Traffic Engineering Report

Proposed Mixed-Use Development

At 26 Edmondstone Road, Bowen Hills

On behalf of The Trustee for 26 Edmondstone Road Unit Trust

About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

No.	Author	Reviewed/Approved		Description	Date
1.	T. Winter	D. Grummitt		Draft DA Report	12/09/18
2.	T. Winter	D. Grummitt RPEQ 19356		Final DA Report	19/09/18
3.	T. Winter			Draft Amended DA Report	15/04/19
4.	T. Winter	D. Grummitt RPEQ 19356		Final Amended DA Report	15/04/19
5.	T. Winter	D. Grummitt RPEQ 19356		Revised Report for RFI	17/12/19
6.	A. Stamatiou	D. Grummitt RPEQ 19356		Revised Report for RFI	19/12/19
7.	D. Grummitt	D. Grummitt RPEQ 19356		Further Issues	23/06/20

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1 Introduction

1.1 Background

TTM Consulting has been engaged by 26 Edmondstone Road Unit Trust to prepare a revised traffic engineering report investigating the amended mixed-use development scheme. It is understood that the revised traffic engineering report will form part of an Information Request response to Economic Development Queensland (EDQ).

1.2 Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand
- Parking layout to provide efficient and safe internal manoeuvring
- Identification of likely traffic impact of development on the public road network
- Access configuration to provide efficient and safe manoeuvring between the site and the public road network
- Suitability of access and internal facilities to provide for pedestrian and cyclist operation

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- Bowen Hills Urban Development Area Development Scheme
- Brisbane City Council City Plan 2014 (for guidance)
- AS2890 – Australian Standards for Parking Facilities

1.3 Site Location

The site is located at 26 Edmondstone Road, Bowen Hills, adjacent to the intersection of Edmondstone Road and Thompson Street, as shown in Figure 1.1. The property description is Lot 1 on RP41028. The site has road frontages to Edmondstone Road and Thompson Street, and is currently occupied by a commercial building. Access is currently achieved via two crossovers, one from Edmondstone Road, and one from Thompson Street. Parking is currently provided along both the Edmondstone Road and Thompson Street frontages, with up to 12 cars facilitated on-site. The existing location and orientation of the parking spaces along Edmondstone Road is undesirable.

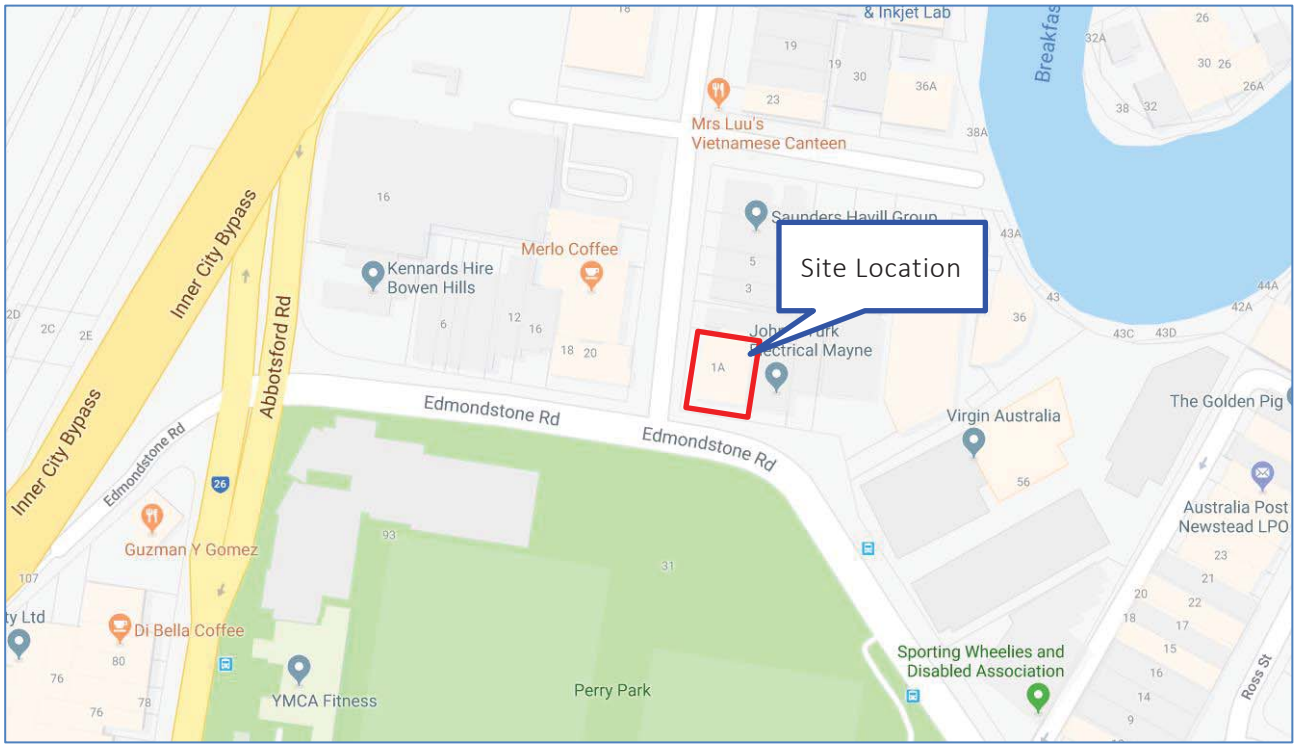


Figure 1.1: Site Location

1.4 Development Profile

The proposed land uses for this development are summarised in Table 1.1.

Table 1.1: Proposed land uses

Use	Area/Qty
Units – 1 Bedroom – 2 Bedroom – 3 Bedroom – Total	 8 dwellings 24 dwellings 10 dwellings 42 dwellings
Cafe	59.14m² GFA
Office/Showroom	198.10m² GFA

1.5 Access

The development plan includes the following access arrangements:

- Thompson Street Access located at the western side of the subject site. The characteristics of this access include:
  - 'Category 2' driveway access

- 6.8m wide at the property boundary
- Priority control
- All turns permitted

1.6 Parking

The development proposal includes the following parking supply:

- 48 spaces, which are located in basement 2 and 3
  - this includes 1 PWD bay

1.7 Servicing

On-site refuse collection and servicing will be undertaken for the development with the RCV and service vehicles temporarily parking on the driveway accessed via Thompson Street.

2 Existing Transport Infrastructure

2.1 The Road Network

The roads in the immediate vicinity of the site are administered by BCC. The hierarchy and characteristics of these roads are shown below in Table 2.1.

Table 2.1: Local Road Hierarchy

Road	Speed Limit	Lanes	Classification	Road Authority
Edmondstone Road	60kph	2 (undivided, plus parking)	District Road	BCC
Thompson Street	50kph	2 (undivided)	District Road	BCC
Abbotsford Road	60kph	6 (undivided)	Arterial Road	BCC

Edmondstone Road has a varying carriageway width along the site frontage, widening from 13m on the western side of the frontage to 18m on the eastern side of the frontage. The intersection of Edmondstone Road and Thompson Street is priority controlled.

Formalised (metered) on-street parking is provided along both sides of Edmondstone Road, limited to 12 hours between 7am-7pm on weekdays. Non-formalised parking occurs on both sides of Thompson Street. Whilst Thompson Street is not metered, given the streets location within Brisbane's Central Traffic Area, a two-hour limit is present between 7am-6pm on weekdays and 7am-12pm on Saturdays. Figure 2.1 shows the typical on-street parking conditions within the vicinity of the subject site.

Figure 2.1: Existing On-street Parking Conditions

2.2 Public Transport and Pedestrian Facilities

Train

Bowen Hills train station is located approximately a 550m walk to the south-west of the site, with frequent services to Brisbane CBD (Central station) during the peak hours.

Buses

Translink has bus routes that utilise Edmondstone Road and Abbotsford Road within the vicinity of the site. The nearest on-street bus stop is located approximately 60m to the south east of the site on Edmondstone Road. These bus stops provide services to Brisbane CBD.

Pedestrians

Formal pedestrian footpaths are located on both sides of Edmondstone Road and Thompson Street. The nearest formal pedestrian crossing of Edmondstone Road is located at the signalised intersection of Abbotsford Road and Edmondstone Road.

Cyclists

No dedicated cyclist facilities are provided within the vicinity of the site; however, cyclist awareness pavement markings are provided along Edmondstone Road. Outlined in BCC's 'City Plan 2014', Abbotsford Road is identified as a secondary cycle route, with Edmondstone Road identified as a local cycle route, as shown in Figure 2.2.

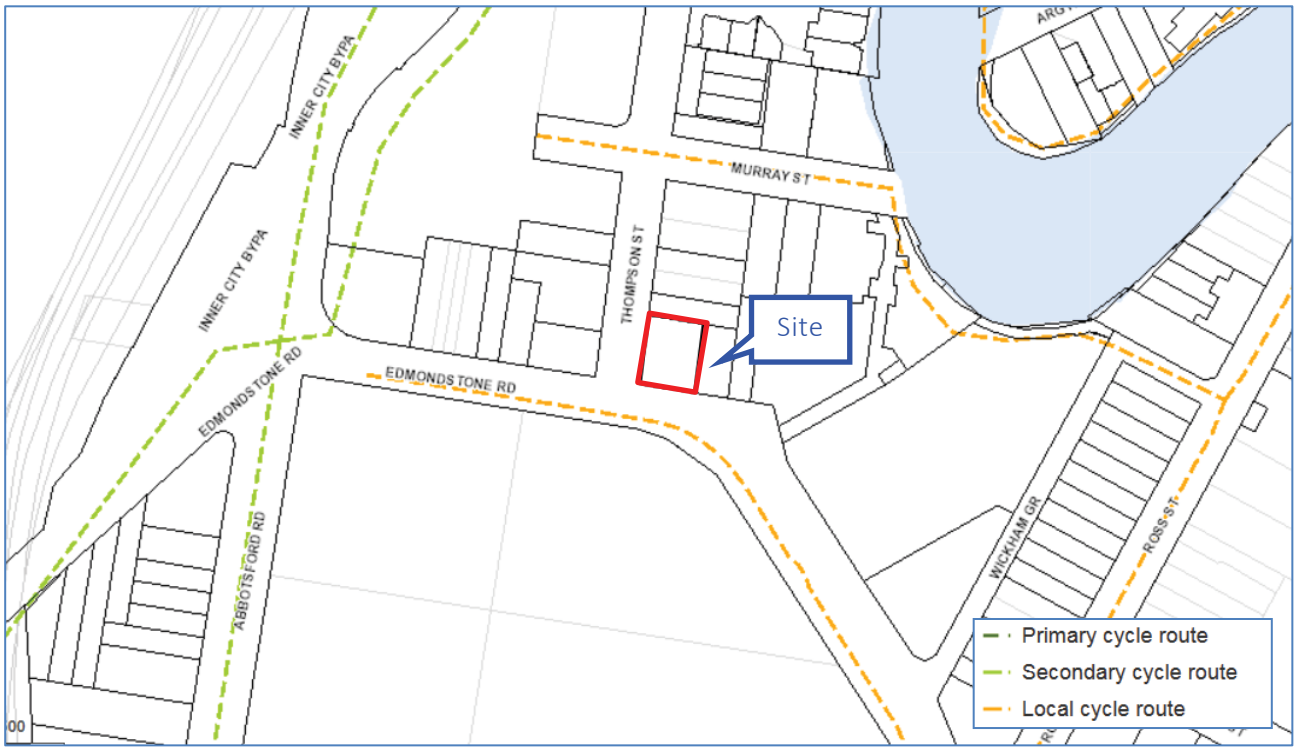


Figure 2.2: BCC Bicycle Network Overlay (Source: BCC Interactive Mapping)

3 Car Parking Arrangements

3.1 Parking Supply

The Bowen Hills UDA Development Scheme (Precinct 8: Thompson Street Precinct) details that the following parking supply is required for the site:

- For residential, an average of 1 space per dwelling (including visitor parking)
- For business and showroom, a maximum of 1 space per 75m² of GFA
- For shop and food, a maximum of 1 space per 50m² of GFA

Based on the above parking supply requirements, the required parking provision for the proposed land uses of this development is summarised in Table 3.1.

Table 3.1: Parking Supply Requirement

Land Use	EDQ Requirement	Extent	Requirement	Provision
Residential Units	1 space/dwelling	42 dwellings	42 spaces	47 spaces 1 PWD space
Cafe	1 space/50m² (max)	59.14m² GFA	2 spaces (max)	
Office/Showroom	1 space/75m² (max)	198.10m² GFA	3 spaces (max)	
Total			**Residential: 42 spaces (min.)** **Commercial: 5 spaces (max.)**	**48 spaces**

A total of 48 spaces are proposed to be provided over two basement levels including the use of car stacker and car lift systems (refer Section 3.3 below for details). The development plans include two allocated visitor parking spaces located within basement 2, including one PWD space.

Based on the parking requirements identified above, the proposed overall parking supply is acceptable.

Outlined in the Building Code of Australia, the proposed development would require a minimum provision of one space within the parking provision for the non-residential land uses. As such, 1 PWD bay has been provided.

3.2 Car Park Layout

Table 3.2 identifies the characteristics of the proposed parking area with respect to the '*AS2890.1*' requirements. The last column identifies the compliance of each design aspect.

Table 3.2: Parking Design Requirements

Design Aspect	AS2890.1 Requirement	Proposed Provision	Compliance
Parking space length: – Standard bay – Small car bay – Tandem bay	 5.4m 5.0m 10.8m	 5.4m 5.0m 10.8m	 Compliant Compliant Compliant
Parking space width: – Residential – Small car bay – Staff	 2.4m 2.3m 2.4m	 2.4m 2.3m 2.4m	 Compliant Compliant Compliant
Aisle Width: – Parking Aisle – Circulation Aisle	 5.8m 5.8m	 6.0m (min) 6.0m (min)	 Compliant Compliant
Parking envelope clearance - Column adjacent to bay	Located between 0.75m and 1.75m of aisle	Located between 0.75m and 1.75m of aisle	Compliant
Parking envelope clearance – space adjacent to wall	Space 0.3m clear of wall	Space 0.3m clear of wall	Compliant
Height Clearance – General Min. – Over PWD bay	 2.2m (2.3m PWD) 2.5m	2.5m (min)	 Compliant Compliant
Parking Aisle Extension	1m beyond last bay	0.9m beyond last bay plus 7.0m aisle width	Performance Solution

The proposed carpark layout generally complies with '*AS2890.1*' requirements; however, the following issue is resolved with a performance-based solution.

Parking Aisle Extension

Whilst the proposed aisle extension on Basement 2 does not satisfy the 1m requirement under '*AS2890.1*', the provision is suitable to cater for the end parking spaces. To demonstrate the suitability of the end aisle provision, TTM have undertaken a swept path analysis showing entry and exit manoeuvres to car parks #1 & 12/13 (TTM Drawing 18BRT0113-01 Rev D, included in **Appendix B**).

Overall, the design of the parking area is generally consistent with '*AS2890.1*' and where the requirements are not satisfied, acceptable performance solutions have been proposed. Based on this, the proposed parking arrangements are considered suitable and 'fit-for-purpose'.

3.3 Car Park Operation

3.3.1 Car Lifts

The development proposal includes two car lifts. The purpose of the car lifts is to facilitate safe movement between each of the basement levels from ground level and provide parking efficiently within the development given the spatial constraints of the site.

The layout of the basement area and positioning of the car lifts allows for vehicles to enter and exit the lifts in a forward gear.

Should another vehicle be queuing on the ground level at the same time as a vehicle is waiting/standing in the manoeuvring area, these vehicles can stand on the main driveway/parking aisle using the holding line as shown on the development plans.

Visitor parking space availability is proposed to be advised via an electronic car park management system which is to include a space occupancy recognition system linked to an electronic advisory sign located on ground level adjacent to the car park lifts. The system is also to include a warning sign to advise entering motorists of a vehicle exiting the lift system to allow the entering motorist to stand clear of the lifts to enable the exiting vehicle to manoeuvre from the lift.

The car park tilt door, located on ground level, is to remain open during typical business hours to allow unimpeded visitor parking access. Visitor access to the car park and lift system outside of typical business hours is to be made available by use of an intercom system (located adjacent the car park tilt door) such that a visitor contacts a resident who in turn can open the gate from their apartment.

The lifts will have a default position depending on the time of day and the direction of the peak movements at that time. For example, during the morning period each lift would have a default position within the basements to cater for the primary demand for vehicles exiting the car park. In the evening periods, both lifts will default to the ground level to cater for the primary demand for vehicles entering the car park. This variable default positioning of the car lifts will help reduce the wait times for respective cars, improving the efficiency of the car lifts to cater for the peak traffic flows.

Based on typical levels of operation (and an average travel speed of 0.5m/s), and 30 second manoeuvring time to and from the lift, the approximate return travel times are as follows:

- Ground to Basement 1 (return) = 87 seconds
- Ground to Basement 2 (return) = 106 seconds

With the two lifts in operation, this provides a minimum capacity of 68vph (34 vehicles per lift). As detailed further in Section 7, the peak traffic generation (and therefore peak demand for use of the car lifts) is expected to be in the order of 17vph in the PM peak hour.

Queueing to Thompson Street is not expected to occur given the low turnover of the resident spaces, and the queueing distance provided.

In the event that the car lift operation drops from two lifts to one, a capacity of 34 vehicles per hour can be achieved. As noted previously, the peak traffic generation is expected to be in the order of 20vph. The peak access inflow is 14vph, which will occur in the PM peak when most vehicles are returning to site. The probability of more than 1 vehicle (6m queue) entering the site simultaneously (or within the 106 second operation period of the car lit) and queuing on the access driveway for this flow of traffic is less than 2%. This is based on the 'Poisson Distribution' equation for queuing theory, as outlined in the 'Austroads Guide to Traffic Management Part 2: Traffic Theory'. As the development provides up to 12m between the car lift holding position and the site boundary, the use of a single lift is not expected to have any impact on the external road network. Instead, it will result in internal delays, which, although not convenient, can be managed.

Based on the above information, TTM consider the proposed car lift arrangements to facilitate vehicle movements between the ground and basement parking levels is a suitable solution. The provision for two lifts to service the two basement levels (or 48 spaces) is more than sufficient given the expected turnover of the car parking spaces.

3.3.2 Car Park Stackers

The proposal includes 34 resident car parking spaces located within 3 separate car stacker systems, consisting of 25 parking spaces within two Wohr Combilift 543 car stackers, and 9 parking spaces within a combined system of a Wohr Combilift 552 and 543 car stackers. The specifications for the car stackers are included in Appendix C.

The two Combilift 543 car stackers are four and five bays wide and three levels high, with one vacant space in each stacker. The combined system of a Wohr Combilift 552 and 543 car stackers are three bays wide, with the 543 located behind the 552. The Combilift 552 has two levels, whilst the Combilift 543 has three levels, with one vacant space in each stacker.

The Wohr Combilift car stackers operate through a shuffle system, using the vacant bay that allows drivers to enter on-grade, exit their vehicles, and then the car is moved to its allocated position within the system. Bays move both vertically and horizontally to achieve the desired location. Secure gates are located at the entrance, and these are only opened when a remote control has triggered the shuffle system and the selected vehicle is in the correct position.

Given the negligible levels of traffic generation associated with the development (i.e. weekday PM peak-hour traffic generation of 17vph) it is not expected that queuing in advance of the car stackers will noticeably impact car park operation.

4 Site Access Arrangements

The proposed Thompson Street access driveway requirements are specified in Table 4.1.

Table 4.1: Typical Driveway Requirements for the Edmondstone Road Access

Design Aspect	AS2890.1 Requirement	Proposed Provision	Compliance
Crossover Width	6.0 – 9.0m Category 2	6.8m Category 2	Compliant
Minimum Intersection Separation	6m from tangent point of kerb	17.6m from tangent point of kerb	Compliant
Sight Distance	Ideally 69m, minimum 45m	Over 100m	Compliant
Pedestrian Visibility Splays	2m x 2.5m	2m x 2.5m	Compliant
Entry Queue Capacity	12m (2 cars)	12m (2 cars)	Compliant

Driveway Location

The development is to remove the existing Edmondstone Road crossover. The existing Thompson Street crossover is to be relocated further to the north (i.e. adjacent to the northern boundary). Overall, this improves the access arrangements as the existing two crossovers are consolidated to a single access.

Based on the above, the proposed access arrangements are considered suitable for the proposed development.

5 Service Vehicle Arrangements

As per the Bowen Hills UDA Development Scheme (Precinct 8: Thompson Street Precinct), there are currently no specific requirements for service vehicle arrangements. The following assessment has been based on the expected demands for the development.

5.1 Estimated Service Vehicle Traffic Generation

It is expected that the service vehicle demands for the development will be limited to the following:

- Daily deliveries of small goods and consumables for the café and showroom space on the ground floor and level 1, generally in vehicles no larger than Small Rigid Vehicles (SRVs).
- Weekly deliveries of goods for the showroom on the ground floor, generally in vehicles no larger than Medium Rigid Vehicles (MRVs).
- Occasional residential furniture/removalist delivery trucks. Based on the size of the units, it is expected that these vehicles will be limited to no greater than an MRV.
- Refuse collection vehicles (RCVs) related to the commercial and residential uses (expected to be twice a week). These vehicles will generally be rear-loading trucks, with the largest possible variant of these trucks operated by BCC's Waste and Resource Recovery Services (WaRRS) being 10.3m long.

5.2 Proposed Service Vehicle Arrangements and Their Adequacy

It is proposed that all service vehicles that attend the development stand within the ground level driveway area adjacent the northern property boundary accessed via the Thompson Street vehicular access.

It is necessary for the RCV (and MRVs) to reverse onto the driveway from Edmondstone Road and then exit in a forward gear.

TTM Drawing 18BRT0013-01 (Rev D), included in **Appendix B**, demonstrates the relevant vehicular swept paths of the design vehicles including the provision for passing opportunities for cars entering/exiting the car park lifts whilst a service vehicle is temporarily standing on the driveway area.

The height clearance provided over the driveway is 4.5m, which is adequate to facilitate RCV's and MRV's.

Overall, the proposed servicing arrangements are considered suitable.

6 Active Transport

6.1 Pedestrian Access

Pedestrian access to the site is considered suitable with a pedestrian access points available via both Edmondstone Road and Thompson Street.

