the platforms is always made behind locked doors. Position sensing, i.e. "door open" and "door closed" is effected by electric signalers.

#### Separation (if necessary):

- Upon request

#### Please note:

Door panels (on the side, cover for running rails, etc.) and door suspensions are not included in the standard version but can be delivered against surcharge as special equipment.

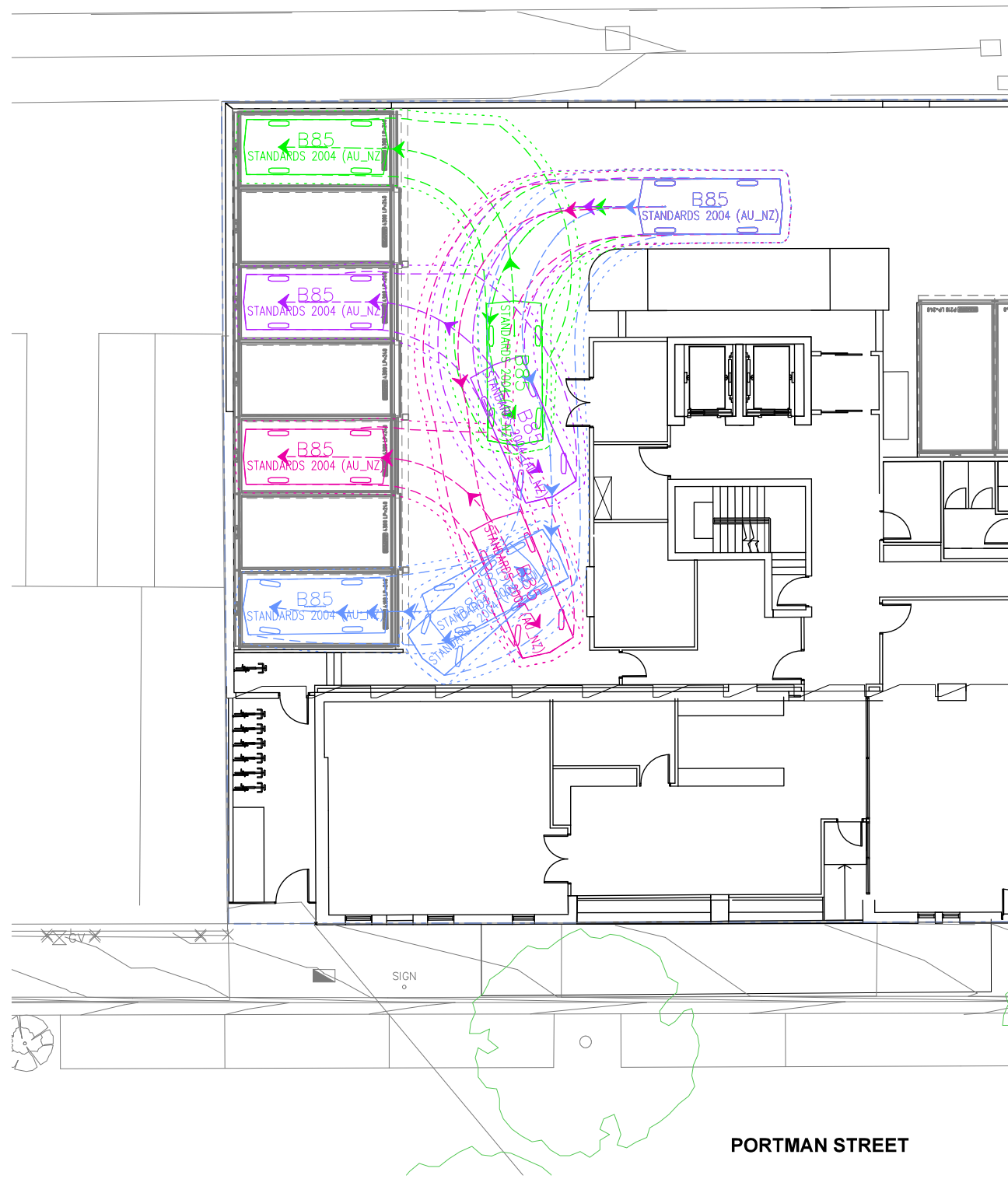
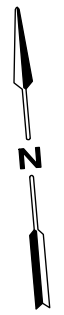
## We reserve the right to change this specification without further notice

KLAUS Multiparking reserves the right in the course of technical progress to use newer or other technologies, systems, processes, procedures or standards in the fulfillment of their obligations other than those originally offered provided the customer derives no disadvantage from their so doing.



