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Benchmarking Cost Analysis

Commuter Multi-Storey Parking Report Rev 1

Department of Infrastructure, Transport, Cities and
Regional Development

making the **difference**



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5 Cost Drivers Discussion

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5.1 Design Standards

Car parking facilities in Australia are generally set out in design standards AS 2890. There are a number of variations in the adoption of these standards. These include:

- Definition of class of parking space - Low turnover, commuter car parking spaces are generally slightly smaller than higher turnover shopping spaces. However, the class of space is often a subject of discussions, with an increase in 'mixed use' car parks used for both short and longer term parking.
- State Transport Authorities, City Councils and Local Authorities often have variations in their requirements regarding car parking standards depending on the strategic planning aims and LEP's.

5.2 Car Park Design

There are hundreds of different potential configurations for multi-storey car parks that deliver the same parking solution, but based on different arrangements of decks, ramps, spaces, circulation, entrances and exits. The selection criteria for these are frequently determined in combination of architectural design, traffic modelling, structural and other engineering design considerations ultimately determined by the overall physical and planning constraints of the site. Each of these solutions will need to comply with the approved standards for vehicle dimensions and movement tracking.

In general, the design is usually based around a 'module' of several car parking spaces that can be replicated across the site foot print, bringing a natural 'logic' to the overall layout. Factors that contribute to the decisions on this module will include:

5.2.1 Planning dimensions

A standard planning module for a commuter car parking bay in Australia is 2.4m x 5.4m (AS/NZS 280-9-1 User Class 1). This assumes no overhang of a front kerb or alternatively the use of wheel stops. Typically, this arrangement covers the largest proportion of car parking in Australia. It allows for safe parking for larger cars including standard SUV's (with some care). More frequent use classes such as retail tend to be slightly larger to allow for a wider range of movement into and out of vehicles.

5.2.2 Car parking bay width

The additional space over and above the footprint of the vehicle itself is generally to allow for safe and accessible movement around the vehicle including manoeuvring and door opening. This factor can vary greatly depending on the structural grid, and has a disproportionate impact on the efficiency of car park layouts, as a small infringement will negate a whole parking space.

5.2.3 Aisle width

Efficient car parking designs frequently utilise one way circulation plans, with a 6m aisle suitable for 90 degree parking. This allows sufficient turning space for manoeuvring in and out car parking spaces, and retains sufficient space for safe pedestrian movement. This aisle width can be reduced for angled parking, or increased to allow for dedicated pedestrian walkways.

5.2.4 Ramp dimensions

Circulation is one of the largest challenges in car parking design. A balance needs to be struck between incorporating changes of level into the car park slab, and the use of ramps. Whilst traffic

vehicle tracking might indicate that a minimum ramp width of 3.6m would work, personal preferences of the driver and allowances for driver error usually require for this to be increased. Maximum inclines of 1:5 with grade transitions are set out in Australian Standards, however longer distances may be required to cover floor to ceiling height which leads to curved circulation ramps in some cases (with additional structural requirement). It is worth noting the tight constraints on ramp design will limit any future flexibility and changes in standards, and often result in unpopular car parks.

Pedestrian ramp standards are different to vehicular ones, and therefore tend to be built separately.

5.3 Construction methodology

Typical long span dimensions for a standard planning grid is 16.2m, which allows a 3 car parking space module (7.2m) with space for services and the like on columns. Typical construction is frequently in-situ and precast concrete, most predominately a composite of these. This form of construction creates a level of robustness, simple construction and inherent fire protection.

Steel columns with precast floors are another popular solution, particularly in constrained sites or if speed to site is a priority.

Whilst open ended facades with natural ventilation are usually a preferred solution, in certain circumstances façade treatment is required, usually for specific planning requirements. A new car park constructed near a railway may well be in a secondary CBD area – these are frequently the subject of increase gentrification and improvement as transport infrastructure access rises in value. Local council will frequently require a treatment to the façade to suit the local development LEP.

5.4 Fire regulations and Travel distances

Means of escape distances must comply with the appropriate code requirements. If a car park has a deep floor plate, this may require a fire protected corridor to be constructed on each floor plate. Equally, travel distance from car to destination can vary – over 150m distances reduce the attractiveness of the car park to drivers. Long term success of the car parks is frequently linked to the attractiveness, and security of pedestrian movement.

Open car parks are usually naturally ventilated and do not require sprinklers if below 25m in height and stand-alone buildings. However, any building over 25m in height will require sprinklers throughout, and special circumstances may apply to car park structures adjacent to other buildings or connected by enclosed bridges. This can significantly increase the proportion of mechanical and electrical equipment, plus requiring additional space for pump rooms, storage tanks, emergency fire access etc.

5.5 Security

Manned security can be an expensive solution to providing confidence to users. Increasingly remotely monitored 24 hour CCTV solutions are being incorporated, which can also extend the hours of use. The technology supporting security systems is maturing rapidly, but can also contribute to additional costs. Good urban design also support additional capital costs being invested in quality lighting, reduction in blind spots.

5.6 Other amenity issues

Space requirements for lobbies – waiting areas, circulation, ticket operations, through traffic, space for buggies.

5.7 Other external cost factors

- Demolition and site clearances
- Services diversions

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- Contamination
- External utilities costs
- Public realm works
- Link buildings and bridges
- Highway works to access car parking facilities including traffic management
- Site constraints
- Ground conditions
- Professional fees
- Land acquisition

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