6.2 Cyclist Requirements

The Bowen Hills UDA Scheme (Precinct 8: Thompson Street Precinct) does not outline on-site cyclist facility requirements.

As per EDQ's further issues advice on-site bicycle parking is to be provided in accordance with Brisbane City Council's planning scheme requirements.

Council's TAPS PSP specifies the following bicycle parking rates for the proposed land uses:

- 1 resident space per dwelling (equates to 42 spaces)
- 1 residential visitor space per 4 dwellings (equates to 11 spaces)
- There is no requirement for the commercial uses

The development plans include a total provision of 52 spaces including 46 spaces located within basement 1 and 6 spaces located on ground level (within the common areas adjacent the lobby and café).

7 Traffic Impact Assessment

7.1 Estimated Existing Traffic Generation

As discussed in Section 1.3, approximately 12 parking spaces are currently provided for the existing commercial development at 26 Edmondstone Road. Based on a parking turnover rate of 60% during the peak hours for visitors, 7 vehicles will enter and exit the site, which equates to 14 vehicle movements (in and out).

7.2 Estimated Development Traffic Generation

The Transport Maritime & Roads Service (TMRS) 'Guide to Traffic Generating Developments' indicates that the peak-hour trip generation characteristics of high-density residential developments at metropolitan location is between 0.07 - 0.32 trips/unit in the weekday AM peak-hour and between 0.06 - 0.41 trips/unit in the weekday PM peak-hour. To ensure a robust assessment, the higher end of the traffic generation ranges (i.e. 0.32vph/unit in the AM peak and 0.41vph/unit in the PM peak) have been adopted. Based on the provision of 42 units, this will equate 17vph being generated in the weekday PM peak-hour, which is viewed as a 'worst case' scenario.

Once the removal of the existing estimated traffic for the site is taken into account, the proposed development is anticipated to generate an additional 4 vehicles on the adjacent road network during peak hours.

Table 7.1: Estimated Development Traffic Generation

Land Use	Extent	Peak Hour	Generation Rate	Traffic Generation
Units	42 dwellings	AM	0.32vph/dwelling	14 vehicles
		PM	0.41vph/dwelling	18 vehicles
Maximum Peak Hour Generation				**17 vehicles**

7.3 Estimated Development Traffic Distribution

The distribution of the development generation traffic is based on the following:

- 20% of development residential traffic is inbound in the AM Peak, with the remaining 80% outbound, and 100% of the commercial staff traffic inbound.
  - 3vph In, 11vph Out
- 80% of development residential traffic is inbound in the PM Peak, with the remaining 20% outbound, and 100% of the commercial staff traffic outbound.
  - 14vph In, 4vph Out

Based on the above distribution, the maximum traffic generation experienced in any direction in and out of the development would be 14vph. Once the traffic has distributed around the local network, the development traffic would likely have a negligible impact.

8 Summary and Conclusions

8.1 Access Arrangements

The access is provided as a 6.8m wide Category 2 driveway to Thompson Street. The existing accesses to Edmondstone Road and Thompson Street will be removed. The entry queueing allows for queuing up to two vehicles, which is considered suitable for the proposed development.

Whilst the access is located along the northern boundary, with the splay protruding into the adjacent site frontage, given the proposed separation to the adjacent existing crossover, the proposed access is unlikely to have an impact on the operation and safety of the adjacent road network and adjacent existing crossover.

8.2 Car Parking Arrangements

The proposed parking supply for the site is consistent with EDQ's accepted parking requirements. TTM recommends that a PWD parking space is provided within the non-residential land use parking provision. 34 out of the 48 car parking spaces provided on-site will be provided within car stacker systems. The basement car park layouts generally comply with '*AS2890.1*' requirements. Overall, TTM considers the proposed car parking arrangements for this development is suitable.

8.3 Service Vehicle Arrangements

Servicing (including refuse collection) for this development will be facilitated in the circulation aisle on the ground level, with service vehicles reversing into the development from Thompson Street. The largest design vehicle, a 10.3m RCV, can manoeuvre on-site in order to exit in a forward gear. Overall, the proposed service vehicle arrangements are considered adequate to meet the needs of the proposed development.

8.4 Traffic Impact Assessment

Due to the low vehicle generation associated with the development, is it unlikely that the additional traffic will have an impact to the operation and safety of the road network within the vicinity of the subject site.

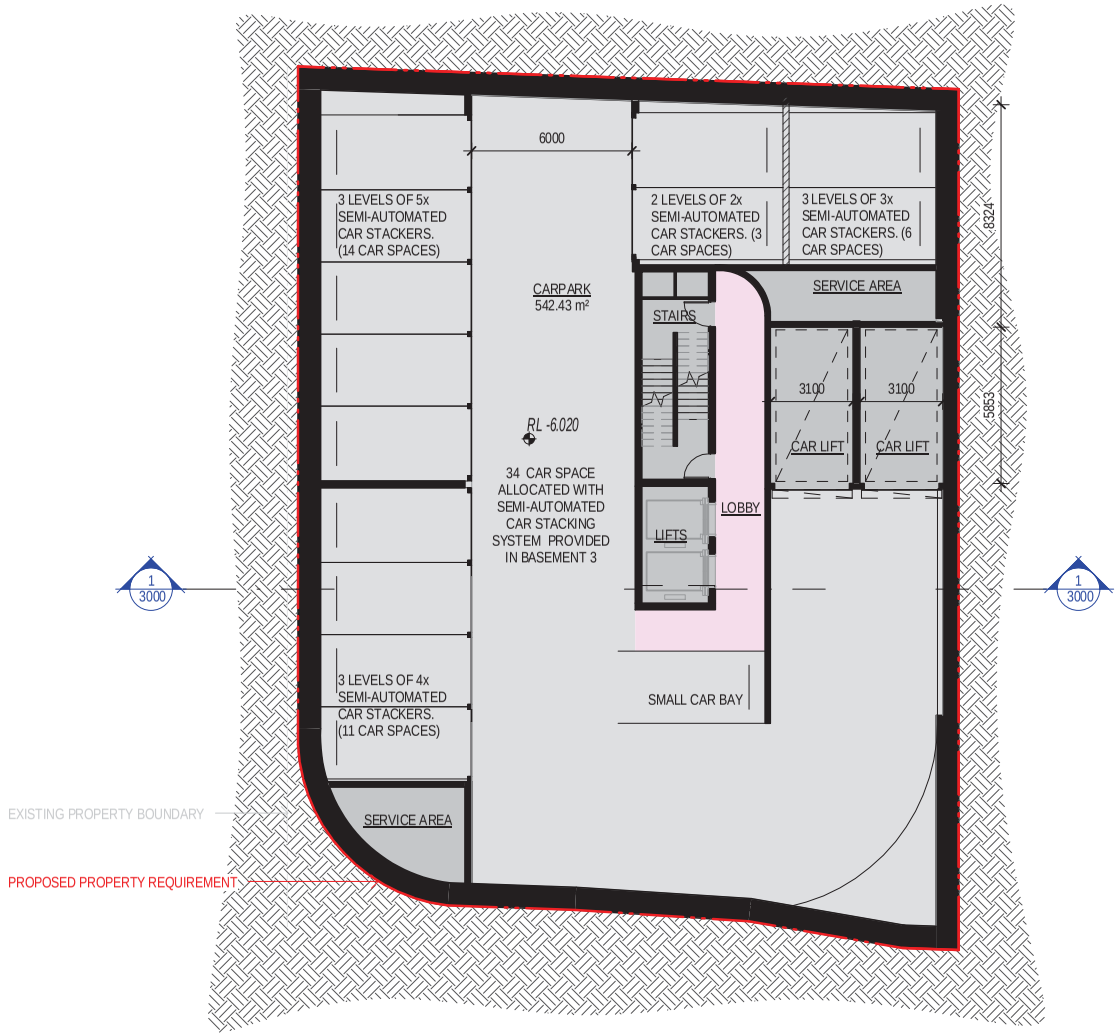
8.5 Conclusion

Based on the assessment contained within this report, TTM see no traffic engineering reason why the relevant approvals should not be granted.

Appendix A Proposed Development Plans

ITEM 1.

NOTE: A MINIMUM HABITABLE FLOOR LEVEL OF 3.2 AHD



REVISED CONDITIONS - VARIATION 4
REFERENCE EMAIL 02/06/20 FROM ETHOS URBAN

1. Notate on the plans a minimum habitable floor level of 3.2m AHD

2. Remove the Preliminary Advice Only stamp from plans in Appendix B TTM Drawing 18BRT0113-01 (Rev C) & 02 (Rev B) in the TTM report

   REFER TO UPDATED TTM REPORT DATED 23.06.2020

3. The TTM report recommends MRV servicing for the showroom use. Demonstrate on the plans where the MRV bay or hold point in accordance with TAPS is to be provided or provide justification on how MRV servicing can be managed.

4. The car stacker in Basement 3 level (-6.02 level shown) doesn't provide sufficient height to accommodate the 3 level car stackers, as detailed in the TTM report, within the nominated location.

FURTHER ISSUES ITEMS
REFERENCE EMAIL 02/06/20 FROM ETHOS URBAN

F2. Confirm what use (i.e. commercial or residential) the 224.51m2 storage area on Basement 1 is associated with.

F3. Delineate on the plans a 3.75m wide footpath (sidewalk) between the roadway (carriageway) and the property boundary for both the Edmondstone Road and Thompson Street frontages of the site.

F4. The driveway splay must not protrude past the northern property boundary of the site (i.e. into the area of the sidewalk adjacent to the northern property on Thompson Street). Amend the plans to taper or snake the driveway to ensure the entire driveway and splay remain wholly within the sidewalk adjacent to the property the subject of this application.

F7. Provide further detail about the visitor parking spaces for cars and bicycles located on Basement level 1 and 2.

F7.1 Include details of how residential and commercial visitors to the site will be advised on the availability of the visitor car spaces, including the number available at any particular point in time

REFER TO UPDATED TTM REPORT DATED 23.06.2020

F7.2 Bicycle parking is to be provided in accordance with TAPS requirements.

REFER TO UPDATED TTM REPORT DATED 23.06.2020

F8. Provide dimensioned plans for accessible units demonstrating accessibility in accordance with EDQ Guideline 2: Accessible Housing.

FLOOR PLAN - BASEMENT 3

0 2 4 6 8 10 m

Scale 1 : 200 @ A3

26 EDMONDSTONE RD, BOWEN HILLS QLD 4006

DATE	PROJECT NUMBER	DRAWING NUMBER
15.06.2020	18005	TP1097 REV 2

ITEM 1.

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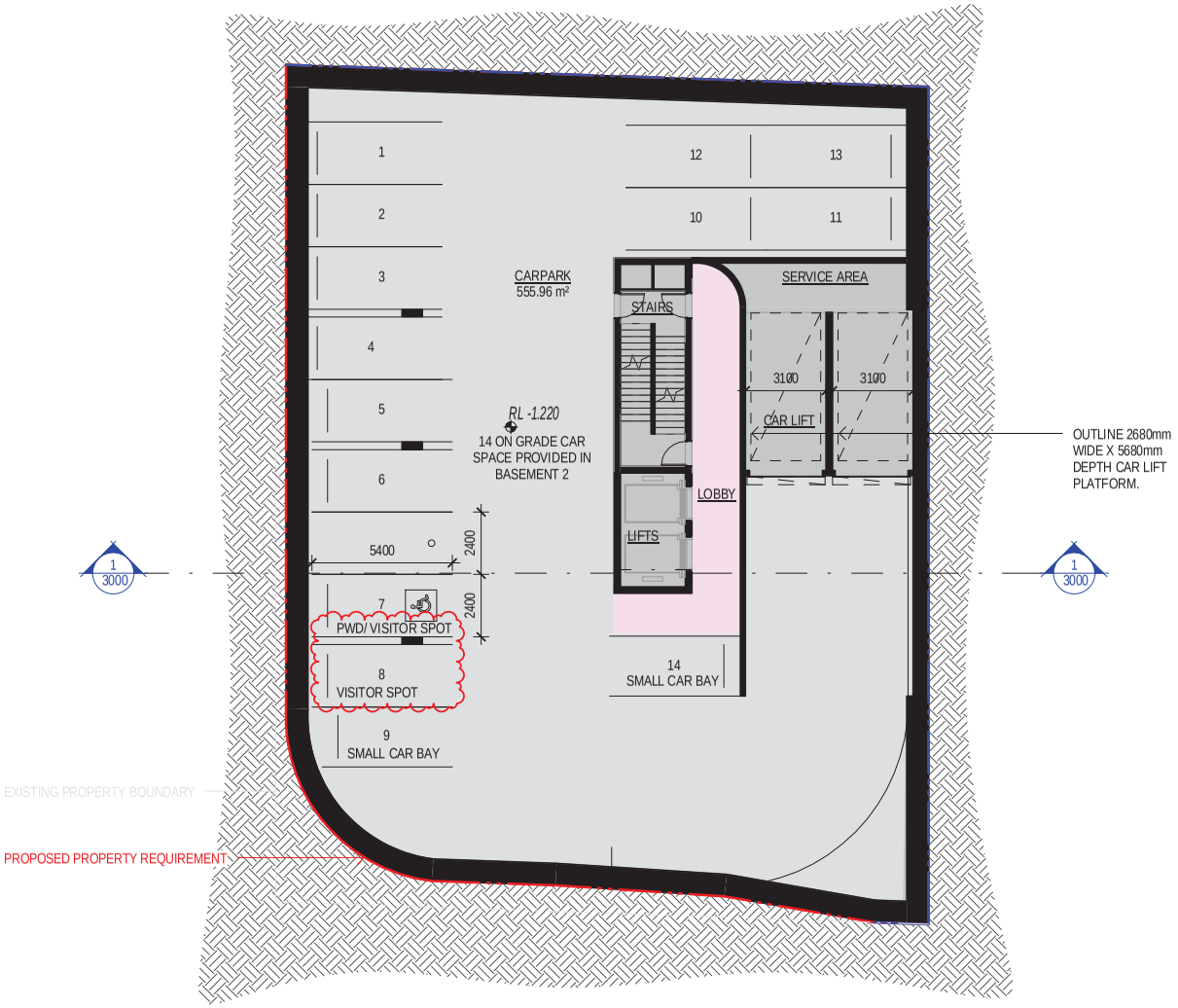

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FLOOR PLAN - BASEMENT 2

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Scale 1 : 200 @ A3

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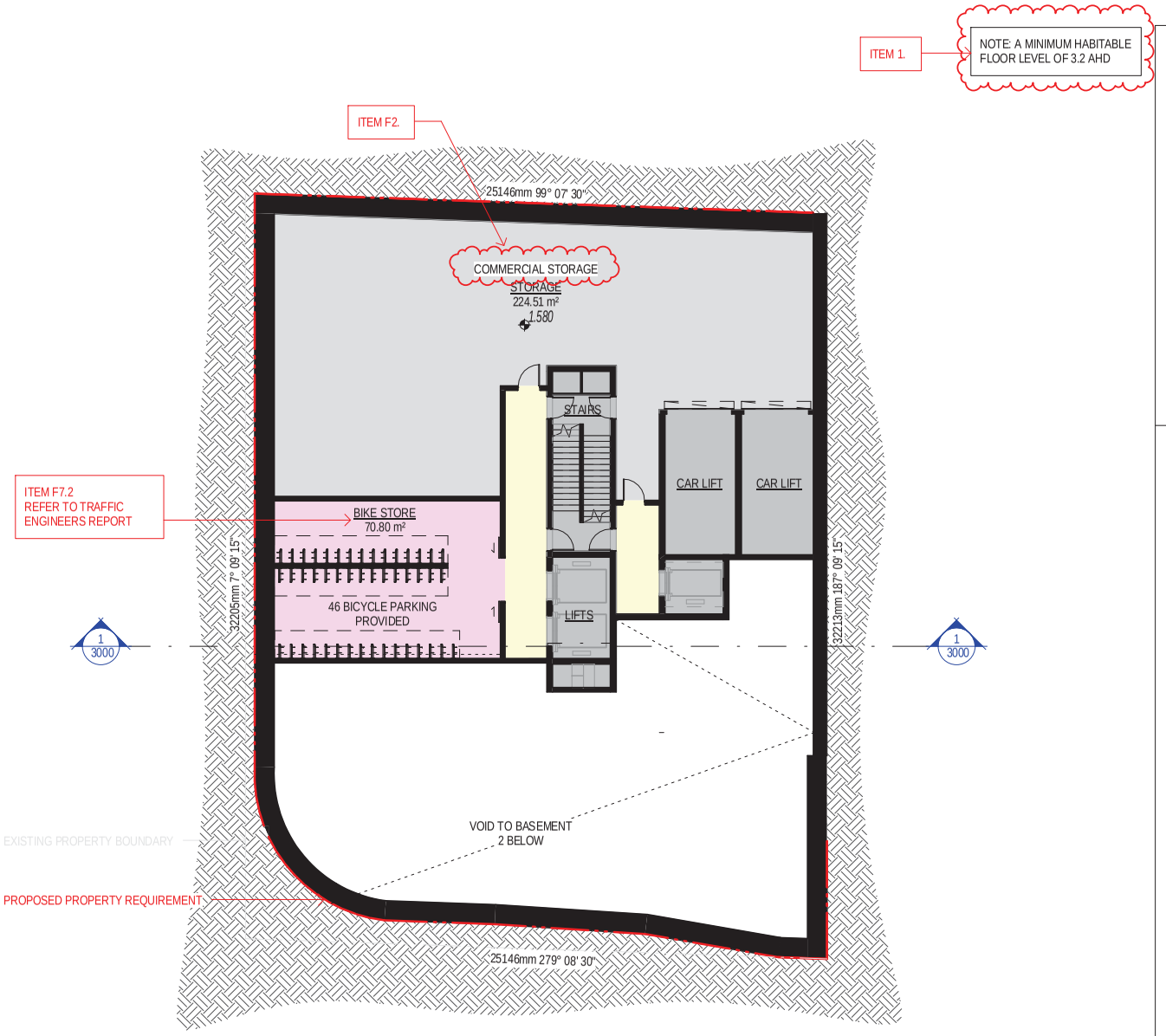

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F7. Provide further detail about the visitor parking spaces for cars and bicycles located on Basement level 1 and 2.

F7.1 Include details of how residential and commercial visitors to the site will be advised on the availability of the visitor car spaces, including the number available at any particular point in time

REFER TO UPDATED TTM REPORT DATED 23.06.2020

F7.2 Bicycle parking is to be provided in accordance with TAPS requirements.

REFER TO UPDATED TTM REPORT DATED 23.06.2020

F8. Provide dimensioned plans for accessible units demonstrating accessibility in accordance with EDQ Guideline 2: Accessible Housing.

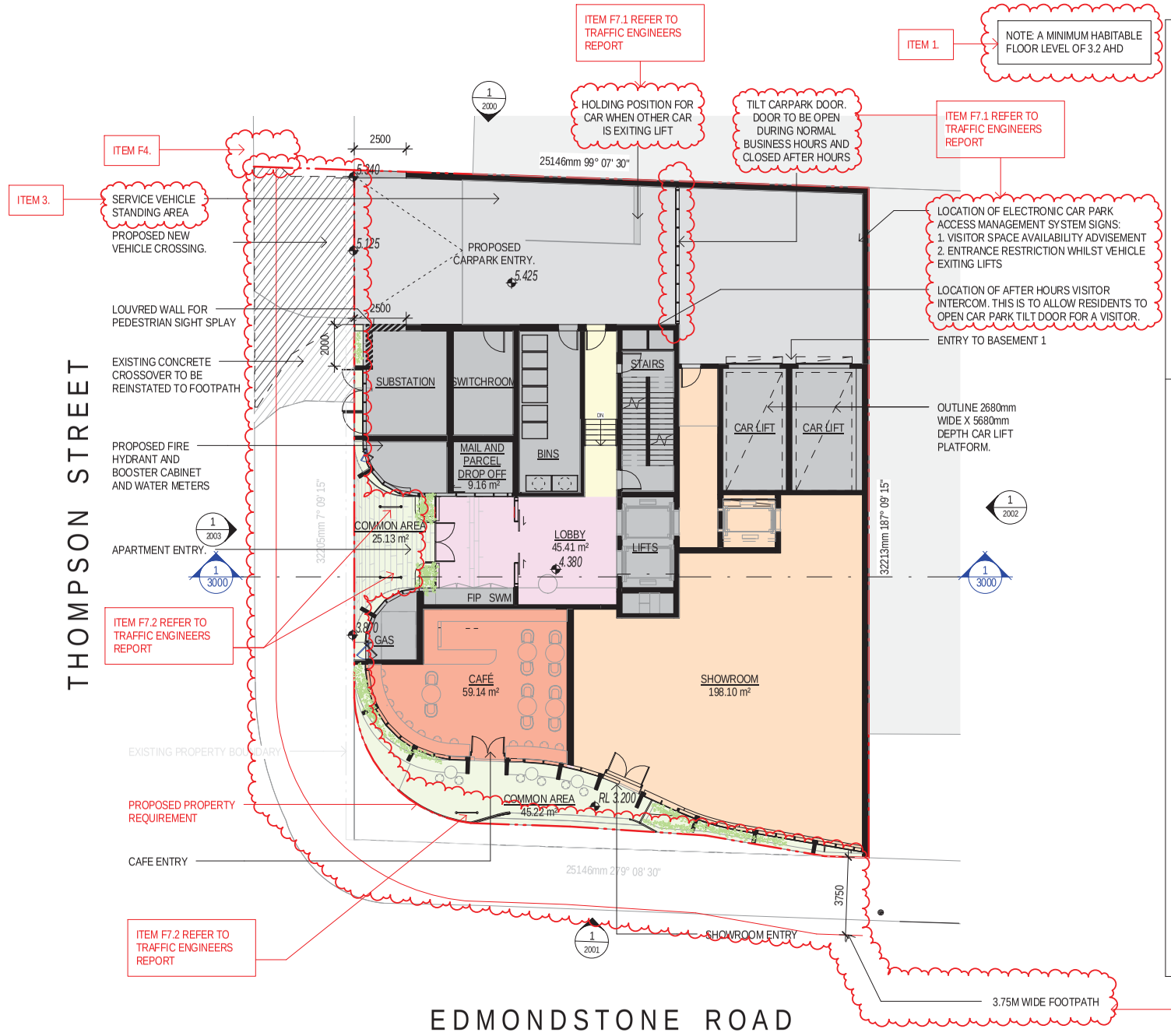
FLOOR PLAN - BASEMENT 1

0 2 4 6 8 10 m

Scale 1 : 200 @ A3

26 EDMONDSTONE RD, BOWEN HILLS QLD 4006

DATE	PROJECT NUMBER	DRAWING NUMBER
10.06.2020	18005	TP1099 REV 3



REVISED CONDITIONS - VARIATION 4
REFERENCE EMAIL 02/06/20 FROM ETHOS URBAN

1. Notate on the plans a minimum habitable floor level of 3.2m AHD
2. Remove the Preliminary Advice Only stamp from plans in Appendix B TTM Drawing 18BRT0113-01 (Rev C) & 02 (Rev B) in the TTM report
   REFER TO UPDATED TTM REPORT DATED 23.06.2020
3. The TTM report recommends MRV servicing for the showroom use. Demonstrate on the plans where the MRV bay or hold point in accordance with TAPS is to be provided or provide justification on how MRV servicing can be managed.
4. The car stacker in Basement 3 level (-6.02 level shown) doesn't provide sufficient height to accommodate the 3 level car stackers, as detailed in the TTM report, within the nominated location.