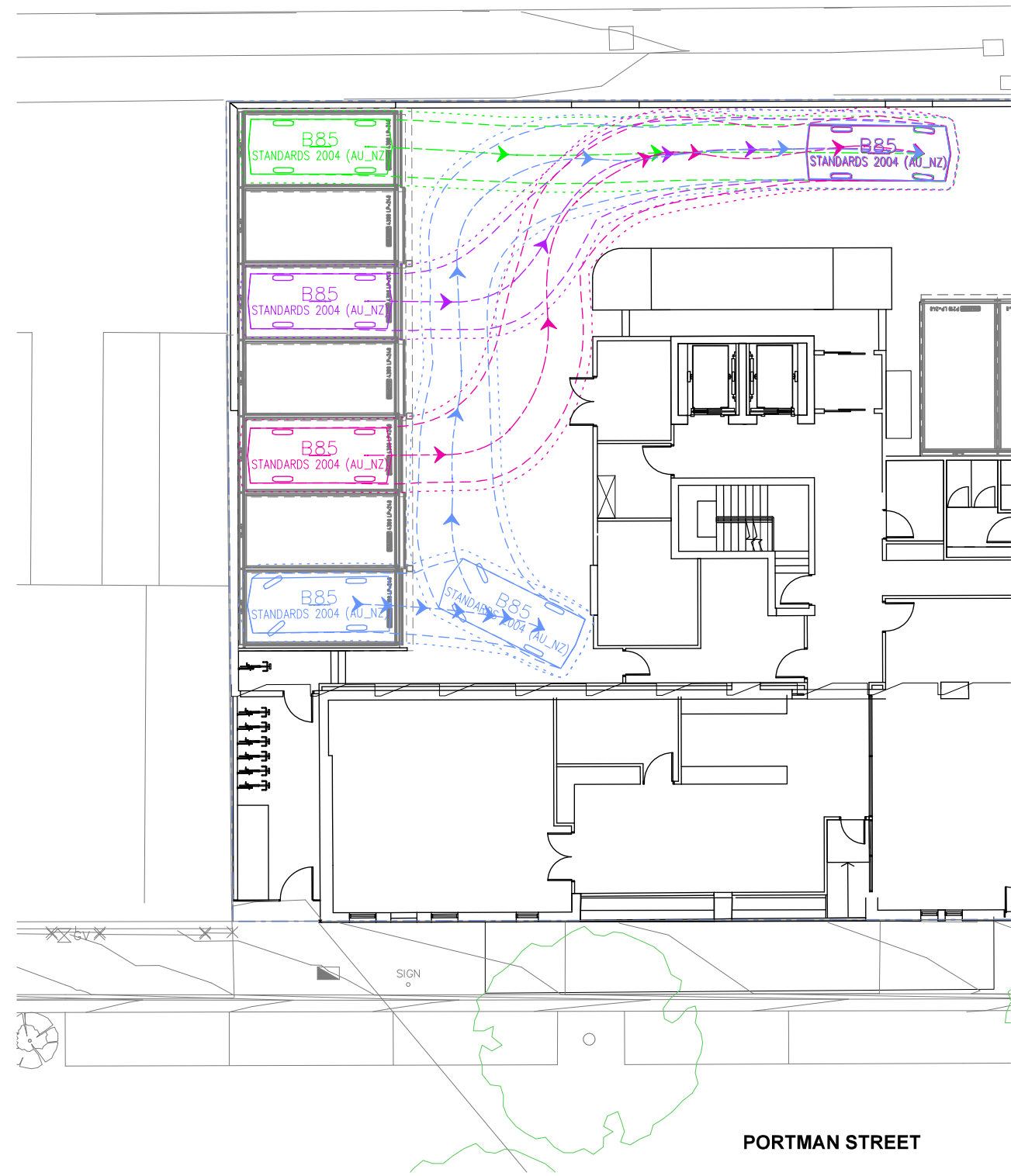
# ***Appendix B    Swept Path Diagrams***





**ENTRY MANOEUVRES**

----- B85 CAR SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

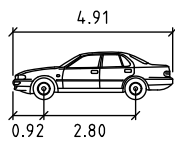


**EXIT MANOEUVRES**

----- B85 CAR SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Date Plotted: 20-03-2020 11:48:03



B85	units
Width	: 1.87 meters
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.1