FURTHER ISSUES ITEMS
REFERENCE EMAIL 02/06/20 FROM ETHOS URBAN

F2. Confirm what use (i.e. commercial or residential) the 224.51m2 storage area on Basement 1 is associated with.

F3. Delineate on the plans a 3.75m wide footpath (sidewalk) between the roadway (carriageway) and the property boundary for both the Edmondstone Road and Thompson Street frontages of the site.

F4. The driveway splay must not protrude past the northern property boundary of the site (i.e. into the area of the sidewalk adjacent to the northern property on Thompson Street). Amend the plans to taper or snake the driveway to ensure the entire driveway and splay remain wholly within the sidewalk adjacent to the property the subject of this application.

F7. Provide further detail about the visitor parking spaces for cars and bicycles located on Basement level 1 and 2.

F7.1 Include details of how residential and commercial visitors to the site will be advised on the availability of the visitor car spaces, including the number available at any particular point in time
REFER TO UPDATED TTM REPORT DATED 23.06.2020

F7.2 Bicycle parking is to be provided in accordance with TAPS requirements.
REFER TO UPDATED TTM REPORT DATED 23.06.2020

F8. Provide dimensioned plans for accessible units demonstrating accessibility in accordance with EDQ Guideline 2: Accessible Housing.

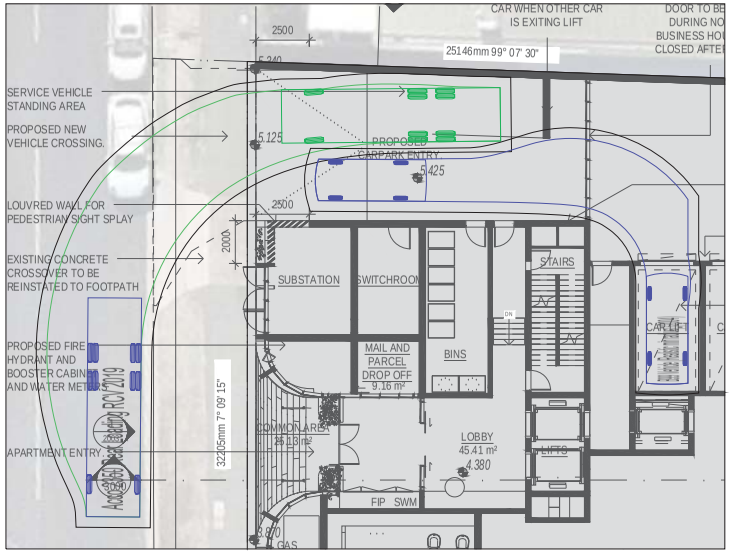
FLOOR PLAN - GROUND LEVEL

0 2 4 6 8 10 m
Scale 1 : 200 @ A3

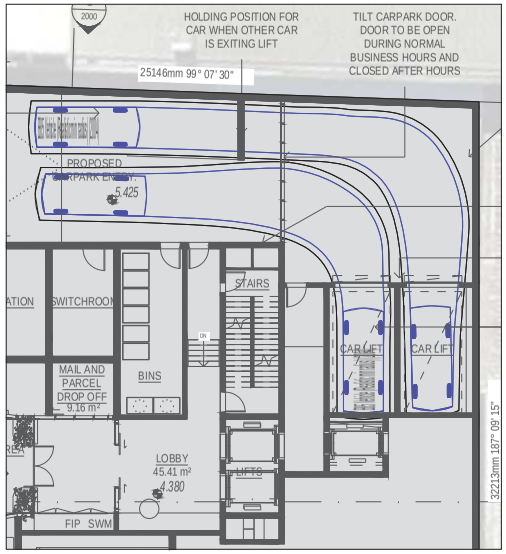
26 EDMONDSTONE RD, BOWEN HILLS QLD 4006

DATE	PROJECT NUMBER	DRAWING NUMBER
23.06.2020	18005	TP1100 REV 6

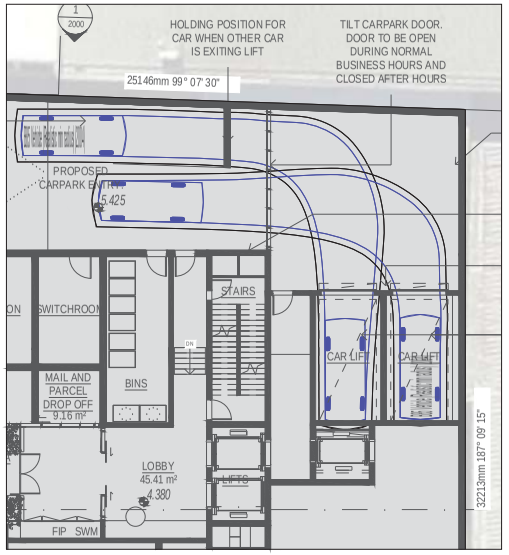
Appendix B TTM Drawing 18BRT0113-01 (Rev D) & 02 (Rev C)



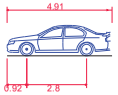
RCV ENTRY & B99 CAR LIFT A EXIT



B85 - CAR LIFT B ENTRY & CAR LIFT A EXIT

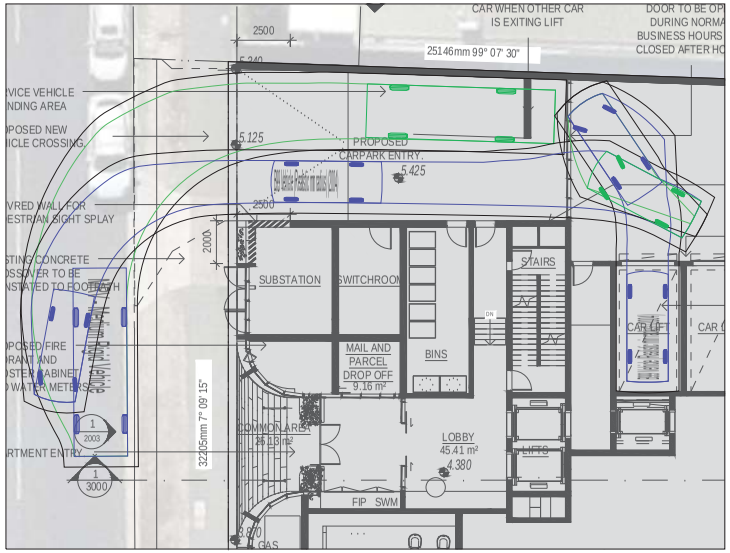


B85 - CAR LIFT A ENTRY & CAR LIFT B EXIT

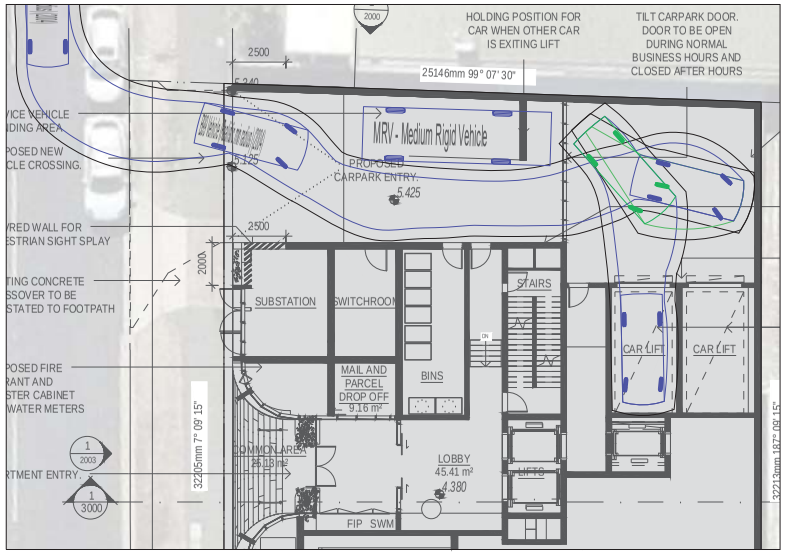


B85 Vehicle (Realistic min radius) (2004)

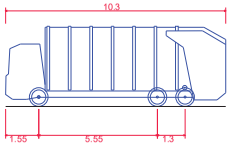
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m



MRV ENTRY & B99 CAR LIFT A EXIT

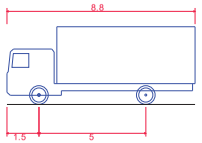


B99 - CAR LIFT A ENTRY WITH PARKED MRV



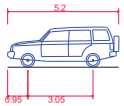
Acco 2350 Split Refuse Truck 2014

Overall Length	10.300m
Overall Width	2.500m
Overall Body Height	3.751m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.500m



MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.000m



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
D	22-06-20	UPDATED BASE PLAN	DG	DG	DG
C	17-12-19	UPDATED BASE PLAN	LD	TB	DG
B	13-12-19	UPDATED BASE PLAN	LD	TB	TB
A	18-09-18	ORIGINAL ISSUE	LD	TW	TW

SCALE 0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE
NORTH
CLIENT: METIER3

TTM CONSULTING PTY LTD
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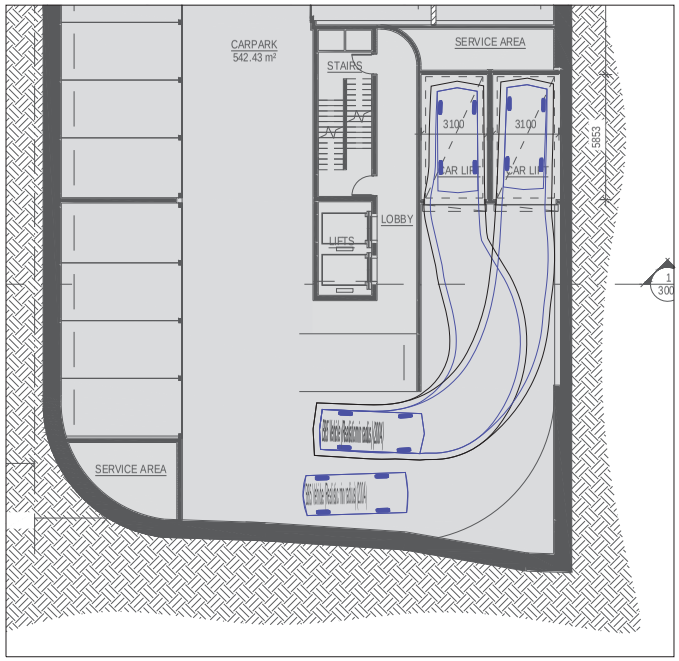
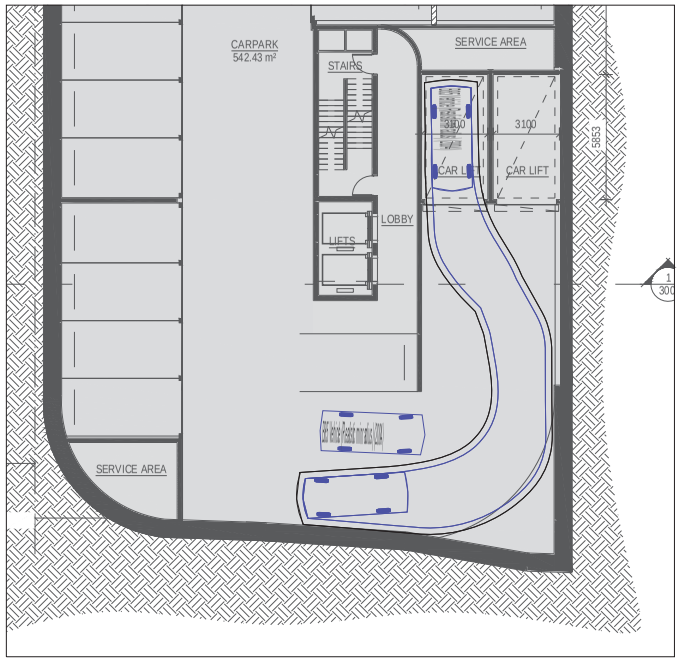
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT: 26 EDMONDSTONE STREET, BOWEN HILLS
DRAWING TITLE: SWEPT PATH ANALYSIS - GROUND FLOOR CIRCULATION
DESIGN VEHICLE - MRV & B85

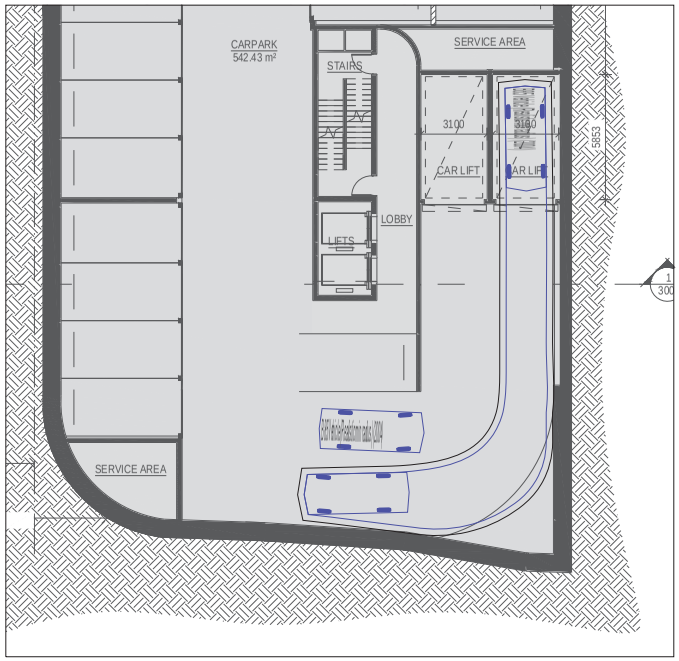
PROJECT NUMBER	18BRT0113
ORIGINAL SIZE	A3
DRAWING NUMBER	18BRT0113-01
REVISION	D
DATE	22 Jun 2020
SHEET	1 OF 2



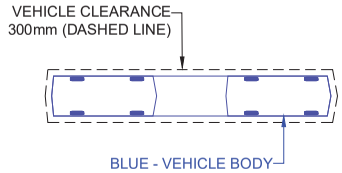
B85 - BASEMENT CAR LIFT CIRCULATION
CAR LIFT ENTRY

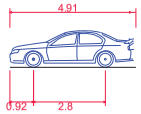


B85 - BASEMENT CAR LIFT CIRCULATION
CAR LIFT A EXIT



B85 - BASEMENT CAR LIFT CIRCULATION
CAR LIFT B EXIT





B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
D	22-06-20	UPDATED BASE PLAN	DG	DG	DG
C	17-12-19	UPDATED BASE PLAN	LD	TB	DG
B	13-12-19	ORIGINAL ISSUE	LD	TB	TB
A	18-09-18	ORIGINAL ISSUE	LD	TW	TW

SCALE 0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE
NORTH
CLIENT
METIER3

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE, QLD, 4000
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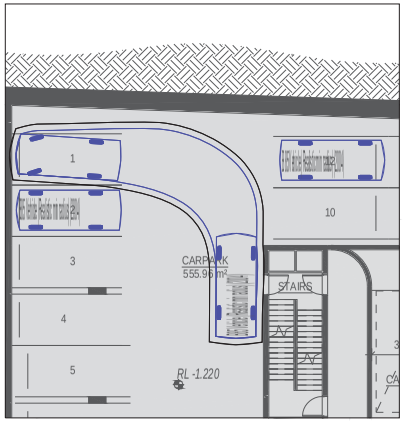
PROJECT
26 EDMONDSTONE STREET, BOWEN HILLS

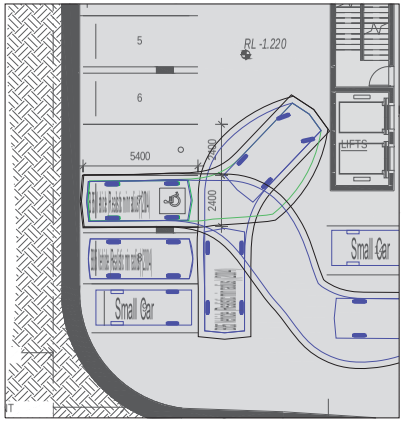
DRAWING TITLE
SWEPT PATH ANALYSIS - BASEMENT/CAR LIFT CIRCULATION
DESIGN VEHICLE - B85

PROJECT NUMBER	18BRT0113
ORIGINAL SIZE	A3
DRAWING NUMBER	18BRT0113-01
REVISION	D
DATE	22 Jun 2020
SHEET	2 OF 2

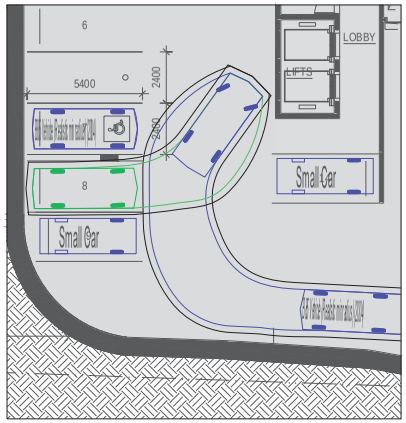
I:\synergy\projects\18brt\18brt0113 26 edmondstone street, bowen hills\3 - plans\ttm\20 06 22 - [01d, 02c]\18brt0113.dwg



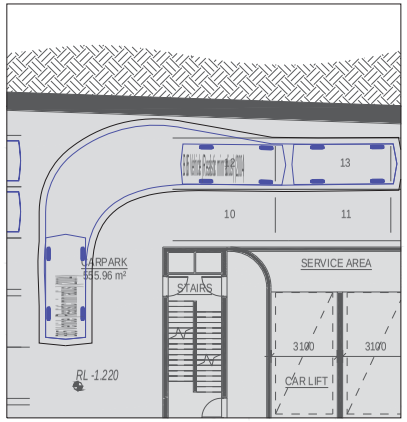
BASEMENT 2
PARKING BAY 1 ENTRY



BASEMENT 2
PARKING BAY 7 ENTRY



BASEMENT 2
PARKING BAY 8 ENTRY



BASEMENT 2
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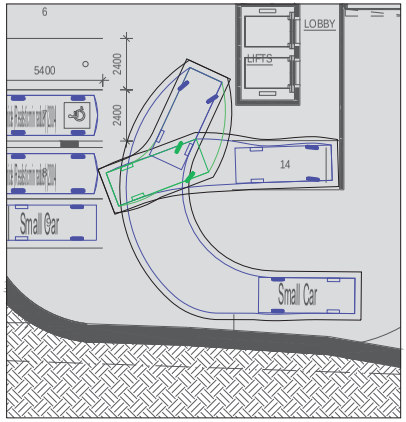

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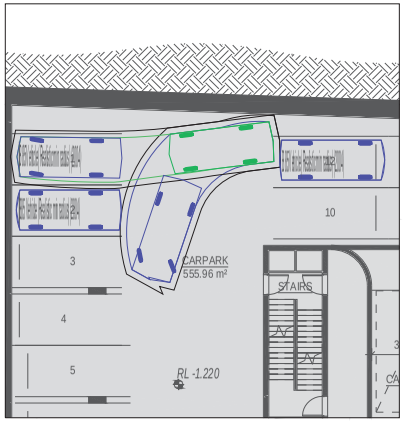
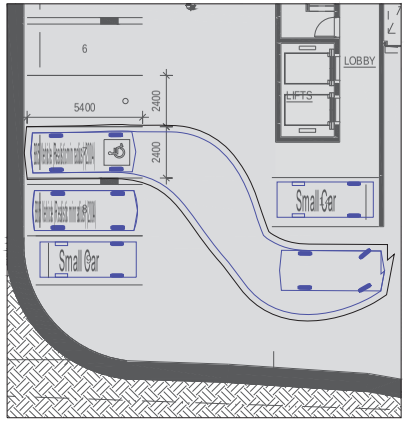


BASEMENT 2
PARKING BAY 1 EXIT



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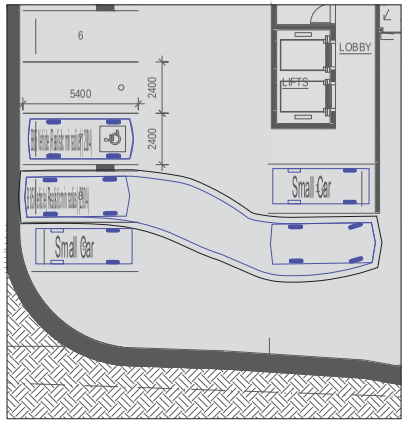
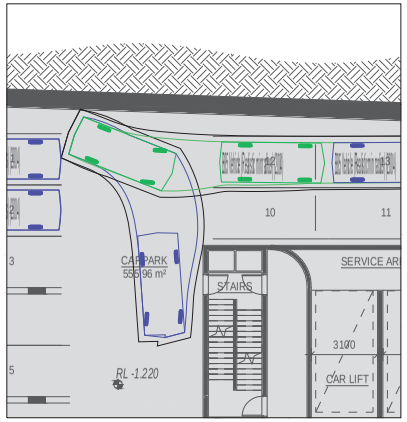
PARKING BAY 7 EXIT



BASEMENT 2
PARKING BAY 8 EXIT



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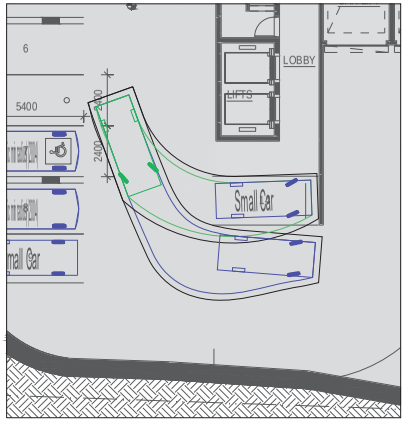
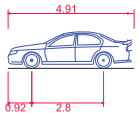
PARKING BAY 12/13 EXIT

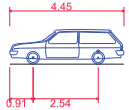


BASEMENT 2
PARKING BAY 14 EXIT



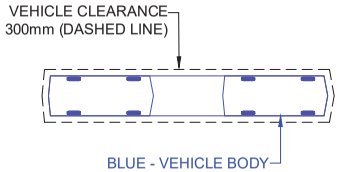
B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m



Small Car BCC

Overall Length	4.450m
Overall Width	1.660m
Overall Body Height	1.354m
Min Body Ground Clearance	0.195m
Track Width	1.400m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	5.600m



REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
C	22-06-20	UPDATED BASE PLAN	DG	DG	DG
B	17-12-19	UPDATED BASE PLAN	LD	TB	DG
A	13-12-19	ORIGINAL ISSUE	LD	TB	TB

SCALE 0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE

NORTH

CLIENT: METIER3

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE, QLD, 4000
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T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT: **26 EDMONDSTONE STREET, BOWEN HILLS**

DRAWING TITLE: **SWEPT PATH ANALYSIS - BASEMENT 2**
DESIGN VEHICLE - B85 & SMALL CAR

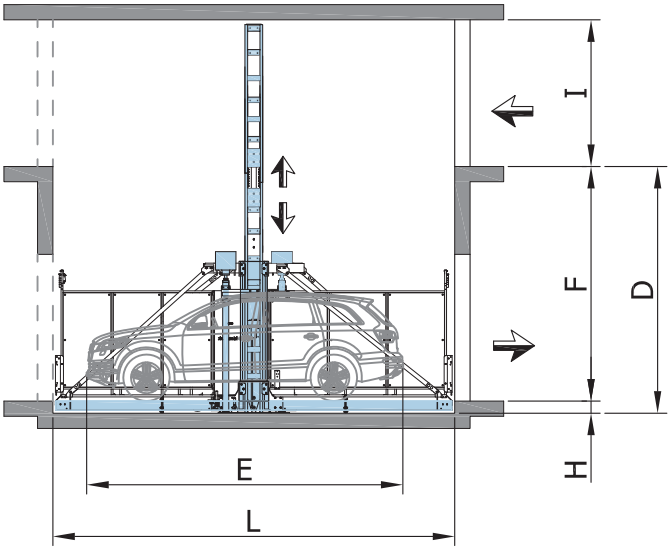
PROJECT NUMBER	18BRT0113
ORIGINAL SIZE	A3
DRAWING NUMBER	18BRT0113-02
REVISION	C
DATE	22 Jun 2020
SHEET	1 OF 1

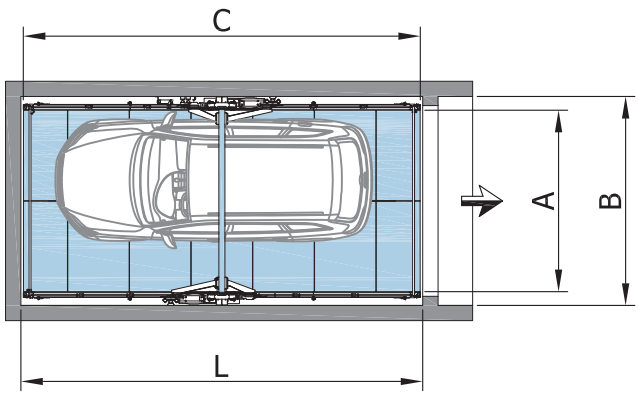
I:\synergy\projects\18brt\18brt0113 26 edmondstone street, bowen hills\3 - plan\ttm\20 06 22 - [01d, 02c]\18brt0113.dwg

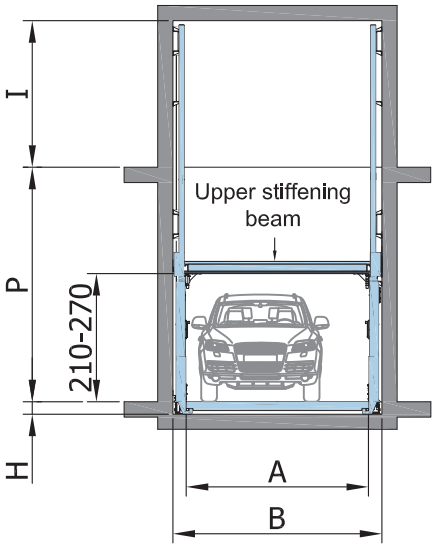
Appendix C Car Stacker and Lift System Specifications

Technical data Mod. IP1-HMT V08

CAR LIFT

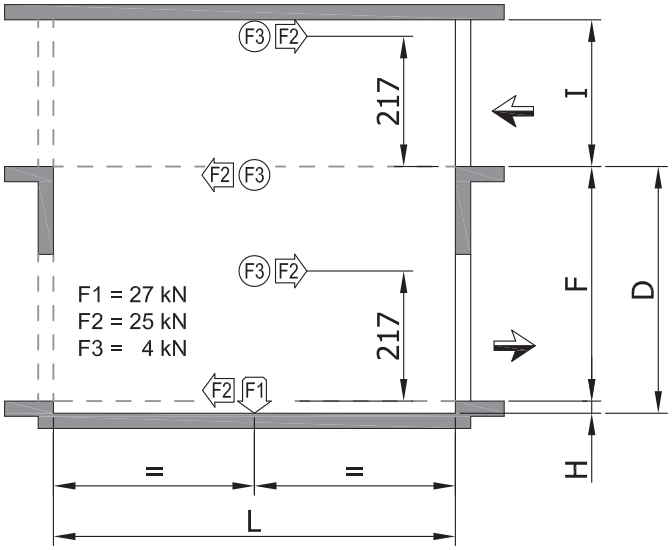






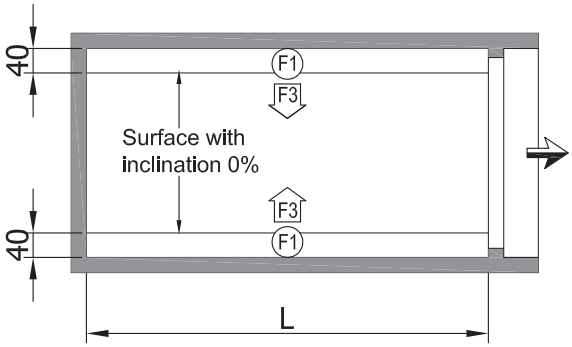
Dimensions are in cm

STANDARD LOADS



All stress loads include car weight.

Recommended material in the fixing area of the columns: reinforced concrete - R min. = 3,5 kN/cm²



TECHNICAL FEATURES

Load (kg)	3200
Motor power (kW)	5,5 (11)
Raising speed (m/s)	0,075 (0,15)
Lowering speed (m/s)	0,15

TECHNICAL DATA

Description	Dimension	Standard	Max
platform width	**A**	250	300
platform length	**C**	520	650
car length	**E**	512	642
pit width	**B**	292	342
pit length	**L**	528	658
pit height	**H** $^{+4}_{0}$	20	20
total height	**D** $^{\pm 5}$	(F + H)	(F + H)
travel	**F** $^{\pm 5}$	300	1190 (Max)
headroom	**I**	240 (Min)	240 (Min)

The manufacturer reserves the right to modify or alter above specifications.

IdealPark

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via E. Fermi, 9

37026 Settimo di Pescantina (VR) - Italy
T +39 045 6750125 - F +39 045 6750263

www.idealpark.it
info@idealpark.it

Data Sheet
WÖHR COMBILIFT 543-2,0

Suitable for condominium and office buildings. For permanent use only!

In case of short time user (e.g. for offices, hotels, a.s.o.) technical adjustments are required. Please contact WÖHR!

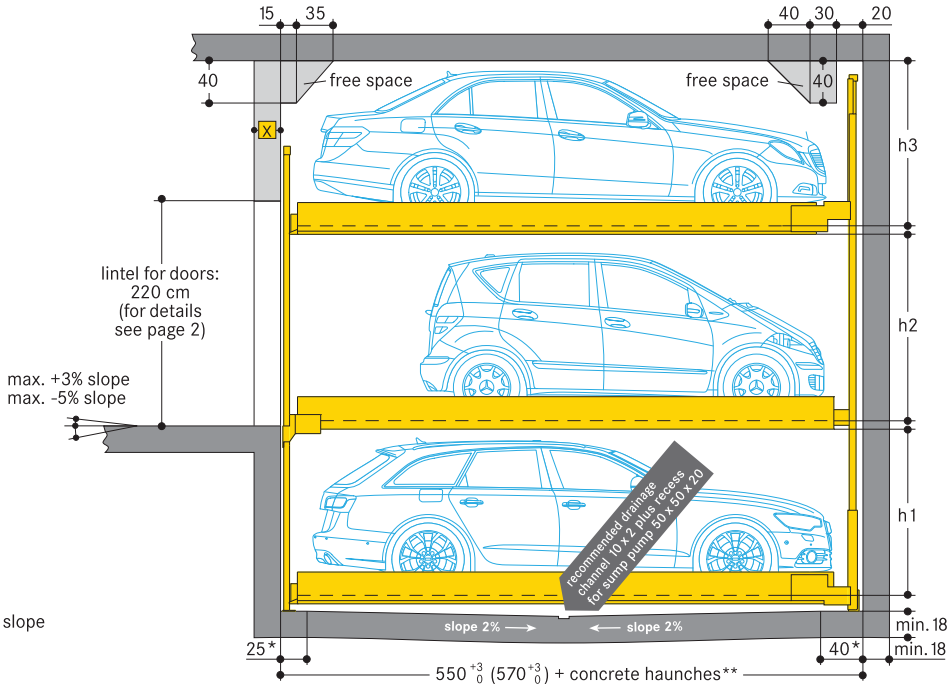
Platforms are in horizontal position to drive on.

Load per platform max. 2000 kg (load per wheel max. 500 kg)

Special reinforced units for higher parking platform load are available (see 543-2,6).

X = Door offset (see page 2 for details)

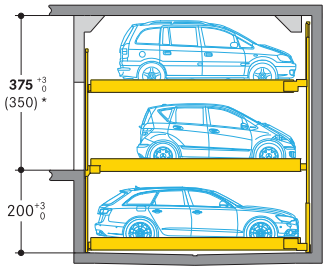
Dimensions in cm



* in this zone, 0% of downward/upward slope in longitudinal and cross direction

** see notes, point 5

Standard type 543 · 2000 kg

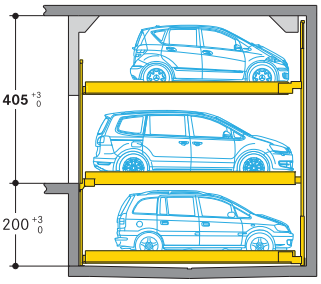


	car height	distance
UL	Cars/Station wagons up to 175 cm	h3 = 180
EL	Cars/Station wagons up to 175 cm	h2 = 180
LL	Cars/Station wagons up to 175 cm	h1 = 180

UL = upper level, EL = entrance level
LL = lower level

* If cars and station wagons with a height of up to **150 cm** are parked on the **upper level**, a clear height of **350 cm** above the entrance level is sufficient.

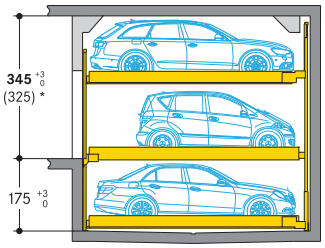
Comfort type 543 · 2000 kg



	car height	distance
UL	Cars/Station wagons up to 175 cm	h3 = 180
EL	Cars/Vans up to 205 cm	h2 = 210
LL	Cars/Station wagons up to 175 cm	h1 = 180
	Cars/Vans up to 2000 kg max.	

With greater h3 height-values, respectively higher cars can be parked on the upper level. Car heights cannot be greater than 205 cm.

Compact type 543 · 2000 kg

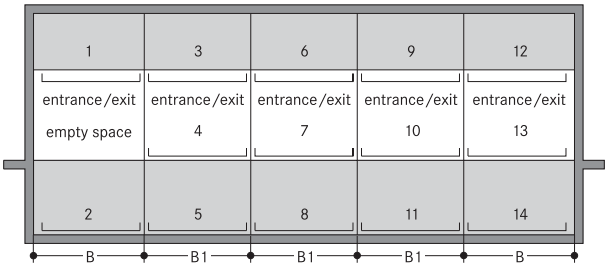


	car height	distance
UL	Cars/Station wagons up to 150 cm	h3 = 155
EL	Cars/Station wagons up to 170 cm	h2 = 175
LL	Cars/Station wagons up to 150 cm	h1 = 155

* If cars and station wagons with a height of up to **150 cm** are parked on the **entrance level**, a clear height of **325 cm** above the entrance level is sufficient.

Please attend to restricted car- and platform distance height!

Width dimensions



Space required B	B1	gives clear platform width
260	250	230
270	260	240
280	**270**	**250**
290	**280**	**260**
300	**290**	**270**

One entry/exit is required on entrance level for each grid.

Notes

1. Pits must always be protected by a sliding shutterdoor (even in underground garages).
2. Arrangements start with 2 grids for 5 cars, 3 grids for 8 cars.
3. Installation length of 550 cm for car length of a max. of 500 cm. Clear platform width of 250 cm for car widths of 190 cm. For large touring sedans we recommend a clear platform width of at least 260–270 cm.
4. For large touring sedans an installation length of 570 cm is recommended. This length offers larger safety distances for potential future developments or projects with short term parkers such as hotels or similar.
5. It is not possible to have channels or undercuts and/or concrete haunches along the pit's rear and front floor-to-wall joints. In the event that channels or undercuts are necessary, the pit length needs to be increased based on the dimensions of said channels or undercuts.
6. The manufacturer reserves the right to construction or model modifications and/or alterations. Furthermore, the right to any subsequent part modification and/or variations and amendments in procedures and standards due to technical and engineering progresses in the art or due to environmental regulation changes, are also hereby reserved.

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Doors

According EN 14010, the Combilift 543 must be closed with shutterdoors. The door controls are integrated in the overall system. That means:

a) The doors are electro-mechanically interlocked.

b) The doors can only be opened when the selected parking place has reached the entry/exit position.

c) Any pits are closed in the entrance area.

Local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

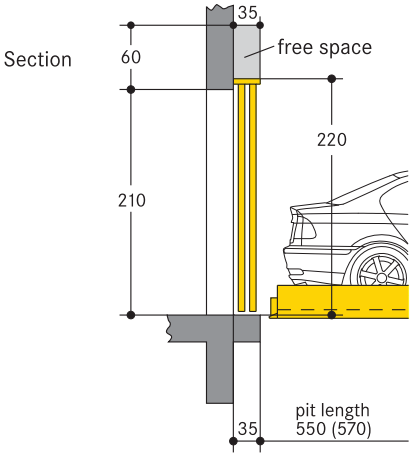
Door types:

Manually operated sliding shutterdoors

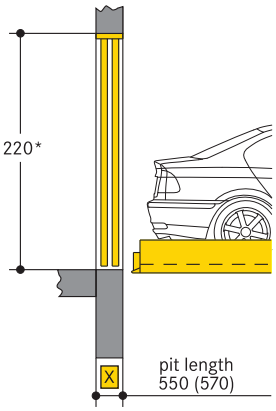
- for underground garages with galvanized fence filling
- above ground with powder coated metal sheets (RAL 7030)

Alternatively, sliding shutterdoors can be supplied with electrical drive.

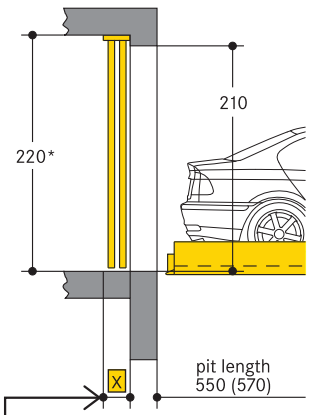
Installation:
Behind the building pillars with door offset



Installation:
Below the lintel between the building pillars



Installation:
In front of the building pillars

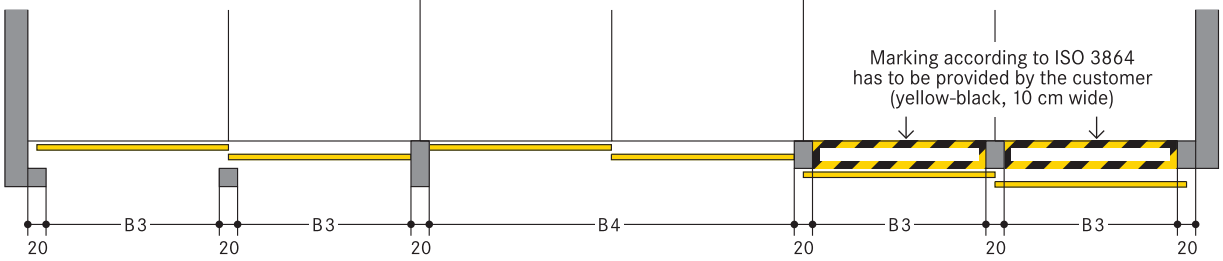


With installation in front of the pillars, the driving aisle is measured from the door.

X = 25 cm for manually operated sliding shutterdoors

X = 35 cm for automatic shutterdoors

Ground plan



Space required B3	B4	Gives clear platform width
230	480	230
240	500	240
250	**520**	**250**
260	**540**	**260**
270	**560**	**270**

* The lintel of 220 cm is absolutely necessary. With differing heights, additional fixings are required at a surcharge. If no lintel is provided, the gates need to be fitted onto a steel frame (subject to surcharges).

Sliding door floor guides in underground garages

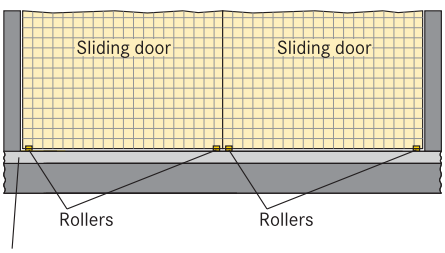
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by plastic rollers, locked down onto floor mounted base plates.

Dowel borehole depth to be approx. 9 cm.

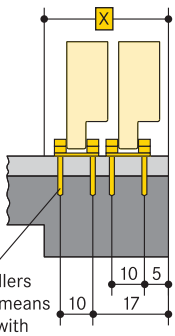
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Locking down of the rollers onto the base plate by means of an adhesive anchor with an M8 internal screw thread.

Sliding door floor guides in above ground garages

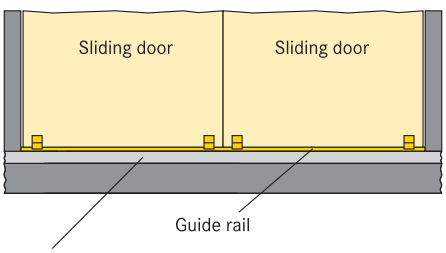
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by guide rails, locked down onto the floor.

Dowel borehole depth to be approx. 8 cm.

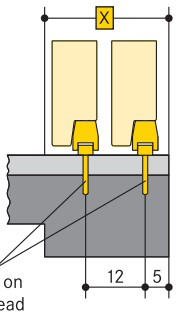
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section

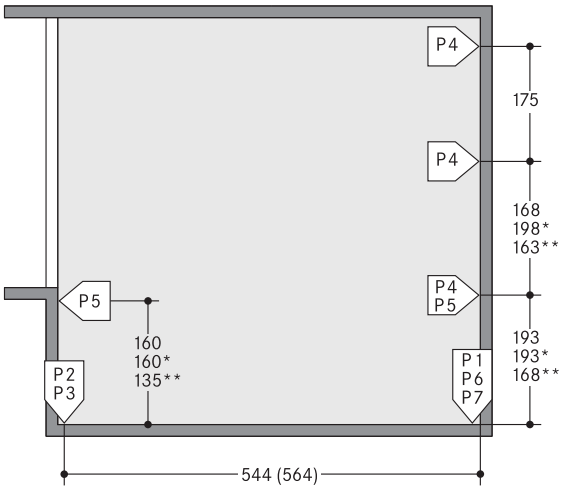


Guide rails to be fixed on using S 10 hexagon head wood bolts and plastic expansion dowels.

Width dimensions and statics

All dimensions shown are minimum. Constructional tolerances must be taken into consideration. **All dimensions in cm.**

Section



( ) dimensions in brackets for longer units

* dimensions for comfort type

** dimensions for compact type

P1 = +70,0 kN [1)]
P2 = +49,0 kN
P3 = +25,0 kN
P4 = ± 5,0 kN
P5 = ± 2,5 kN
P6 = ±30,0 kN
P7 = ±15,0 kN

[1)] all static loadings include the weight of the car

Bearing loads are transmitted by wall plates with min. 30 cm² surface and to the floor by base plates with min. 350 cm² surface.

Wall and base plates to be fixed by heavy duty anchor bolts to a drilling depth of 10-12 cm. When fixing to the waterproof concrete floors chemical anchors are employed (to be advised by WÖHR).