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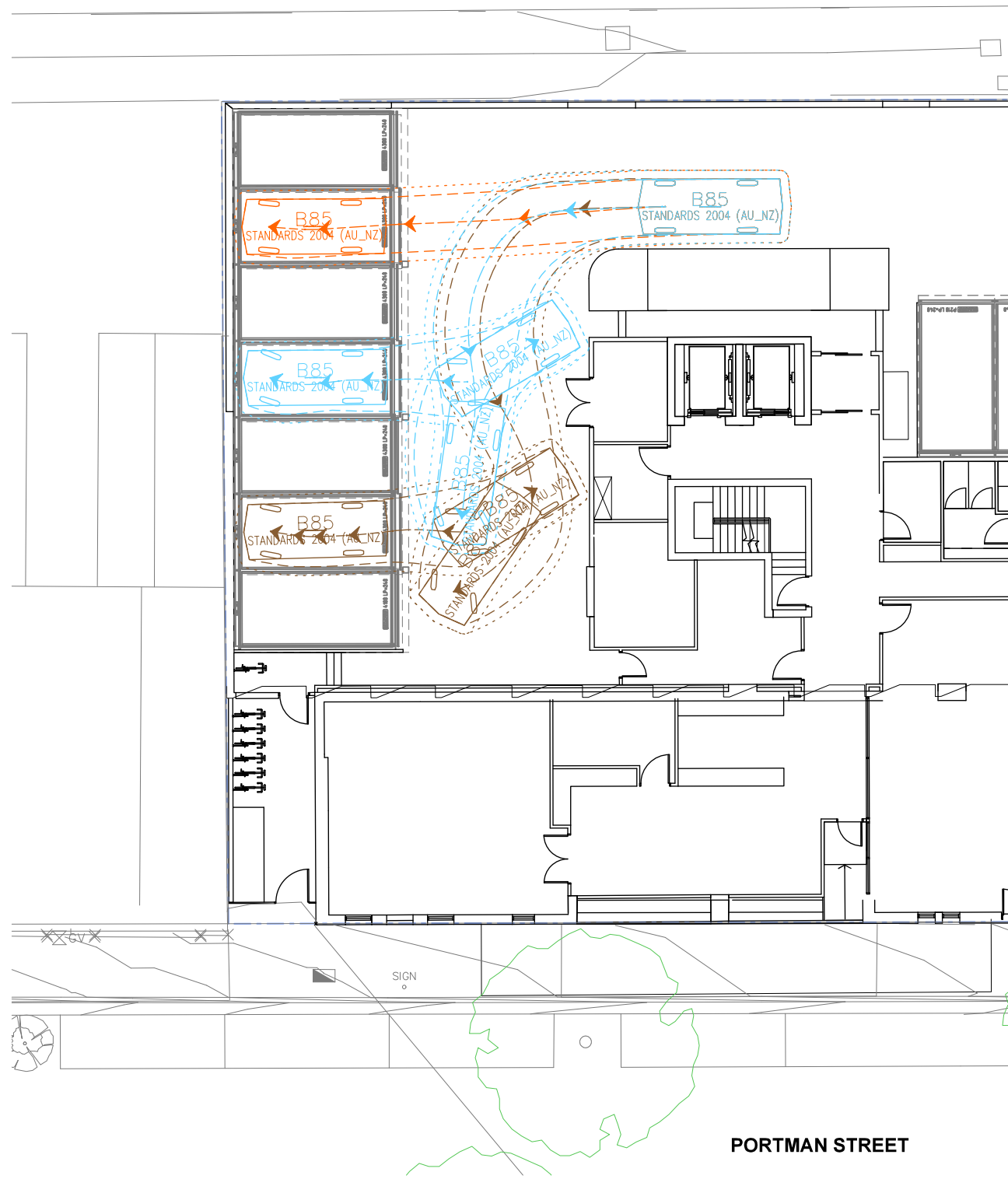
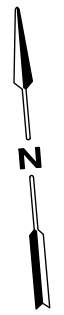


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 VEHICLE SITE ACCESS  
 SWEEP PATH ANALYSIS (1 of 2)

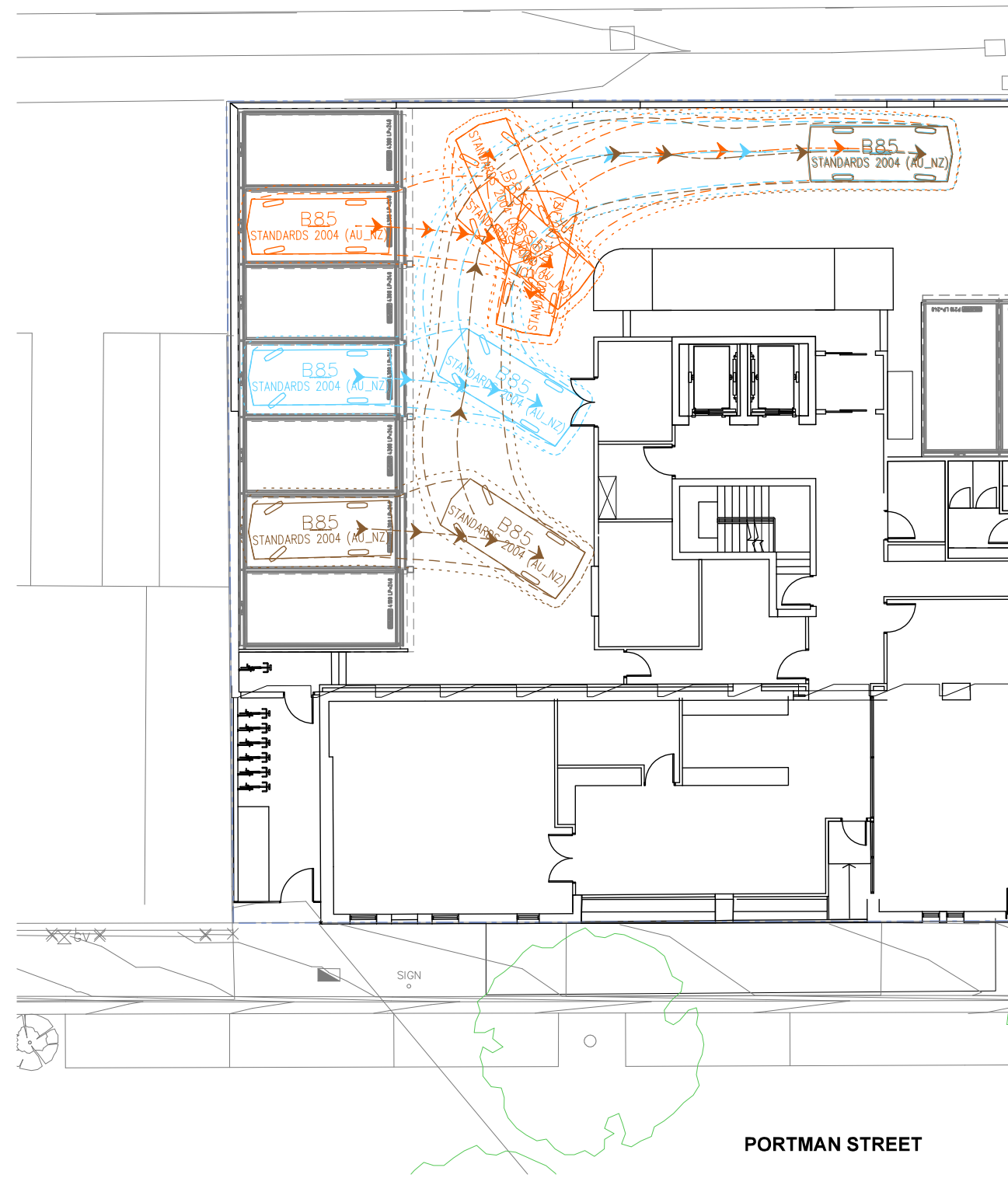
Designed	Approved	Metway Ref
DK	JD	69 F8