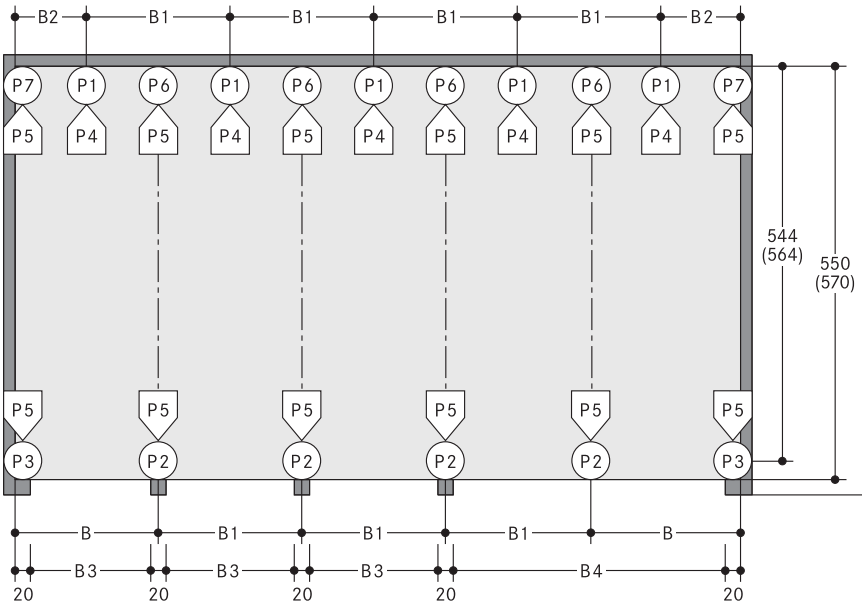
Base plate thickness min. 18 cm. Rear wall and base plate must be formed of concrete and must have a flat surface without protrusions.

Concrete quality according to the static building requirements, however for the dowel fixing concrete quality of min. C20/25 is required.

The specified lengths to the support points are mean values. Please contact WÖHR Agent for exact positions for any variations on the standard units.

Please contact WÖHR Agent for clarify the door widths/widths of columns. Grid width of 250 / 260 / 270 / 280 / 290 cm must be observed.

Ground plan



The driving aisle width to be compliant with country regulations locally in force.

Space required					gives clear
B	B1	B2	B3	B4	platform width
260	250	135	230	480	230
270	260	140	240	500	240
280	**270**	**145**	**250**	**520**	**250**
290	**280**	**150**	**260**	**540**	**260**
300	**290**	**155**	**270**	**560**	**270**

Notice:

If the width of the pillars is more than 20 cm, than the width of the drive through will be reduced accordingly to the above mentioned width dimensions. In order to avoid this, we recommend to extend the measures between the pillars (B3 and B4) accordingly. Please contact WÖHR.

Hydraulic power packs

The hydraulic power pack is positioned within the system.

Switch cabinet

The switch cabinet is positioned within the system at the rear wall.

Electrical data

Connections 230/400 V, 50 Hz, 3 phases. Power consumption max. 3.0 kW. Fuse or circuit breaker 3 x 16 A slow blow (according to DIN VDE 0100 part 430) and supply line 3 Ph + N + PE according to local EVU provisions up to the main switch, and connection of the supply line generally performed by the customer.

Grounding and potential equalisation:
- to be performed by the customer compliant to DIN EN 60204
- connections required every 10 metres

General product information

The entrance level parking place row has one place less than the upper and lower level. This empty space always stays on entrance floor level.
The platforms at the entrance floor level are shifted sideways by one space so that the empty space is above the lower level platform to be raised, or below the upper floor platform to be lowered.

Hotel garage

If used by hotel guests, the installation requires special planning and construction. Please ask for details.

Noise protection

Basis is the German DIN 4109 “Noise protection in buildings”.

With the following conditions required 30 dB (A) in rooms can be provided:
- noise protection package from our accessory
- insulation figure of the construction of min. $R'_W = 57$ dB
- walls which are bordering the parking systems must be done as single wall and deflection resistant with min. m’= 300 kg/m²
- solid ceiling above the parking systems with min. m’= 400 kg/m²

At differing constructional conditions additional sound absorbing measures are to be provided by the customer.

The best results are reached by separated sole plates from the construction.

Increased noise protection:

If increased noise protection must be provided planning has to be confirmed on a project basis by WÖHR.

Temperature

The installation is designed to operate between +5°and +40°C. Atmospheric Humidity: 50% at +40°C. If the local circumstances differ from the above please contact WÖHR.

Conformity test

All our systems are checked according to EC machinery directive 2006/42/EC and EN 14010.

Illumination

Illumination has to be considered acc. to local requirements by the customer.

Numbering of the parking spaces

1. The empty space of the Combilift is always on the left in the entrance level.
2. The numbering is as follows:

UL	1	3	6	9	12
EL		4	7	10	13
LL	2	5	8	11	14

3. The numbering for each system starts with 1 as above.
4. Different numbering of parking spaces is possible at a surcharge (software changes are necessary).

Free spaces

Special drawings for free spaces to accommodate air ducts or other pipes can be requested at WÖHR Agent!

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided by the customer acc. to local requirements, height min. 200 cm – this is applicable during the construction phase too.

Drainage

We recommend providing gutter in the pit centre and connecting the gutter either to a gully or a drainage pit 50 x 50 x 20 cm. If the pump sump is not accessible for manual drainage, the client must provide a pump on site to empty the pump sump. Lateral slope only within the gutter.

To prevent hazards for the ground water, we recommend giving the pit floor an oil-resistant coating as a means of protecting the environment.
If this is to be connected to the sewage system, it is advisable to provide oil and/or petrol seperators.

Maintenance

WÖHR and its foreign partners have an assembly and customer network. Annual maintenance is performed at conclusion of a maintenance contract.

Protection against corrosion

Independent of a maintenance workings has to be carried out acc. to WÖHR Cleaning and Maintenance Instruction regularly.

Clean up galvanized parts and platforms of dirt and road salt as well as other pollution (corrosion danger)!

Pit must always be ventilated and dearated well.

Parking place width

We recommend a clear platform width of at least 250 cm.

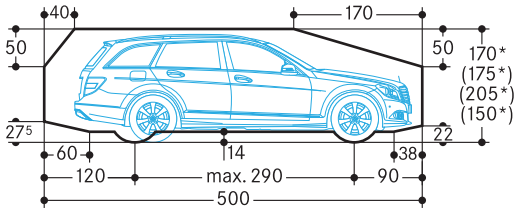
Dimensions

All dimensions shown are minimum. Construction tolerances must be taken into consideration. All dimensions in cm.

Fire safety

Each and every fire safety requirement and all possible mandatory item(s) and equipment(s) (fire extinguishing systems and fire alarm systems, etc.) are to be provided by the customer.

Clearance profile (standard saloon/estate car)



* The total car height includes roof rail and antenna fixture and must not exceed the mentioned max. height dimension.

Notes

We recommend providing wiring conduits leading to operating panels, particularly in above-ground garages.

The wiring conduits should placed 120 cm above entrance level in a support in the middle of the area.

Data Sheet
WÖHR COMBILIFT 543-2,6

Suitable for condominium and office buildings. For permanent use only!

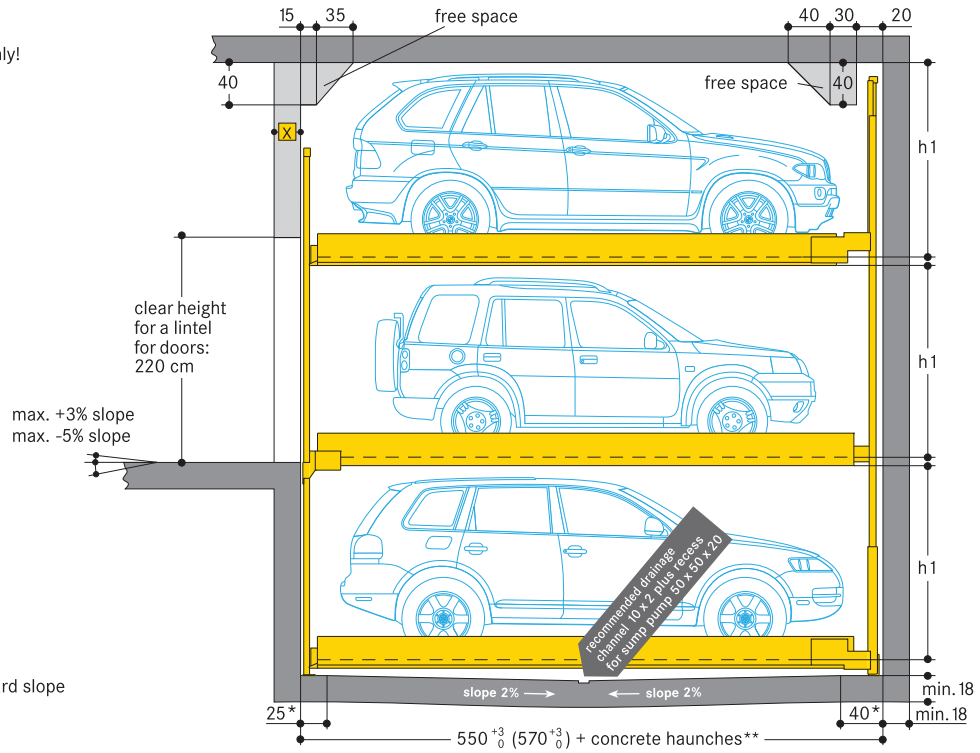
In case of short time user (e.g. for offices, hotels, a.s.o.) technical adjustments are required. Please contact WÖHR!

Platforms are in horizontal position to drive on.

Load per platform max. 2600 kg (load per wheel max. 650 kg)

X = to be clarified with door supplier.

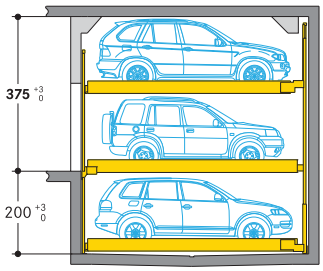
Dimensions in cm



* in this zone, 0% of downward/upward slope in longitudinal and cross direction

** see notes, point 5

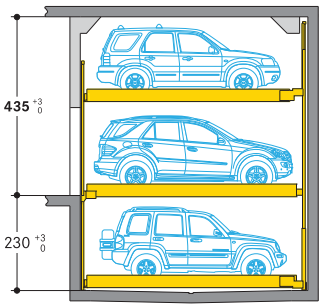
Comfort type 543 · 2600 kg



	car height	distance
UL	Cars/Vans/SUVs up to 175 cm	h1 = 180
EL	Cars/Vans/SUVs up to 175 cm	h1 = 180
LL	Cars/Vans/SUVs up to 175 cm	h1 = 180

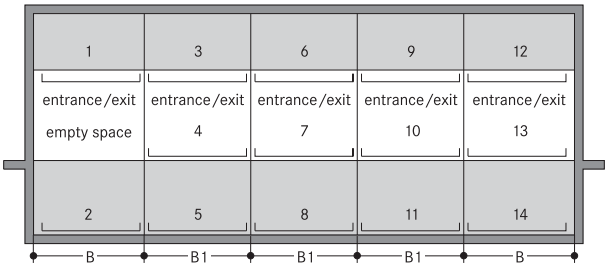
UL = upper level, EL = entrance level, LL = lower level

Premium type 543 · 2600 kg



	car height	distance
UL	Cars/Vans/SUVs up to 205 cm	h1 = 210
EL	Cars/Vans/SUVs up to 205 cm	h1 = 210
LL	Cars/Vans/SUVs up to 205 cm	h1 = 210

Width dimensions



Space required B	B1	gives clear platform width
280	**270**	**250**
290	**280**	**260**
300	**290**	**270**

One entry/exit is required on entrance level for each grid.

Notes

1. Pits must always be protected by a sliding shutterdoor (even in underground garages).
2. Arrangements start with 2 grids for 5 cars, 3 grids for 8 cars.
3. Installation length of 550 cm for car length of a max. of 500 cm. Clear platform width of 250 cm for car widths of 190 cm. For large touring sedans we recommend a clear platform width of at least 260–270 cm.
4. For large touring sedans an installation length of 570 cm is recommended. This length offers larger safety distances for potential future developments or projects with short term parkers such as hotels or similar.
5. It is not possible to have channels or undercuts and/or concrete haunches along the pit's rear and front floor-to-wall joints. In the event that channels or undercuts are necessary, the pit length needs to be increased based on the dimensions of said channels or undercuts.
6. The manufacturer reserves the right to construction or model modifications and/or alterations. Furthermore, the right to any subsequent part modification and/or variations and amendments in procedures and standards due to technical and engineering progresses in the art or due to environmental regulation changes, are also hereby reserved.

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The solution for Sport Utility Vehicles (SUV), Minibuses, Jeeps and other heavy cars up to 2,6 to

Doors

According EN 14010, the Combilift 543 must be closed with shutterdoors. The door controls are integrated in the overall system. That means:

a) The doors are electro-mechanically interlocked.

b) The doors can only be opened when the selected parking place has reached the entry/exit position.

c) Any pits are closed in the entrance area.

Local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

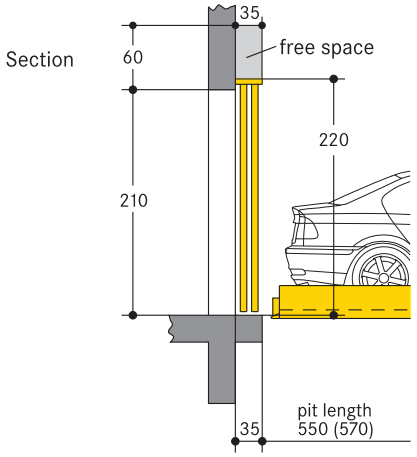
Door types:

Manually operated sliding shutterdoors

- for underground garages with galvanised barred metal panelling
- above ground with powder coated metal sheets (RAL 7030)

Alternatively, sliding shutterdoors can be supplied with electrical drive.

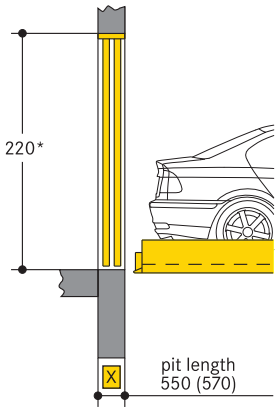
Installation:
Behind the building pillars with door offset



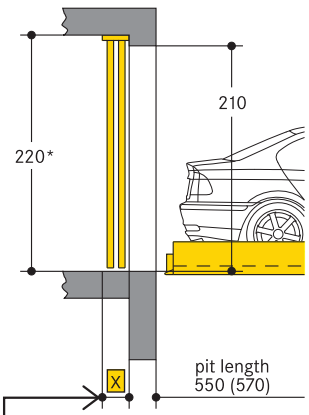
X = 25 cm for manually operated sliding shutterdoors

X = 35 cm for automatic shutterdoors

Installation:
Below the lintel between the building pillars

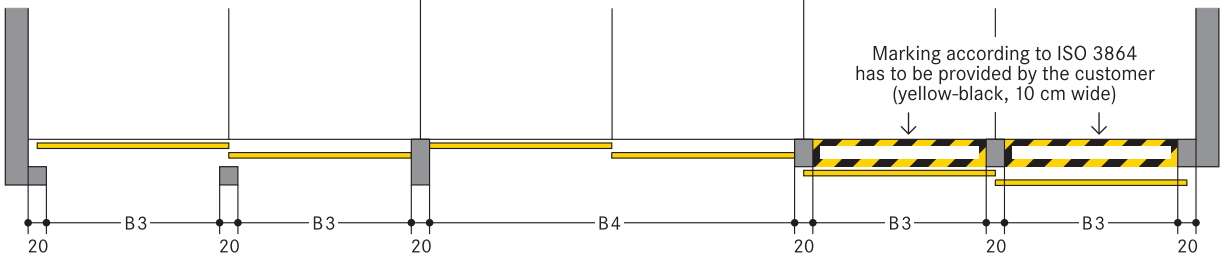


Installation:
In front of the building pillars



With installation in front of the pillars, the driving aisle is measured from the door.

Ground plan



Space required B3	B4	Gives clear platform width
250	**520**	**250**
260	**540**	**260**
270	**560**	**270**

* The lintel of 220 cm is absolutely necessary. With differing heights, additional fixings are required at a surcharge. If no lintel is provided, the gates need to be fitted onto a steel frame (subject to surcharges).

Sliding door floor guides in underground garages

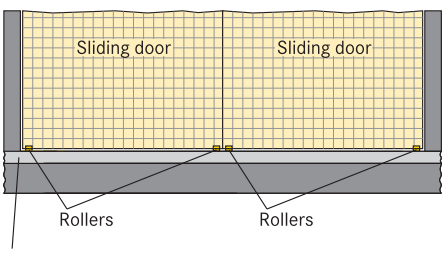
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by plastic rollers, locked down onto floor mounted base plates.

Dowel borehole depth to be approx. 9 cm.

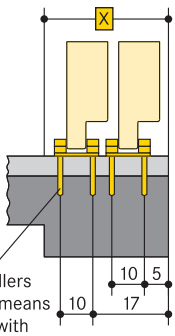
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Locking down of the rollers onto the base plate by means of an adhesive anchor with an M8 internal screw thread.

Sliding door floor guides in above ground garages

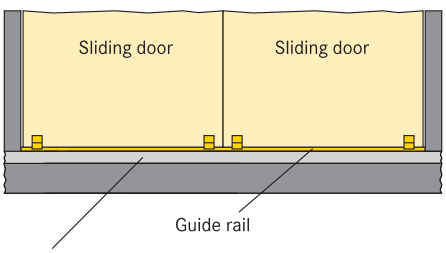
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by guide rails, locked down onto the floor.

Dowel borehole depth to be approx. 8 cm.

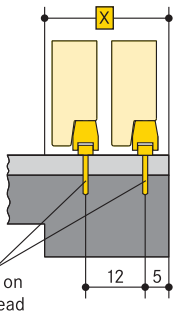
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section

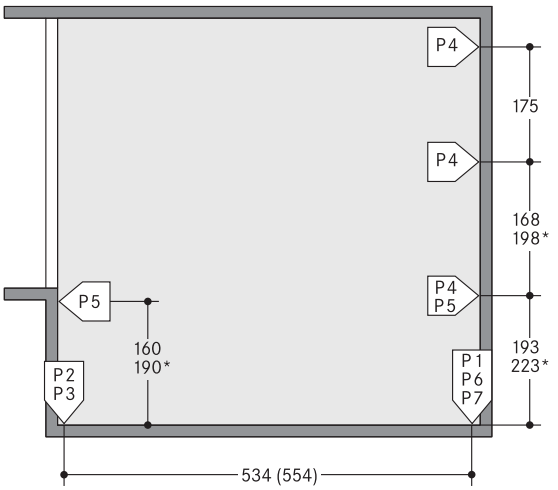


Guide rails to be fixed on using S 10 hexagon head wood bolts and plastic expansion dowels.

Width dimensions and statics

All dimensions shown are minimum. Constructional tolerances must be taken into consideration. **All dimensions in cm.**

Section



( ) dimensions in brackets for longer units

* dimensions for premium type

P1 = +80,0 kN [1)]
P2 = +70,0 kN
P3 = +35,0 kN
P4 = ± 5,0 kN
P5 = ± 2,5 kN
P6 = ±30,0 kN
P7 = ±15,0 kN

[1)] all static loadings include the weight of the car

Bearing loads are transmitted by wall plates with min. 30 cm² surface and to the floor by base plates with min. 350 cm² surface.

Wall and base plates to be fixed by heavy duty anchor bolts to a drilling depth of 10-12 cm. When fixing to the waterproof concrete floors chemical anchors are employed (to be advised by WÖHR).

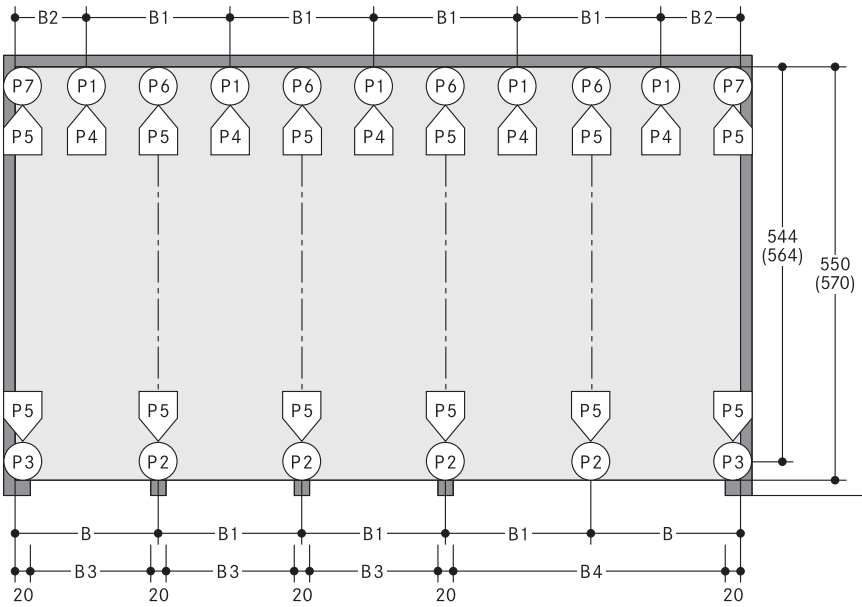
Base plate thickness minimum 18 cm. Rear wall and base plate must be formed of concrete and must have a flat surface without protrusions.

Concrete quality according to the static building requirements, however for the dowel fixing concrete quality of min. C20/25 is required.

The specified lengths to the support points are mean values. Please contact WÖHR Agent for exact positions for any variations on the standard units.

Please contact WÖHR Agent for clarify the door widths/widths of columns. Grid width of 270 /280/290 cm must be observed.

Ground plan



The driving aisle width to be compliant with country regulations locally in force.

Space required					gives clear
B	B1	B2	B3	B4	platform width
280	**270**	**145**	**250**	**520**	**250**
290	**280**	**150**	**260**	**540**	**260**
300	**290**	**155**	**270**	**560**	**270**

Notice:

If the width of the pillars is more than 20 cm, than the width of the drive through will be reduced accordingly to the above mentioned width dimensions. In order to avoid this, we recommend to extend the measures between the pillars (B3 and B4) accordingly. Please contact WÖHR.

Hydraulic power packs

The hydraulic power pack is positioned within the system.

Switch cabinet

The switch cabinet is positioned within the system at the rear wall.

Electrical data

Connections 230/400 V, 50 Hz, 3 phases. Power consumption max. 3.0 kW. Fuse or circuit breaker 3 x 16 A slow blow (according to DIN VDE 0100 part 430) and supply line 3 Ph + N + PE according to local EVU provisions up to the main switch, and connection of the supply line generally performed by the customer.

Grounding and potential equalisation:
- to be performed by the customer compliant to DIN EN 60204
- connections required every 10 metres

General product information

The entrance level parking place row has one place less than the upper and lower level. This empty space always stays on entrance floor level.
The platforms at the entrance floor level are shifted sideways by one space so that the empty space is above the lower level platform to be raised, or below the upper floor platform to be lowered.

Hotel garage

If used by hotel guests, the installation requires special planning and construction. Please ask for details.

Noise protection

Basis is the German DIN 4109 “Noise protection in buildings”.

With the following conditions required 30 dB (A) in rooms can be provided:
- noise protection package from our accessory
- insulation figure of the construction of min. $R'_W = 57$ dB
- walls which are bordering the parking systems must be done as single wall and deflection resistant with min. m’= 300 kg/m²
- solid ceiling above the parking systems with min. m’= 400 kg/m²

At differing constructional conditions additional sound absorbing measures are to be provided by the customer.

The best results are reached by separated sole plates from the construction.

Increased noise protection:

If increased noise protection must be provided planning has to be confirmed on a project basis by WÖHR.

Temperature

The installation is designed to operate between +5°and +40°C. Atmospheric Humidity: 50% at +40°C. If the local circumstances differ from the above please contact WÖHR.

Conformity test

All our systems are checked according to EC machinery directive 2006/42/EC and EN 14010.

Illumination

Illumination has to be considered acc. to local requirements by the customer.

Numbering of the parking spaces

1. The empty space of the Combilift is always on the left in the entrance level.
2. The numbering is as follows:

UL	1	3	6	9	12
EL		4	7	10	13
LL	2	5	8	11	14

3. The numbering for each system starts with 1 as above.
4. Different numbering of parking spaces is possible at a surcharge (software changes are necessary).

Free spaces

Special drawings for free spaces to accommodate air ducts or other pipes can be requested at WÖHR Agent!

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided by the customer acc. to local requirements, height min. 200 cm – this is applicable during the construction phase too.

Drainage

We recommend providing gutter in the pit centre and connecting the gutter either to a gully or a drainage pit 50 x 50 x 20 cm. If the pump sump is not accessible for manual drainage, the client must provide a pump on site to empty the pump sump. Lateral slope only within the gutter.

To prevent hazards for the ground water, we recommend giving the pit floor an oil-resistant coating as a means of protecting the environment.
If this is to be connected to the sewage system, it is advisable to provide oil and/or petrol seperators.

Maintenance

WÖHR and its foreign partners have an assembly and customer network. Annual maintenance is performed at conclusion of a maintenance contract.

Protection against corrosion

Independent of a maintenance workings has to be carried out acc. to WÖHR Cleaning and Maintenance Instruction regularly.

Clean up galvanized parts and platforms of dirt and road salt as well as other pollution (corrosion danger)!

Pit must always be ventilated and dearated well.

Parking place width

We recommend a clear platform width of at least 250 cm.

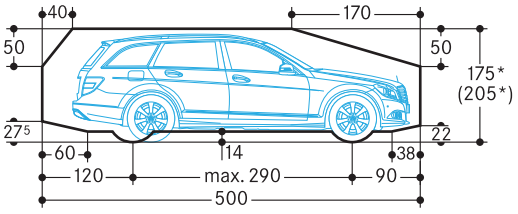
Dimensions

All dimensions shown are minimum. Construction tolerances must be taken into consideration. All dimensions in cm.

Fire safety

Each and every fire safety requirement and all possible mandatory item(s) and equipment(s) (fire extinguishing systems and fire alarm systems, etc.) are to be provided by the customer.

Clearance profile (standard saloon/estate car)



* The total car height includes roof rail and antenna fixture and must not exceed the mentioned max. height dimension.

Notes

We recommend providing wiring conduits leading to operating panels, particularly in above-ground garages.

The wiring conduits should placed 120 cm above entrance level in a support in the middle of the area.

Data Sheet
WÖHR COMBILIFT 552-2,0

Special solution for driving through to reach a rear parking
Suitable for condominium and office buildings.
For permanent user only!

In case of short time user (e.g. for offices, hotels, a.s.o.) technical adjustments are required. Contact WÖHR!

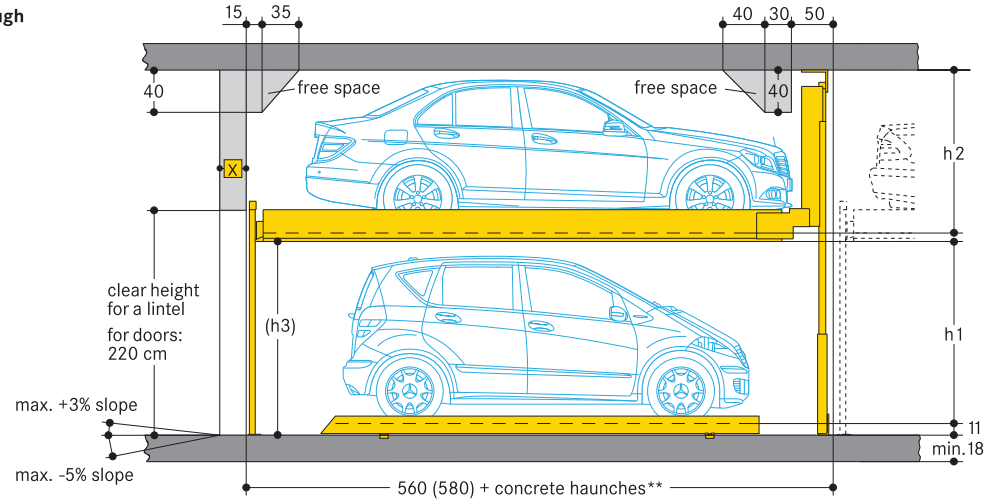
Platforms are in horizontal position to drive on.

Load per platform max. 2000 kg (load per wheel max. 500 kg)

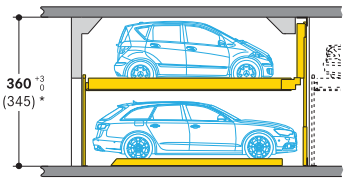
X = to be clarified with door supplier

Dimensions in cm

** see notes, point 5



Standard type 552 · 2000 kg



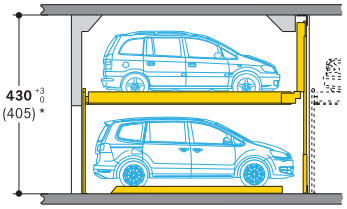
car height	distance
UL Cars/Station wagons up to 165 cm	h2 = 168
EL Cars/Station wagons up to 165 cm	h1 = 170

UL = upper level, EL = entrance level

Access height h3 = 181 cm.

* If cars and station wagons with a height of up to **150 cm** are parked on the **upper level**, a clear height of **345 cm** above the entrance level is sufficient.

Comfort type 552 · 2000 kg

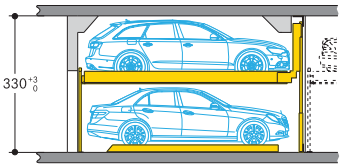


car height	distance
UL Cars/Vans up to 200 cm	h2 = 203
EL Cars/Vans up to 200 cm	h1 = 205
Cars/Vans up to 2000 kg max.	

Access height h3 = 216 cm.

* If cars and vans with a height of up to **175 cm** are parked on the **upper level**, a clear height of **405 cm** above the entrance level is sufficient.

Compact type 552 · 2000 kg

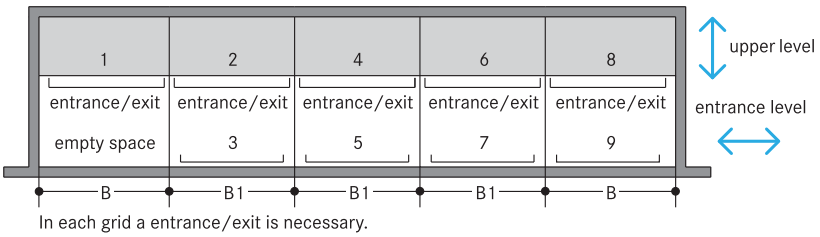


car height	distance
UL Cars/Station wagons up to 150 cm	h2 = 153
EL Cars/Station wagons up to 150 cm	h1 = 155

Access height h3 = 166 cm.

Please attend to restricted car- and platform distance height!

Width dimensions



In each grid a entrance/exit is necessary.

Space required B	B1	gives clear platform width UL	gives clear platform width EL
260	250	230	207*
270	260	240	217*
280	**270**	**250**	**227***
290	**280**	**260**	**227***
300	**290**	**270**	**227***

* the space to get in and out of the car for platforms in entrance level is increased by 35 cm driver side.

Notes

1. Installation length of 560 cm for car length of a max. of 500 cm. Clear platform width of 250 cm for car widths of 190 cm. For large touring sedans we recommend a clear platform width of at least 260–270 cm.
2. For very large cars an installation length of 580 cm is recommended. This length offers larger safety distances for potential future developments. Installation length of min. 580 cm for projects with short term parkers such as hotels or similar.
3. For 2 or 3 row arrangement min. platform width 250 cm.
4. For arrangement with Combilift 543 (542) doors are required.
5. It is not possible to have channels or undercuts and/or concrete haunches along the intersection joints connecting the floor and both the front and rear building support columns. In the event that channels or undercuts are necessary, the total installation length needs to be increased based on the dimensions of said channels or undercuts.
6. The manufacturer reserves the right to construction or model modifications and/or alterations. Furthermore, the right to any subsequent part modification and/or variations and amendments in procedures and standards due to technical and engineering progresses in the art or due to environmental regulation changes, are also hereby reserved.

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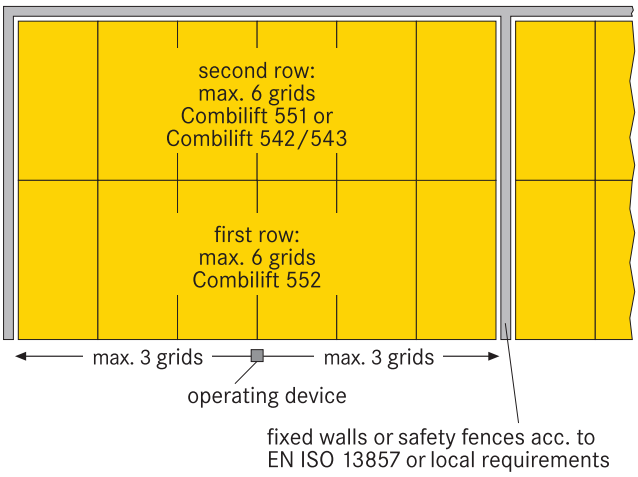
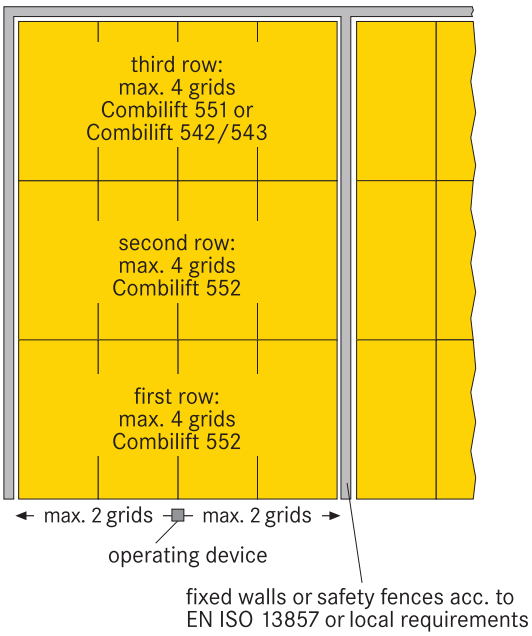
Grid arrangement

To guarantee visibility and for safety reasons, please consider the following maximum grid arrangement for 2 or 3 rows one behind the other.

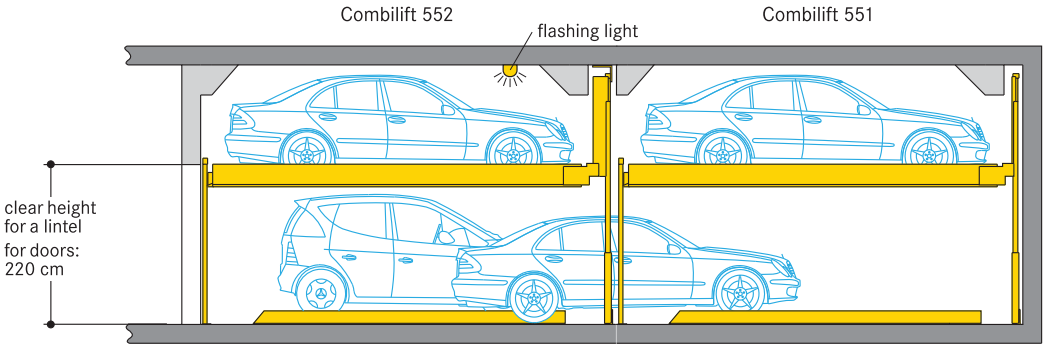
2 rows one behind the other



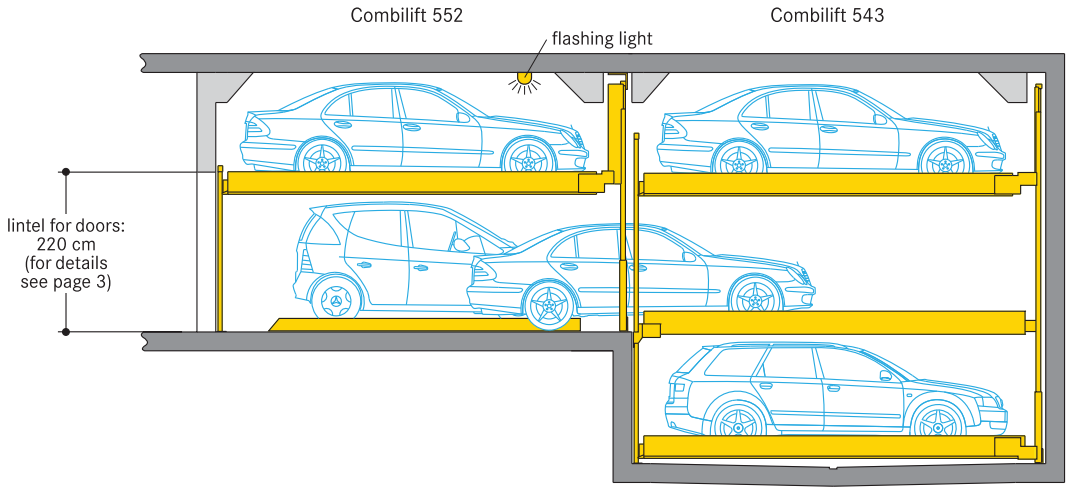
3 rows one behind the other



Design proposal: Combilift 552/Combilift 551 one behind the other



Design proposal: Combilift 552/Combilift 543 (542) one behind the other



Doors (Combilift 552/Combilift 543 (542) one behind the other)

The door controls are integrated in the overall system. That means:

a) The doors are electro-mechanically interlocked.

b) The doors can only be opened when the selected parking place has reached the entry/exit position.

Local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

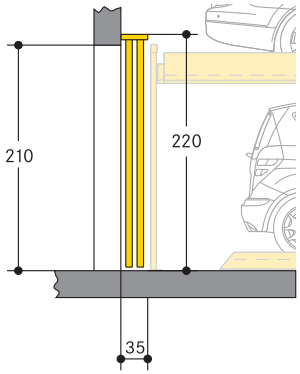
Door types:

Manually operated sliding shutterdoors with galvanised barred metal panelling (also for above ground garages).

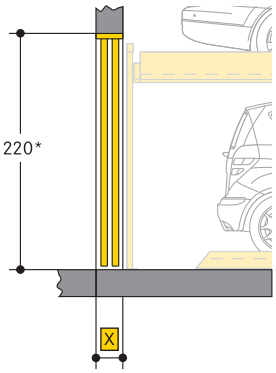
Alternatively, sliding shutterdoors can be supplied with electrical drive.

Installation:
Behind the building pillars with door offset

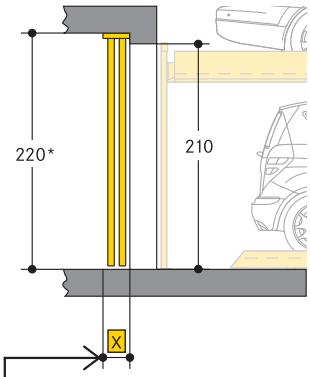
Section



Installation:
Below the lintel between the building pillars



Installation:
In front of the building pillars

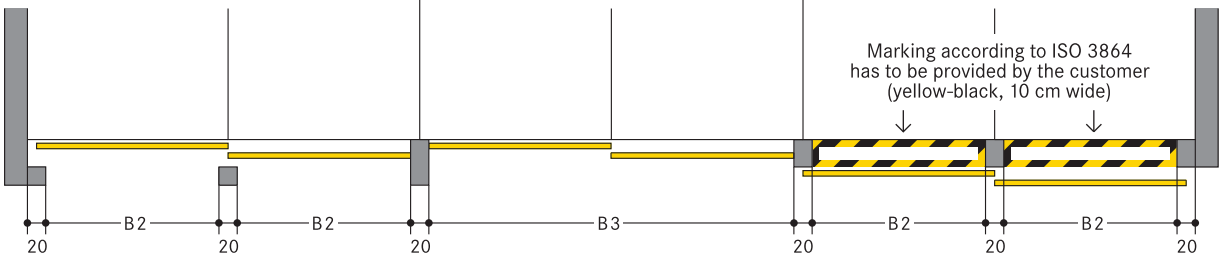


With installation in front of the pillars, the driving aisle is measured from the door.

X = 25 cm for manually operated sliding shutterdoors

X = 35 cm for automatic shutterdoors

Ground plan



Space required B2	B3	Gives clear platform width
230	480	230
240	500	240
250	**520**	**250**
260	**540**	**260**
270	**560**	**270**

* The lintel of 220 cm is absolutely necessary. With differing heights, additional fixings are required at a surcharge. If no lintel is provided, the gates need to be fitted onto a steel frame (subject to surcharges).

Sliding door floor guides in underground garages

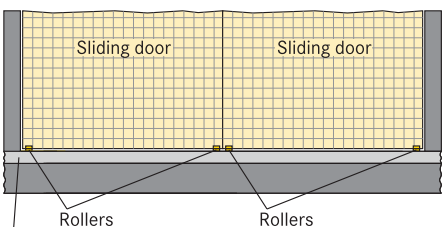
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by plastic rollers, locked down onto floor mounted base plates.

Dowel borehole depth to be approx. 9 cm.

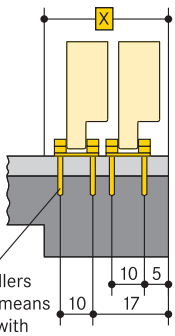
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Locking down of the rollers onto the base plate by means of an adhesive anchor with an M8 internal screw thread.

Sliding door floor guides in above ground garages

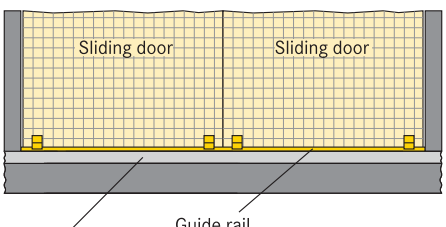
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by guide rails, locked down onto the floor.

Dowel borehole depth to be approx. 8 cm.

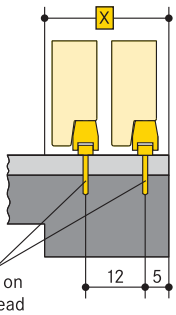
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Guide rails to be fixed on using S 10 hexagon head wood bolts and plastic expansion dowels.

Evenness tolerances

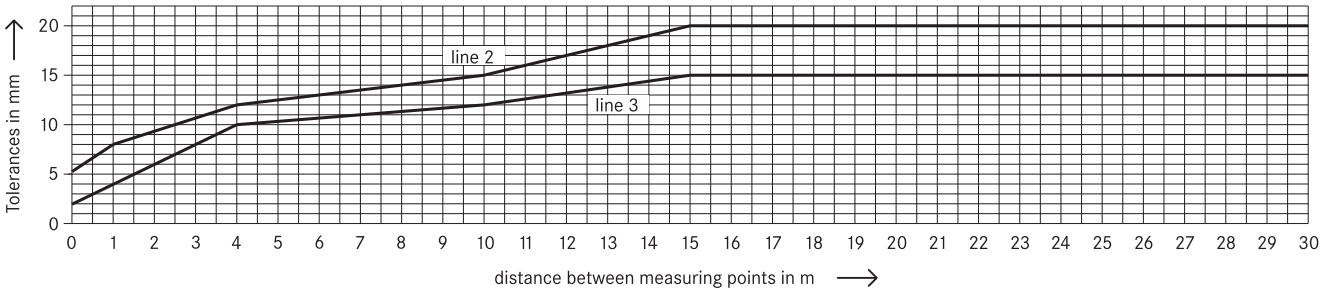
According to EN 14010 the danger of trapping between nonparallel platforms edges and the groundhastobeprevented.The distance between the lower flangeof the platforms and the garage ground must therefore not exceed 2cm.

To adhere to the safety regulations and to get the necessary even ground, the tolerances of evenness to DIN 18202, table 3, line 3, must not be exceeded. Therefore exact levelling of the ground by the client is essential.

Abstract from DIN 18202, table 3

column	1	2	3	4	5	6
line	reference	Vertical measurements as limits in mm with measuring points distances in m to* 0,1	1	4	10	15
2	Unfinished to surface of covers, subconcrete and subsoils for higher demands, e.g. as foundation for cast plaster floor, industrial soils, paving tiles and slabstone paving, compund floor paving. Finished surfaces for minor purposes, e.g. warehouses, cellars	5	8	12	15	20
3	Finished grounds, e.g. floor pavement serving as foundation for coverings. Coverings, tile coverings, PVC flooring and glued coverings.	2	4	10	12	15

* Intermediate values are to be taken out the diagram and must be rounded-off to mm.