Project Number	Drawing Number	Revision
190206	SPA100	C



**ENTRY MANOEUVRES**

----- B85 CAR SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

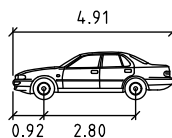


**EXIT MANOEUVRES**

----- B85 CAR SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Date Plotted: 20-03-2020 11:48:42



B85		units
Width	: 1.87	meters
Track	: 1.77	
Lock to Lock Time	: 6.0	
Steering Angle	: 34.1	

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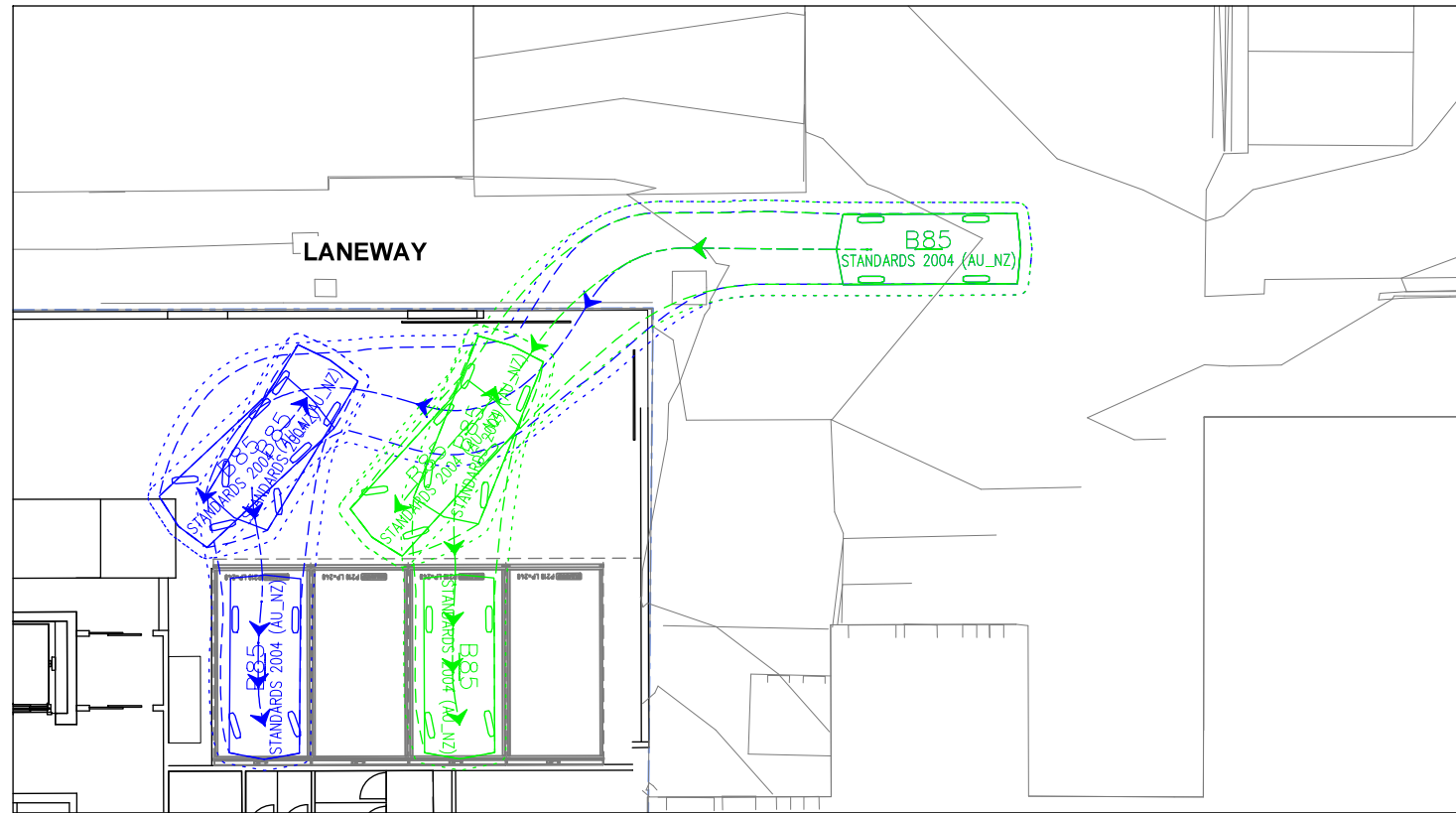