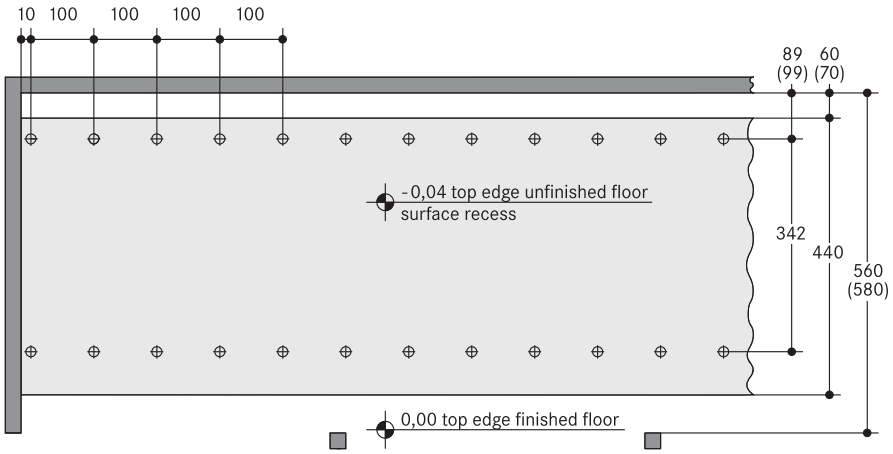
Check points

The evenness of a surface is checked independently of its position and slope by bore hole gauges between two check points on the surface. WÖHR normally make a random test using single measurements in case of obviously inaccurate surfaces.

For uniform examination of the evenness of the ground surface the following points are defined as measuring and check points:

a) for surface recess.
b) for finished floor.

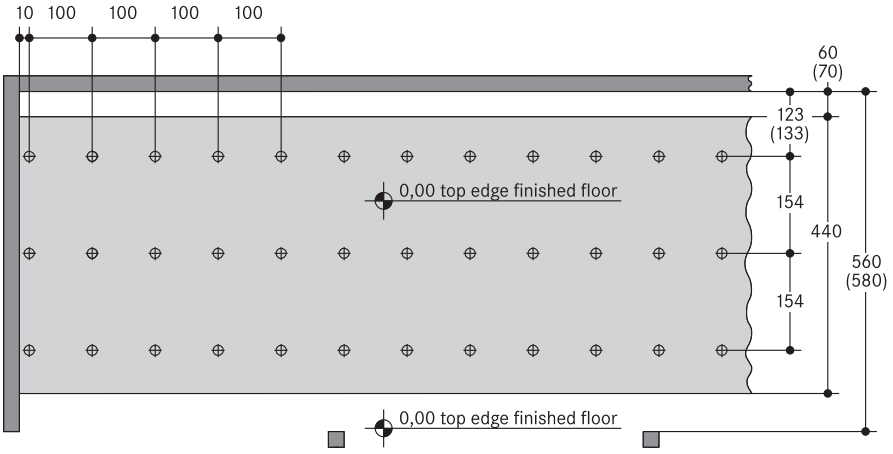
a) Layout for surface recess width 4,40 m



⊕ Measuring points at 100 cm points for checking the unevenness acc. to DIN 18202, table 3, line 2, or acc. diagram

( ) dimensions in brackets for increased length

b) Layout for finished floor after placing floor pavement



⊕ Measuring points at 100 cm points for checking the unevenness acc. to DIN 18202, table 3, line 3, or acc. diagram

( ) dimensions in brackets for increased length

Track Installation · Flooring works · Drainage

The moving rail load of each platform wheel is max. 6 kN.

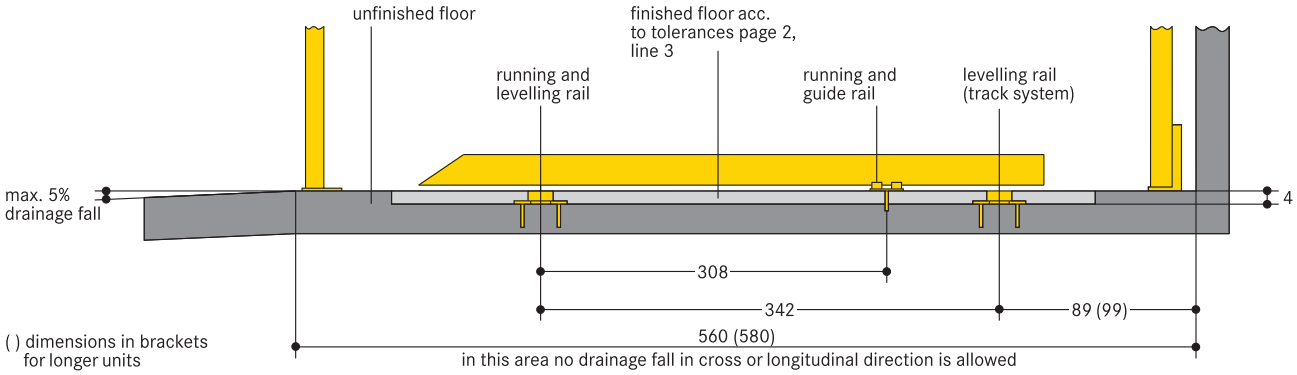
The evenness of the floor + screed must be achieved according to DIN 18202, table 3, line 2. After checking the floor + screed the levelling rails are mounted on top of the highest point.

The underlining and fixing of the levelling rails occurs at the intended fixing points. For the laying of the running and levelling rails a meter tear is to be attached permanently for every railway track provided by the customer.

The screed is to be peeled off by the client on height of the levelling rails. Do not use mastic asphalt.
The running and guide rails are fastened after placement of the screed with bolts. Evenness according to DIN 18202, table 3, line 3.

In the area of the railway track no expansion gap or building dividing gaps are allowed.

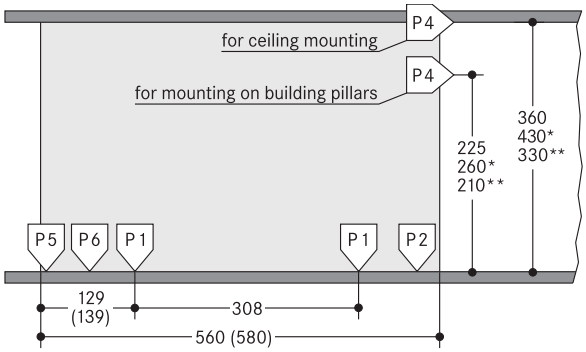
Due to the technical requirements there is no drainage fall allowed in the area of the system.



Width dimensions and statics

All dimensions shown are minimum. Constructional tolerances must be taken into consideration. **All dimensions in cm.**

Section



( ) dimensions in brackets for longer units

* dimensions for economic type

** dimensions for comfort type

P1 = + 6,0 kN [1)]
P2 = +10,0 kN
P4 = ± 0,5 kN
P5 = ± 9,0 kN
P6 = ± 1,0 kN

[1)] all static loadings include the weight of the car

Bearing loads are transmitted by wall plates with min. 30 cm² surface and to the floor by base plates with min. 350 cm² surface.

Wall and base plates will be fixed by heavy duty anchor bolts to a drilling depth of 10-12cm. When fixing to the waterproof concrete floors chemical anchors are employed (to be advised by WÖHR).

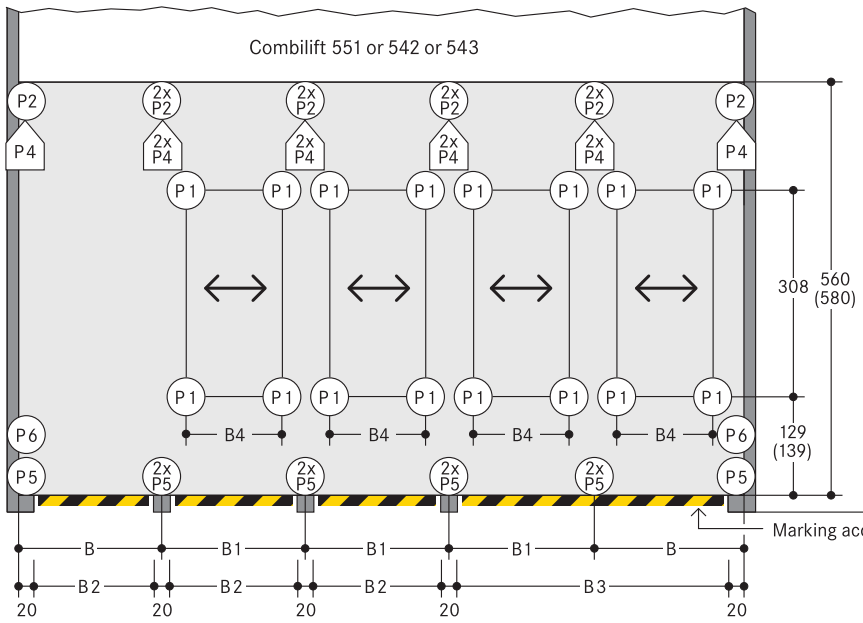
Base plate thickness min. 18 cm. Rear wall and base plate must be formed of concrete and must have a flat surface without protrusions.

Concrete quality according to the static requirements of the building, but for the dowel fastening we require a concrete quality of min. C20/25.

The specified lengths to the support points are mean values. Please contact WÖHR Agent for exact positions for any variations on the standard units.

Please contact WÖHR Agent for clarify the door widths/widths of columns. Grid width of 250 / 260 / 270 / 280 / 290 cm must be observed.

Ground plan



The driving aisle width to be compliant with country regulations locally in force.

Space required				gives clear platform width	
B	B1	B2	B3	EL (B5)	UL
260	250	230	480	207	230
270	260	240	500	217	240
280	**270**	**250**	**520**	**227**	**250**
290	**280**	**260**	**540**	**227**	**260**
300	**290**	**270**	**560**	**227**	**270**

Hydraulic power packs

The hydraulic power pack is positioned within the system.

Switch cabinet

The switch cabinet is positioned within the system at the rear wall.

Electrical data

Connections 230/400 V, 50 Hz, 3 phases. Power consumption max. 3.0 kW. Fuse or circuit breaker 3 x 16 A slow blow (according to DIN VDE 0100 part 430) and supply line 3 Ph + N + PE according to local EVU provisions up to the main switch, and connection of the supply line generally performed by the customer.

Grounding and potential equalisation:
- to be performed by the customer compliant to DIN EN 60204
- connections required every 10 metres

General product information

The combilift Type 552 consists of 2 platform rows, one above the other. In front (to the full width) of the installations is a drive way which is situated on the lower platform row (access level). The lower platform row consists of one platform less than the upper level.

In order to access a platform on the upper level, the lower level platforms (access level) shift laterally into the free space. The selected upper platform is now lowered vertically into the free space provided in the access level.

Hotel garage

If used by hotel guests, the installation requires special planning and construction. Please ask for details.

Noise protection

Basis is the German DIN 4109 “Noise protection in buildings”.

With the following conditions required 30 dB (A) in rooms can be provided:

- noise protection package from our accessory
- insulation figure of the construction of min. $R'_W = 57$ dB
- walls which are bordering the parking systems must be done as single wall and deflection resistant with min. m’= 300 kg/m²
- solid ceiling above the parking systems with min. m’= 400 kg/m²

At differing constructional conditions additional sound absorbing measures are to be provided by the customer.

The best results are reached by separated sole plates from the construction.

Increased noise protection:

If increased noise protection must be provided planning has to be confirmed on a project basis by WÖHR.

Temperature

The installation is designed to operate between +5°and +40°C. Atmospheric Humidity: 50% at +40°C. If the local circumstances differ from the above please contact WÖHR.

Numbering of the parking spaces

1. The empty space of the Combilift is always on the left in the entrance level.
2. The numbering is as follows:

UL	1	2	4	6	8
EL		3	5	7	9

3. The numbering for each system starts with 1 as above.
4. Different numbering of parking spaces is possible at a surcharge (software changes are necessary).

Conformity test

All our systems are checked according to EC machinery directive 2006/42/EC and EN 14010.

Illumination

Illumination has to be considered acc. to local requirements by the customer.

Free spaces

Special drawings for free spaces to accommodate air ducts or other pipes can be requested at WÖHR Agent!

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided by the customer acc. to local requirements, height min. 200 cm – this is applicable during the construction phase too.

Maintenance

WÖHR and its foreign partners have an assembly and customer network. Annual maintenance is performed at conclusion of a maintenance contract.

Protection against corrosion

Independent of a maintenance workings has to be carried out acc. to WÖHR Cleaning and Maintenance Instruction regularly.

Clean up galvanized parts and platforms of dirt and road salt as well as other pollution (corrosion danger)!

Pit must always be ventilated and dearated well.

Parking place width

We recommend a clear platform width of at least 250 cm.

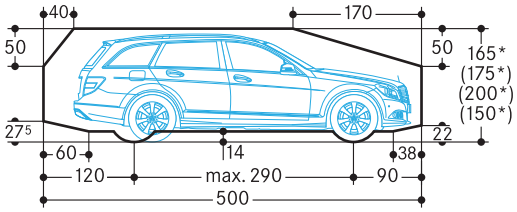
Dimensions

All dimensions shown are minimum. Construction tolerances must be taken into consideration. All dimensions in cm.

Fire safety

Each and every fire safety requirement and all possible mandatory item(s) and equipment(s) (fire extinguishing systems and fire alarm systems, etc.) are to be provided by the customer.

Clearance profile (standard saloon/estate car)



* The total car height includes roof rail and antenna fixture and must not exceed the mentioned max. height dimension.

Note

If doors are planned we recommend installing an empty pipe for cabling to the control panel from the rear. This empty pipe should be 120 cm above ground level in the centre of a column.

Data Sheet
WÖHR COMBILIFT 552-2,6

Special solution for driving through to reach a rear parking
Suitable for condominium and office buildings.
For permanent user only!

In case of short time user (e.g. for offices, hotels, a.s.o.) technical adjustments are required. Contact WÖHR!

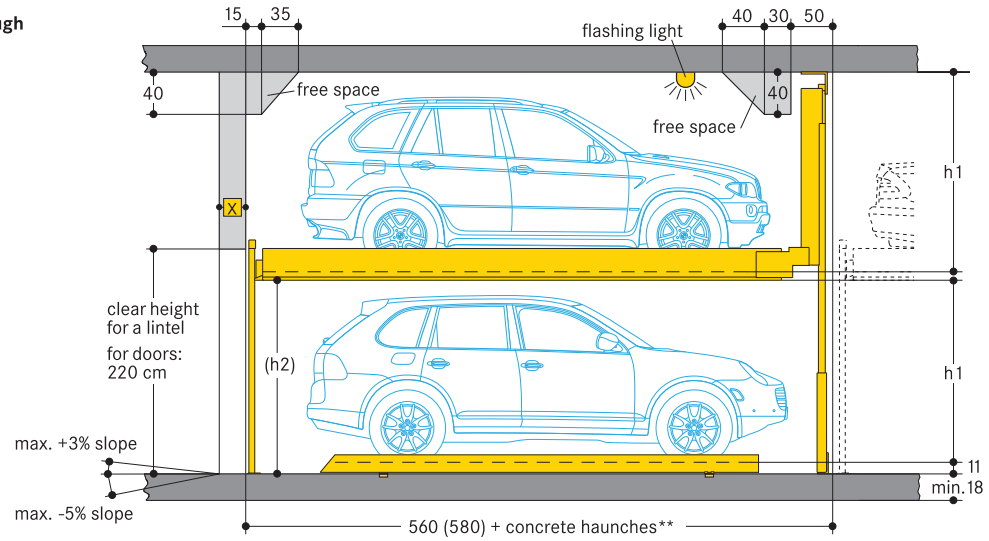
Platforms are in horizontal position to drive on.

Load per platform max. 2600 kg (load per wheel max. 650 kg)

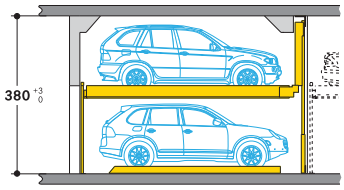
X = to be clarified with door supplier

Dimensions in cm

** see notes, point 5



Comfort type 552 · 2600 kg

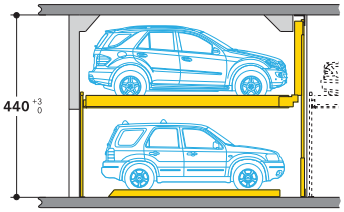


	car height	distance
UL	Cars/Vans/SUVs up to 175 cm	h1 = 180
EL	Cars/Vans/SUVs up to 175 cm	h1 = 180

UL = upper level, EL = entrance level

Access height h2 = 191 cm.

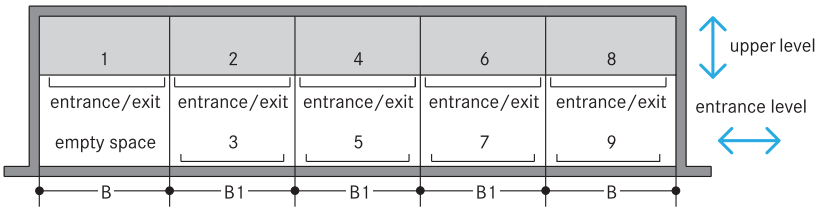
Premium type 552 · 2600 kg



	car height	distance
UL	Cars/Vans/SUVs up to 205 cm	h1 = 210
EL	Cars/Vans/SUVs up to 205 cm	h1 = 210

Access height h2 = 221 cm.

Width dimensions



In each grid a entrance/exit is necessary.

Space required B	B1	gives clear platform width UL	gives clear platform width EL
280	**270**	**250**	**227***
290	**280**	**260**	**227***
300	**290**	**270**	**227***

* the space to get in and out of the car for platforms in entrance level is increased by 35 cm driver side.

Notes

1. Installation length of 560 cm for car length of a max. of 500 cm. Clear platform width of 250 cm for car widths of 190 cm. For large touring sedans we recommend a clear platform width of at least 260–270 cm.
2. For very large cars an installation length of 580 cm is recommended. This length offers larger safety distances for potential future developments. Installation length of min. 580 cm for projects with short term parkers such as hotels or similar.
3. For 2 or 3 row arrangement min. platform width 250 cm.
4. For arrangement with Combilift 543 (542) doors are required.
5. It is not possible to have channels or undercuts and/or concrete haunches along the intersection joints connecting the floor and both the front and rear building support columns. In the event that channels or undercuts are necessary, the total installation length needs to be increased based on the dimensions of said channels or undercuts.
6. The manufacturer reserves the right to construction or model modifications and/or alterations. Furthermore, the right to any subsequent part modification and/or variations and amendments in procedures and standards due to technical and engineering progresses in the art or due to environmental regulation changes, are also hereby reserved.

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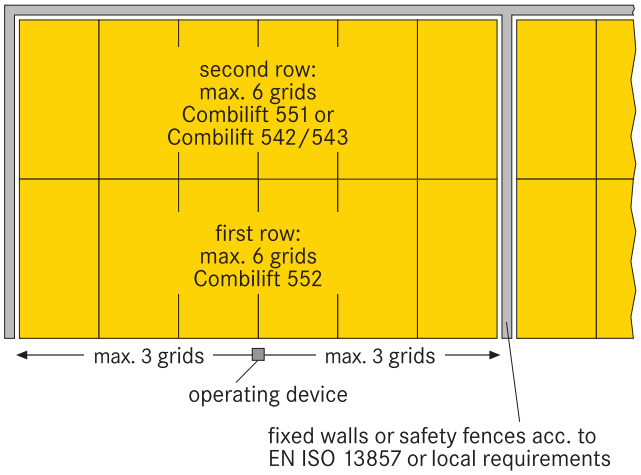
The solution for Sport Utility Vehicles (SUV), Minibuses, Jeeps and other heavy cars up to 2,6 to

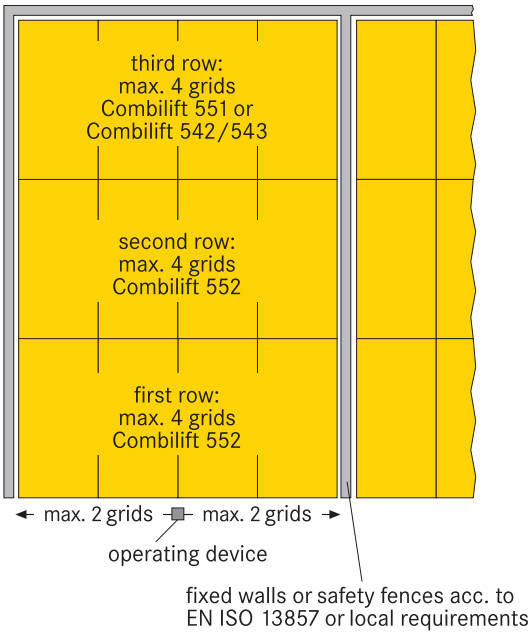
Grid arrangement

To guarantee visibility and for safety reasons, please consider the following maximum grid arrangement for 2 or 3 rows one behind the other.

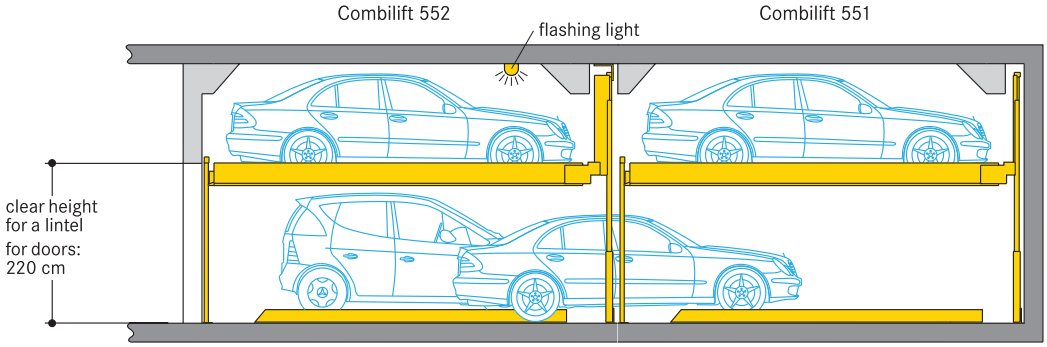
2 rows one behind the other



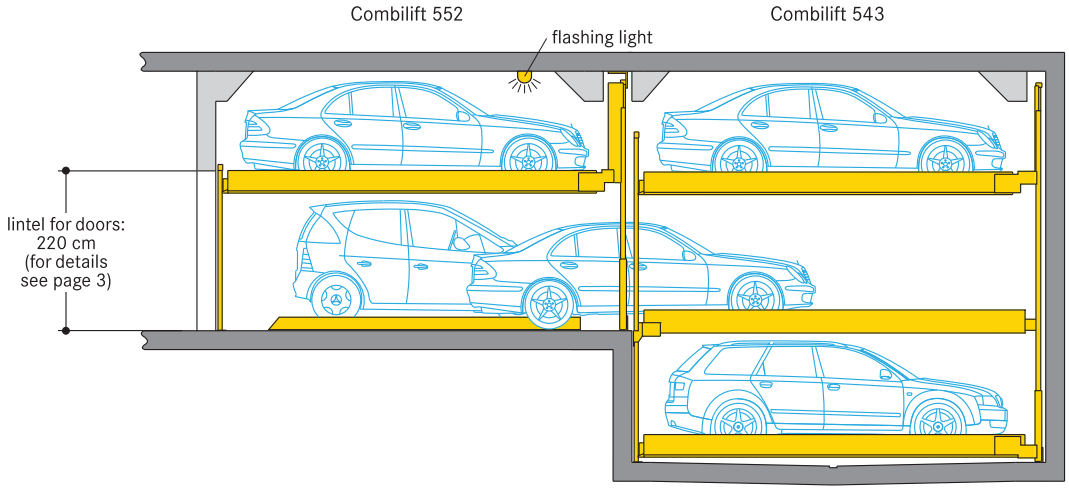
3 rows one behind the other



Design proposal: Combilift 552/Combilift 551 one behind the other



Design proposal: Combilift 552/Combilift 543 (542) one behind the other



Doors (Combilift 552/Combilift 543 (542) one behind the other)

The door controls are integrated in the overall system. That means:

a) The doors are electro-mechanically interlocked.

b) The doors can only be opened when the selected parking place has reached the entry/exit position.