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Drawing Title  
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 VEHICLE SITE ACCESS  
 SWEEP PATH ANALYSIS (2 of 2)

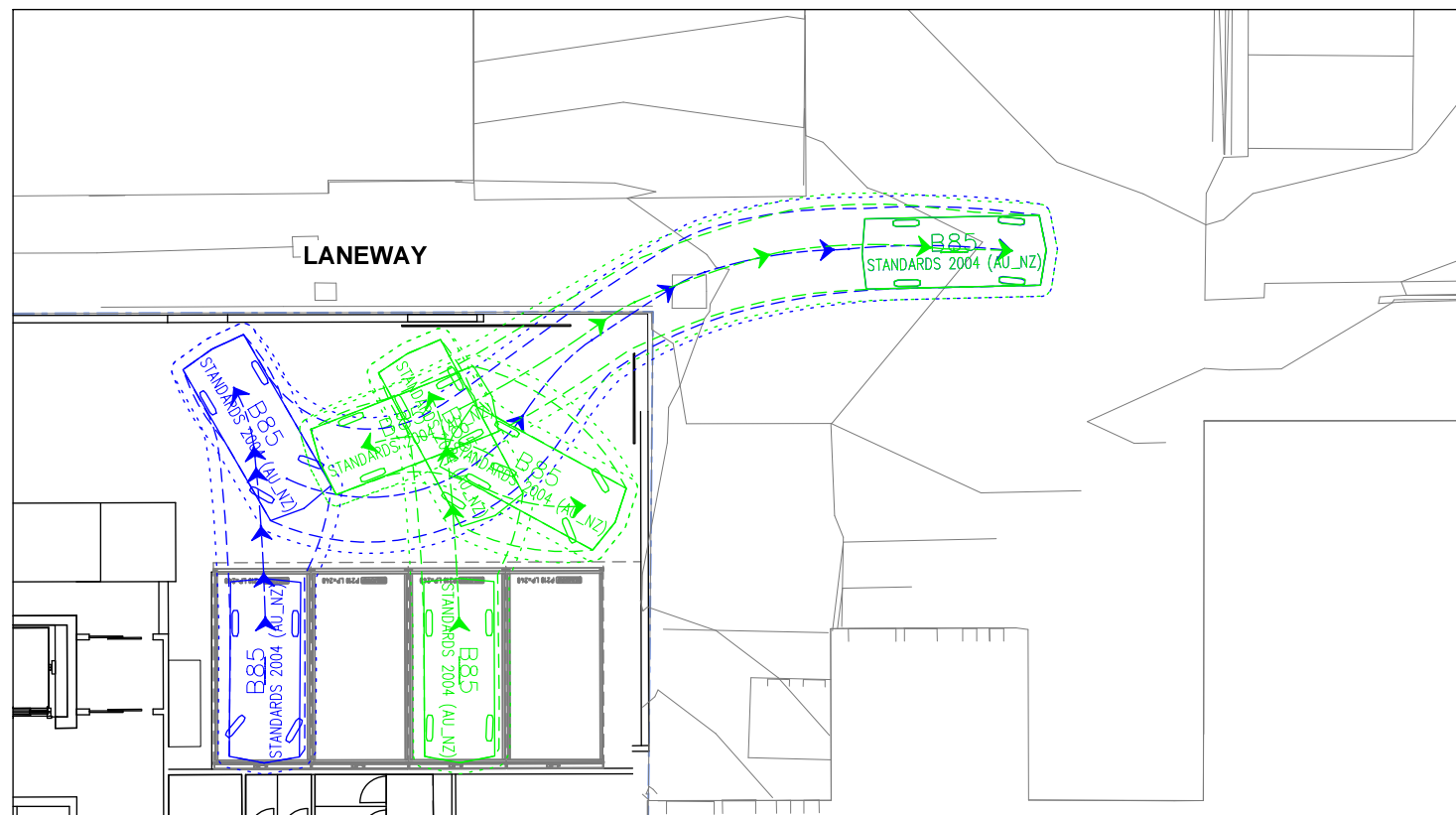
Designed	Approved	Metway Ref
DK	JD	69 F8

Project Number	Drawing Number	Revision
190206	SPA101	C



**ENTRY MANOEUVRES**

----- DESIGN VEHICLE SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

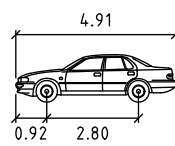


**EXIT MANOEUVRES**

----- DESIGN VEHICLE SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Date Plotted: 20-03-2021:11:55:58



B85 meters  
 Width : 1.87  
 Track : 1.77  
 Lock to Lock Time : 6.0  
 Steering Angle : 34.1

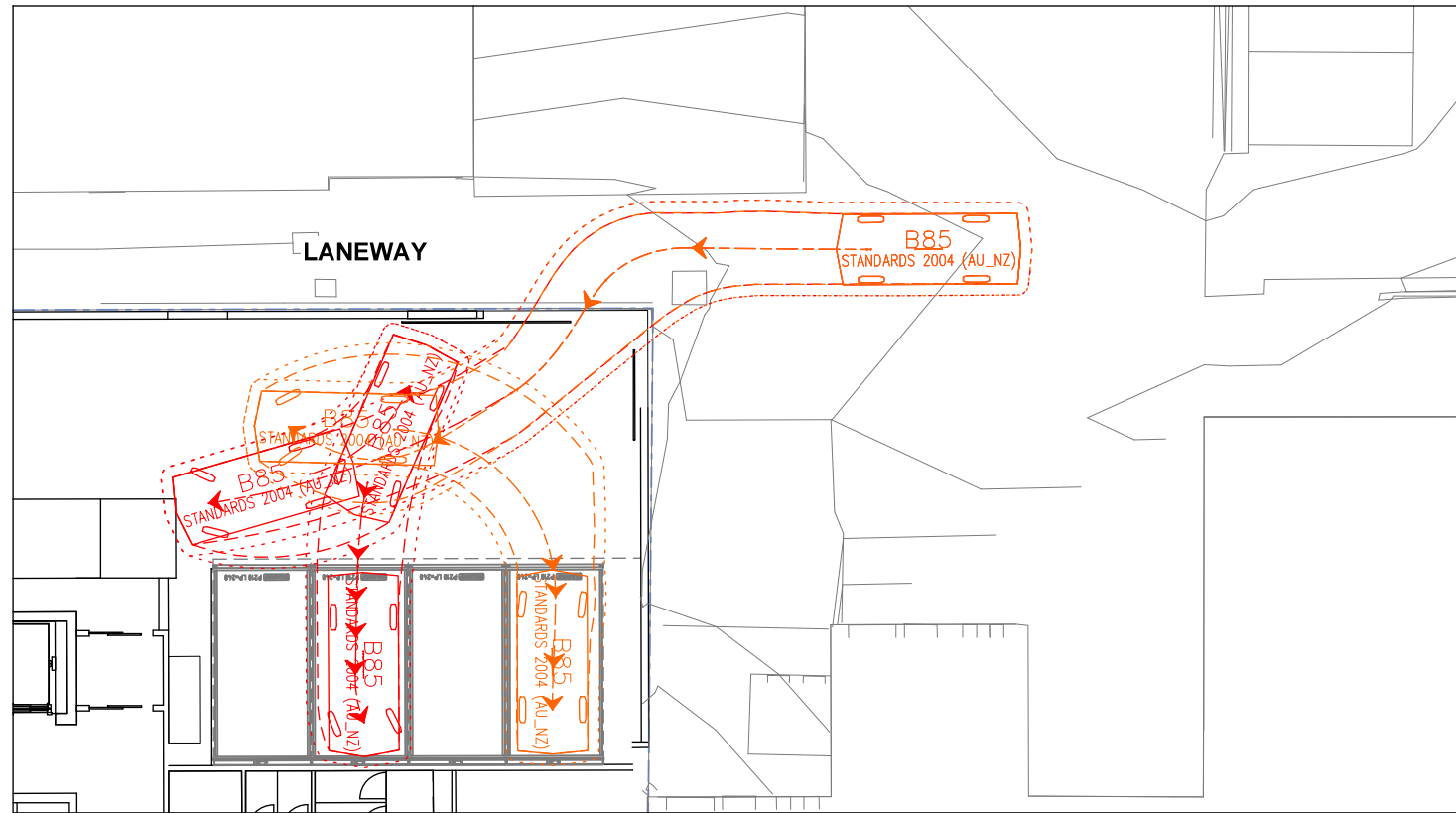


Drawing Title  
 45 PORTMAN STREET, OAKLEIGH  
 VEHICLE STACKER ACCESS  
 SWEEP PATH ANALYSIS (1 of 2)