Local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

Door types:

Manually operated sliding shutterdoors with galvanized fence filling (also for above ground garages).

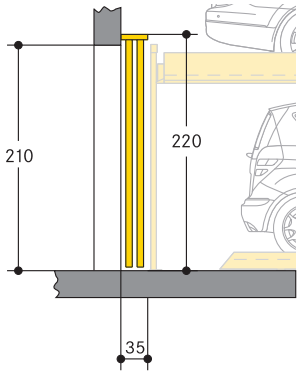
Alternatively, sliding shutterdoors can be supplied with electrical drive.

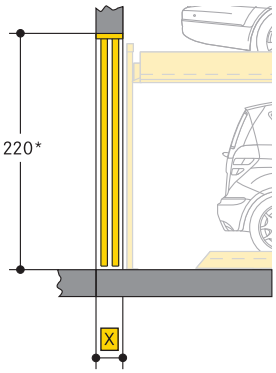
Installation:
Behind the building pillars with door offset

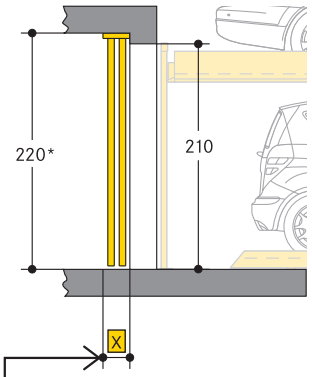
Installation:
Below the lintel between the building pillars

Installation:
In front of the building pillars

Section



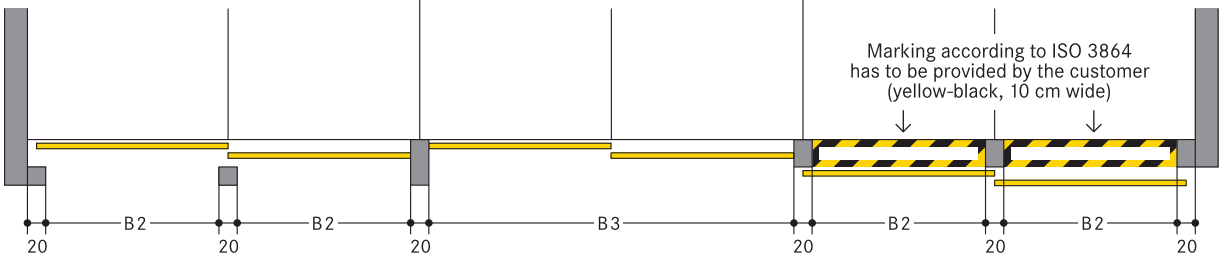




X = 25 cm for manually operated sliding shutterdoors

X = 35 cm for automatic shutterdoors

Ground plan



Space required B2	B3	Gives clear platform width
250	**520**	**250**
260	**540**	**260**
270	**560**	**270**

* The lintel of 220 cm is absolutely necessary. With differing heights, additional fixings are required at a surcharge. If no lintel is provided, the gates need to be fitted onto a steel frame (subject to surcharges).

Sliding door floor guides in underground garages

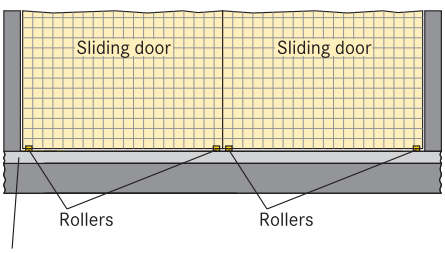
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by plastic rollers, locked down onto floor mounted base plates.

Dowel borehole depth to be approx. 9 cm.

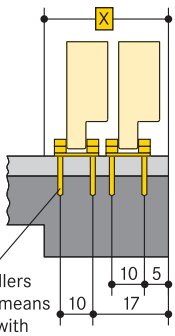
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Locking down of the rollers onto the base plate by means of an adhesive anchor with an M8 internal screw thread.

Sliding door floor guides in above ground garages

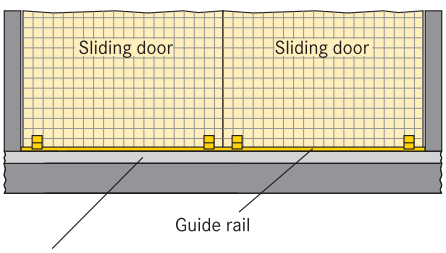
The evenness or flatness of the floor in the bottom floor guide section is required to comply with the DIN 18202, Table 3, line 3, standard requirements.

The bottom floor guides are constituted by guide rails, locked down onto the floor.

Dowel borehole depth to be approx. 8 cm.

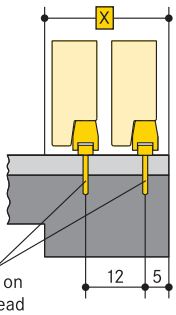
Note: In the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (for a max of 4 cm).

Front view



Finished floor level compliant to DIN 18353, floor evenness compliant to DIN 18202 table 3, line 3.

Section



Guide rails to be fixed on using S 10 hexagon head wood bolts and plastic expansion dowels.

Evenness tolerances

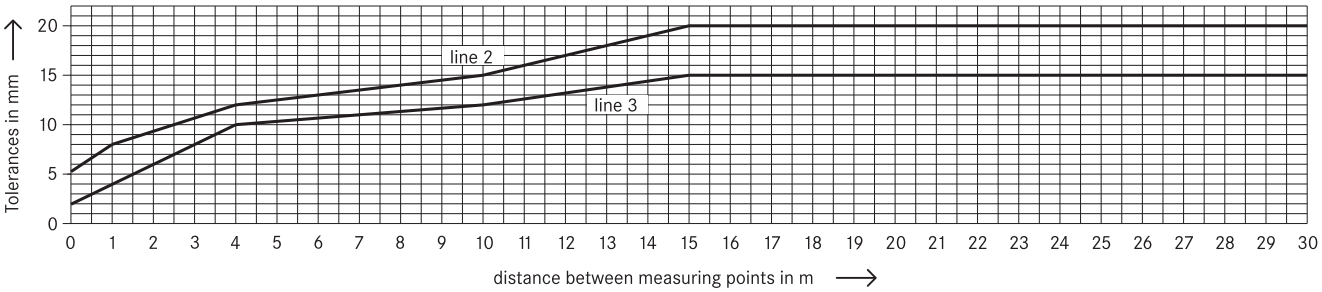
According to EN 14010 the danger of trapping between nonparallel platforms edges and the groundhastobeprevented.The distance between the lower flangeof the platforms and the garage ground must therefore not exceed 2cm.

To adhere to the safety regulations and to get the necessary even ground, the tolerances of evenness to DIN 18202, table 3, line 3, must not be exceeded. Therefore exact levelling of the ground by the client is essential.

Abstract from DIN 18202, table 3

column	1	2	3	4	5	6
line	reference	Vertical measurements as limits in mm with measuring points distances in m to* 0,1	1	4	10	15
2	Unfinished to surface of covers, subconcrete and subsoils for higher demands, e.g. as foundation for cast plaster floor, industrial soils, paving tiles and slabstone paving, compund floor paving. Finished surfaces for minor purposes, e.g. warehouses, cellars	5	8	12	15	20
3	Finished grounds, e.g. floor pavement serving as foundation for coverings. Coverings, tile coverings, PVC flooring and glued coverings.	2	4	10	12	15

* Intermediate values are to be taken out the diagram and must be rounded-off to mm.



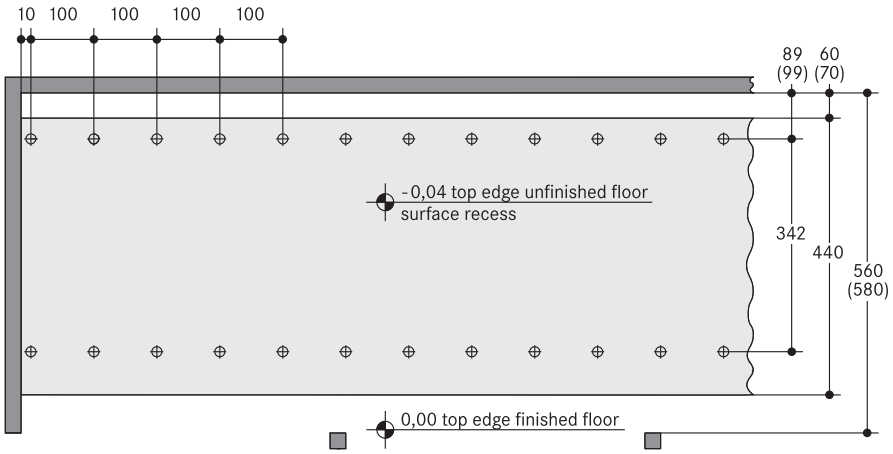
Check points

The evenness of a surface is checked independently of its position and slope by bore hole gauges between two check points on the surface. WÖHR normally make a random test using single measurements in case of obviously inaccurate surfaces.

For uniform examination of the evenness of the ground surface the following points are defined as measuring and check points:

a) for surface recess.
b) for finished floor.

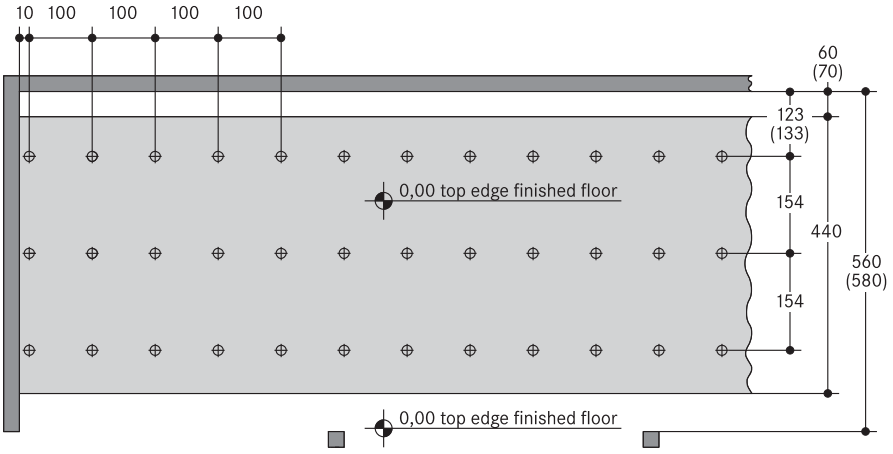
a) Layout for surface recess width 4,40 m



⊕ Measuring points at 100 cm points for checking the unevenness acc. to DIN 18202, table 3, line 2, or acc. diagram

( ) dimensions in brackets for increased length

b) Layout for finished floor after placing floor pavement



⊕ Measuring points at 100 cm points for checking the unevenness acc. to DIN 18202, table 3, line 3, or acc. diagram

( ) dimensions in brackets for increased length

Track Installation · Flooring works · Drainage

The moving rail load of each platform wheel is max. 10 kN.

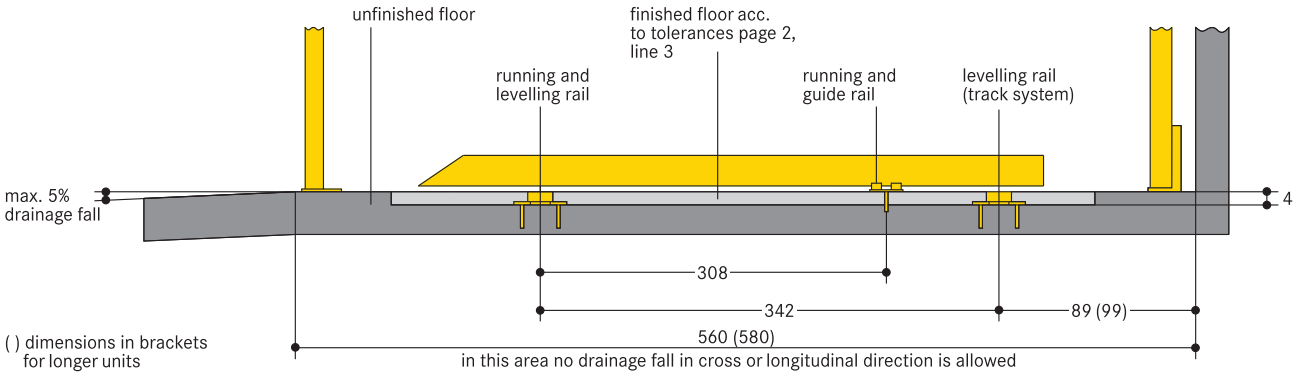
The evenness of the floor + screed must be achieved according to DIN 18202, table 3, line 2. After checking the floor + screed the levelling rails are mounted on top of the highest point.

The underlining and fixing of the levelling rails occurs at the intended fixing points. For the laying of the running and levelling rails a meter tear is to be attached permanently for every railway track provided by the customer.

The screed is to be peeled off by the client on height of the levelling rails. Do not use mastic asphalt.
The running and guide rails are fastened after placement of the screed with bolts. Evenness according to DIN 18202, table 3, line 3.

In the area of the railway track no expansion gap or building dividing gaps are allowed.

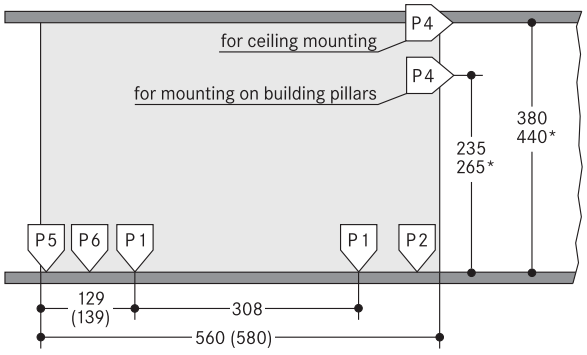
Due to the technical requirements there is no drainage fall allowed in the area of the system.



Width dimensions and statics

All dimensions shown are minimum. Constructional tolerances must be taken into consideration. **All dimensions in cm.**

Section



( ) dimensions in brackets for longer units

* dimensions for premium type

P1 = + 7,8 kN [1)]
P2 = +13,0 kN
P4 = +0,65 kN / − 2,0 kN
P5 = +11,7 kN
P6 = ± 1,3 kN

[1)] all static loadings include the weight of the car

Bearing loads are transmitted by wall plates with min. 30 cm² surface and to the floor by base plates with min. 350 cm² surface.
Wall and base plates to be fixed by heavy duty anchor bolts to a drilling depth of 10-12 cm. When fixing to the waterproof concrete floors chemical anchors are employed (to be advised by WÖHR).

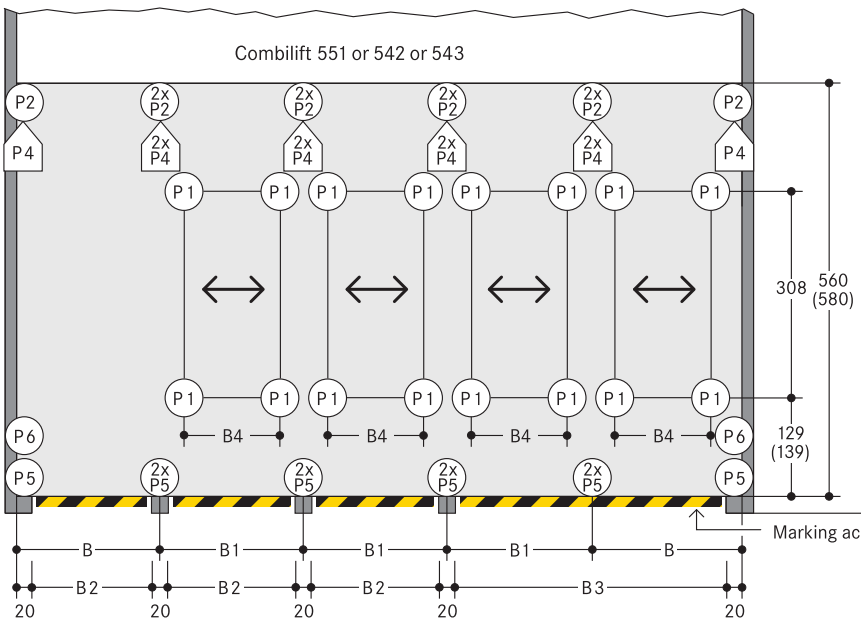
Base plate thickness min. 18 cm. Rear wall and base plate must be formed of concrete and must have a flat surface without protrusions.

Concrete quality according to the static building requirements, however for the dowel fixing concrete quality of min. C20/25 is required.

The specified lengths to the support points are mean values. Please contact WÖHR Agent for exact positions for any variations on the standard units.

Please contact WÖHR Agent for clarify the door widths/widths of columns. Grid width of 270 /280/290 cm must be observed.

Ground plan



The driving aisle width to be compliant with country regulations locally in force.

Space required				gives clear platform width	
B	B1	B2	B3	EG (B4)	OG
280	**270**	**250**	**520**	**227**	**250**
290	**280**	**260**	**540**	**227**	**260**
300	**290**	**270**	**560**	**227**	**270**

Hydraulic power packs

The hydraulic power pack is positioned within the system.

Switch cabinet

The switch cabinet is positioned within the system at the rear wall.

Electrical data

Connections 230/400 V, 50 Hz, 3 phases. Power consumption max. 3.0 kW. Fuse or circuit breaker 3 x 16 A slow blow (according to DIN VDE 0100 part 430) and supply line 3 Ph + N + PE according to local EVU provisions up to the main switch, and connection of the supply line generally performed by the customer.

Grounding and potential equalisation:
- to be performed by the customer compliant to DIN EN 60204
- connections required every 10 metres

General product information

The combilift Type 552 consists of 2 platform rows, one above the other. In front (to the full width) of the installations is a drive way which is situated on the lower platform row (access level). The lower platform row consists of one platform less than the upper level.

In order to access a platform on the upper level, the lower level platforms (access level) shift laterally into the free space. The selected upper platform is now lowered vertically into the free space provided in the access level.

Hotel garage

If used by hotel guests, the installation requires special planning and construction. Please ask for details.

Noise protection

Basis is the German DIN 4109 “Noise protection in buildings”.

With the following conditions required 30 dB (A) in rooms can be provided:

- noise protection package from our accessory
- insulation figure of the construction of min. $R'_W = 57$ dB
- walls which are bordering the parking systems must be done as single wall and deflection resistant with min. m’= 300 kg/m²
- solid ceiling above the parking systems with min. m’= 400 kg/m²

At differing constructional conditions additional sound absorbing measures are to be provided by the customer.

The best results are reached by separated sole plates from the construction.

Increased noise protection:

If increased noise protection must be provided planning has to be confirmed on a project basis by WÖHR.

Temperature

The installation is designed to operate between +5°and +40°C. Atmospheric Humidity: 50% at +40°C. If the local circumstances differ from the above please contact WÖHR.

Numbering of the parking spaces

1. The empty space of the Combilift is always on the left in the entrance level.
2. The numbering is as follows:

UL	1	2	4	6	8
EL		3	5	7	9

3. The numbering for each system starts with 1 as above.
4. Different numbering of parking spaces is possible at a surcharge (software changes are necessary).

Conformity test

All our systems are checked according to EC machinery directive 2006/42/EC and EN 14010.

Illumination

Illumination has to be considered acc. to local requirements by the customer.

Free spaces

Special drawings for free spaces to accommodate air ducts or other pipes can be requested at WÖHR Agent!

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided by the customer acc. to local requirements, height min. 200 cm – this is applicable during the construction phase too.

Maintenance

WÖHR and its foreign partners have an assembly and customer network. Annual maintenance is performed at conclusion of a maintenance contract.

Protection against corrosion

Independent of a maintenance workings has to be carried out acc. to WÖHR Cleaning and Maintenance Instruction regularly.

Clean up galvanized parts and platforms of dirt and road salt as well as other pollution (corrosion danger)!

Pit must always be ventilated and dearated well.

Parking place width

We recommend a clear platform width of at least 250 cm.

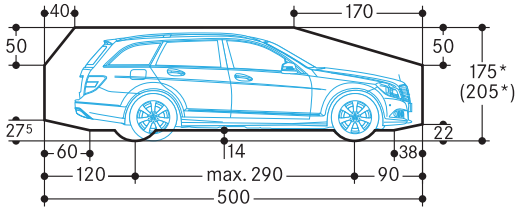
Dimensions

All dimensions shown are minimum. Construction tolerances must be taken into consideration. All dimensions in cm.

Fire safety

Each and every fire safety requirement and all possible mandatory item(s) and equipment(s) (fire extinguishing systems and fire alarm systems, etc.) are to be provided by the customer.

Clearance profile (standard saloon/estate car)



* The total car height includes roof rail and antenna fixture and must not exceed the mentioned max. height dimension.

Note

If doors are planned we recommend installing an empty pipe for cabling to the control panel from the rear. This empty pipe should be 120 cm above ground level in the centre of a column.