Designed DK	Approved JD	Metway Ref 69 F8
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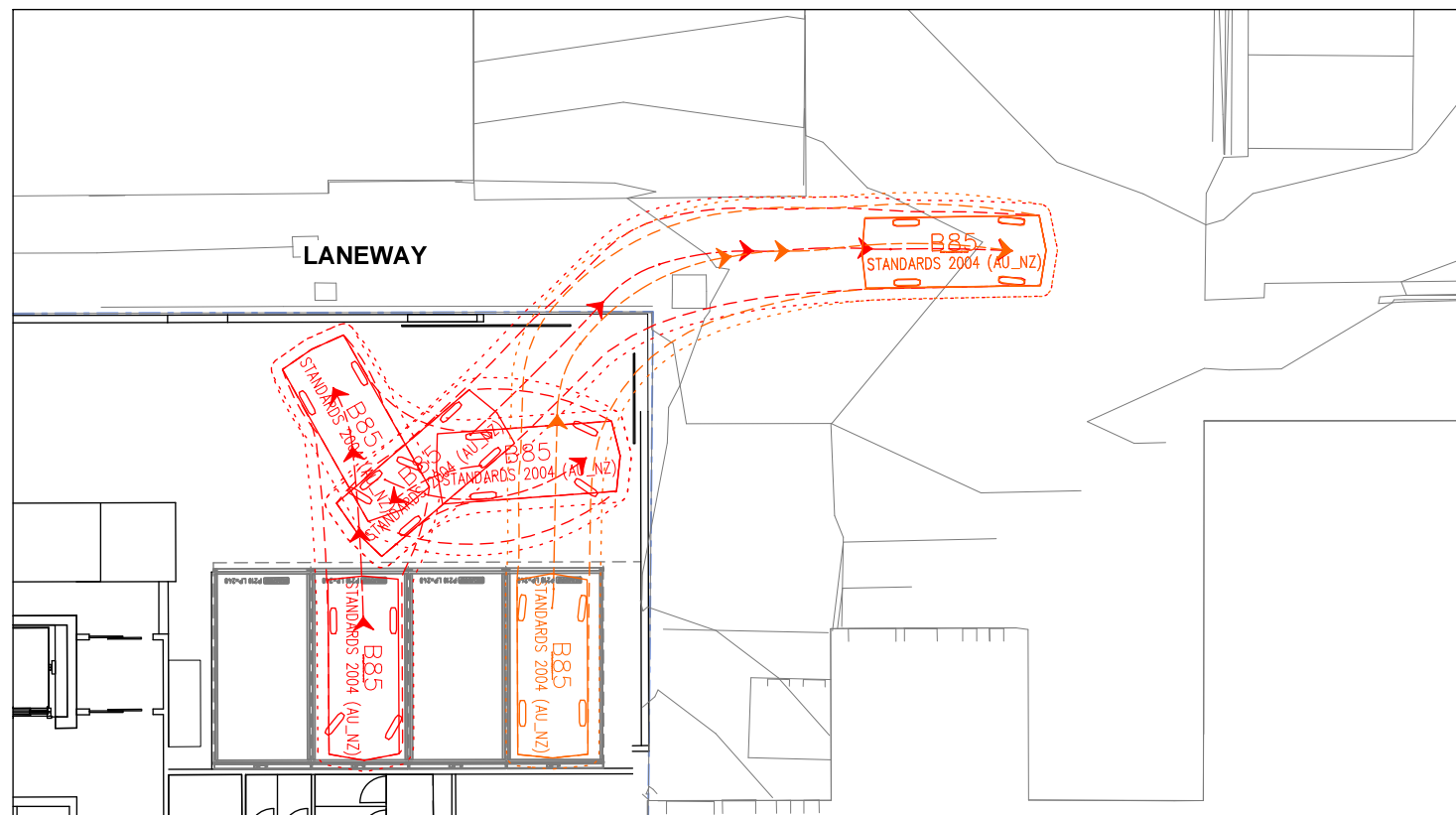
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Project Number 190206	Drawing Number SPA103	Revision B
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**ENTRY MANOEUVRES**

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 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

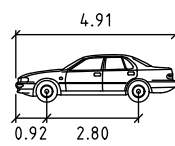


**EXIT MANOEUVRES**

----- DESIGN VEHICLE SWEEP PATHS SHOWN DASHED  
 ..... 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Date Plotted: 20-03-2020 11:57:45



B85 meters  
 Width : 1.87  
 Track : 1.77  
 Lock to Lock Time : 6.0  
 Steering Angle : 34.1



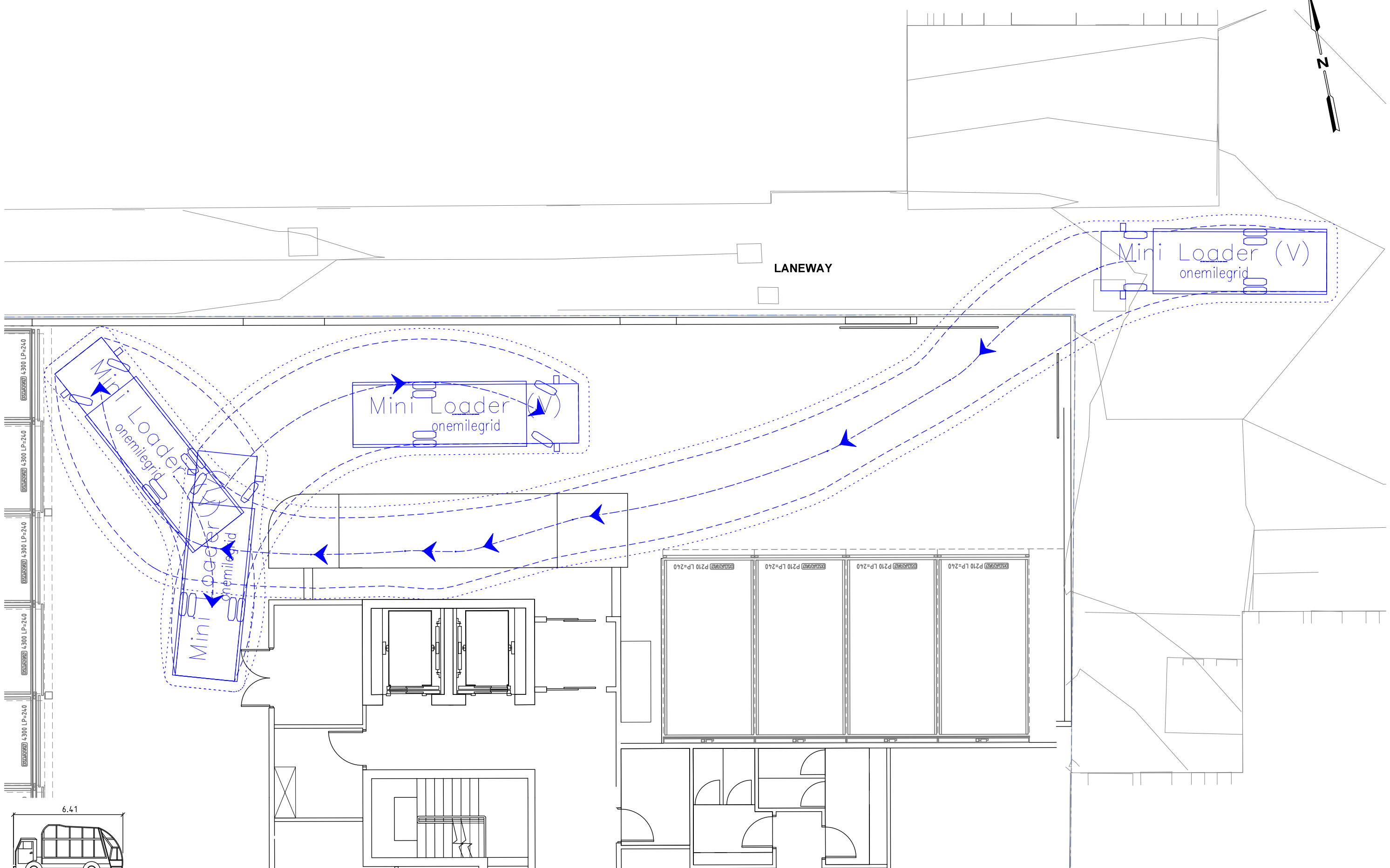
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 45 PORTMAN STREET, OAKLEIGH  
 VEHICLE STACKER ACCESS  
 SWEEP PATH ANALYSIS (2 of 2)

Designed DK	Approved JD	Metway Ref 69 F8
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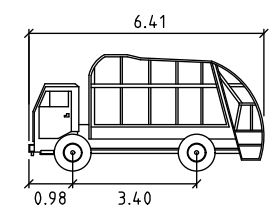
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Project Number 190206	Drawing Number SPA104	Revision B
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CAD File: N:\Projects\2019\190206\Drawings\190206SPA102.dgn



WASTE MINI LOADER		units
Width	: 1.85	meters
Track	: 1.85	meters
Lock to Lock Time	: 4.0	seconds
Steering Angle	: 33.6	degrees

**LEGEND**  
 - - - - - DESIGN VEHICLE SWEEP PATHS SHOWN DASHED  
 ······· 300mm CLEARANCE ENVELOPE SHOWN DOTTED

56 Down Street, Collingwood, VIC 3066  
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 Phone (03) 9939 8250

Scale: 1:100 @ A3

Drawing Title		
45-49 PORTMAN STREET, OAKLEIGH MINI LOADER SITE ACCESS SWEEP PATH ANALYSIS		
Designed DK	Approved JD	Metway Ref 69 F8
Project Number 190206	Drawing Number SPA102	Revision C

Date Plotted: 20-03-2020 11:51:05

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